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“HOME ENVIRONMENT CHARACTERISTICS ASSOCIATED WITH OBESITY RISK IN  
PRESCHOOL-AGED CHILDREN AND THEIR PARENTS”

by

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Written under the direction of

Carol Byrd-Bredbenner

And approved by

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## **ABSTRACT OF THE DISSERTATION**

### **“HOME ENVIRONMENT CHARACTERISTICS ASSOCIATED WITH OBESITY RISK IN PRESCHOOL-AGED CHILDREN AND THEIR PARENTS”**

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An increased understanding of factors in the home environment that support or thwart healthy weight status could assist healthcare providers, researchers, parents, and caregivers in creating home environments that support optimal child growth and development. The home environment may be described in numerous ways, including its demographic (e.g., household composition), psychographic (e.g., maternal stress), and behavioral (e.g., sleep duration and physical activity) characteristics, as well as the physical near environment (e.g., home and neighborhood). Thus, the purpose of this study is to comprehensively examine the demographic, psychographic, behavioral, and physical environment characteristics that are associated with weight status in preschool aged children (ages 2 to 5 years) and their mothers.

The main research questions for this study are: 1) describe what are the weight-related characteristics of the home environments (i.e., parental demographic, psychographic, behavioral, and physical environment characteristics) of preschool children?, 2) describe how do weight-related characteristics of home environments differ with the weight status of mothers?, and 3A) examine what intrapersonal, interpersonal, and home environment characteristics were associated with maternal obese vs. non-obese weight status?; 3B) what is the obesity risk of non-obese mothers based on a score derived using the characteristics elucidated in Question 3A?; and 3C) how do non-obese mothers' intrapersonal, interpersonal, and home environmental characteristics differ based on their obesity risk score tertile?

A large, diverse sample of mothers of preschool-aged children (n=550) were recruited to complete an online survey comprised of valid, reliable scales to evaluate the home environment characteristics of families with preschool-aged children and assess the obesity risk of children and mothers.



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## **CHAPTER 1:**

### **INTRODUCTION**

The 2011-2012 data from the National Health and Nutrition Examination Survey (NHANES) indicated that nearly 34.9 percent of U.S. adults are obese.<sup>1</sup> It is no longer debated that obesity and its comorbidities are significantly impacting Americans both in financial and quality of life costs. In 2009, the overall estimated annual medical burden of obesity accounted for approximately 10 percent of all medical spending,<sup>2</sup> totaling \$147 billion. This is substantially higher than the \$78.5 billion estimated cost in 1998.<sup>3</sup> The physical health consequences of obesity are numerous and include effects on the pulmonary, orthopedic, neurological, gastroenterological, endocrine, and cardiovascular systems, as well as causing systemic inflammation, thereby greatly impacting quality of life.<sup>4-7</sup>

Obese children are at immediate risk for health problems, including asthma, cardiovascular problems, diabetes, low-grade inflammation, as well as musculoskeletal injury, sleep apnea, and non-alcoholic fatty liver disease.<sup>6,8-15</sup> In addition to these health consequences, obese children experience increased rates of social stigmatization<sup>16</sup> and depression.<sup>16-20</sup> Obesity in childhood is particularly problematic because obesity status during childhood tracks into adulthood, thereby setting up children for lifelong weight problems.<sup>21-25</sup> The most recent estimates indicate that in 2013-2014, 17 percent of U.S. children and adolescents and approximately 9 percent of children aged 2 to 5 years were obese<sup>26</sup>

The increase in obesity rates in the U.S. likely reflects changes in environmental factors and lifestyle choices related to increased energy intake and inadequate energy expenditure, rather than genetic changes because of the slow rate at which population-wide genetic changes occur.<sup>27-</sup>  
<sup>29</sup> Changes in the environment that have occurred in tandem with the increase in obesity include shifting dietary patterns, which have led to an increase in calorie intake,<sup>30,31</sup> combined with a decline in energy expenditure associated with a sedentary lifestyle.<sup>32</sup>

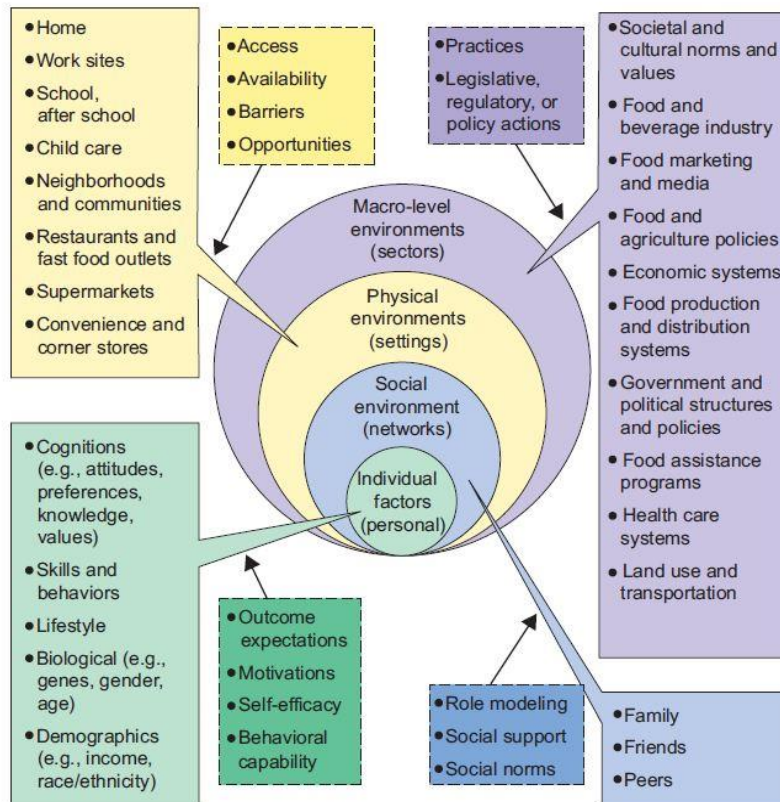
Research has increasingly provided evidence that environmental factors significantly influence diet, physical activity, and obesity in adults<sup>33-35</sup> and children,<sup>36-39</sup> yet the causal relationships for many of these associations remain tenuous.<sup>35,38</sup> Figure 1 graphically describes the many environmental and personal lifestyle choices that affect eating practices,<sup>40</sup> and may be used to describe the various behaviors, including physical activity, that influence weight status. The figure is an effective conceptual representation of the many influencers people face when making weight-related decisions. Macro-level factors have a more indirect (yet important) role in influencing behaviors and include social norms, agriculture policies, economic policies, advertising, and more. Factors that are more directly influenced by an individual include his or her physical and social environments and personal factors (e.g., skills and behaviors).

In recent years, many health behavior change theories have recognized the influence of environmental factors on health outcomes.<sup>41</sup> This ecological approach to public health issues posits that an individual's motivation and skills alone are not adequate to facilitate behavior change; environments and policies also need to support and facilitate the practice of healthful behaviors.<sup>17, 18, 35,38,42</sup> Reciprocal determinism, a construct of Bandura's Social Cognitive Theory, describes how an individual's characteristics and behaviors, as well as the environment within which the behaviors occur, simultaneously and reciprocally affect each other.<sup>43</sup> If environments do not support weight-management behaviors, it is difficult for individuals to engage in behaviors that allow them to avoid unhealthy weight gain. Interventions to prevent overweight and obesity in children under 5 years of age have thus far failed to show an effect in reducing or limiting weight gain,<sup>44</sup> perhaps because little attention has been given to social and environmental factors.<sup>45</sup>

To adequately provide treatment for and prevention of obesity in adults and children, it has become increasingly apparent that the environment must be considered.<sup>46,47</sup> For children and their parents, the prevailing shared environment is the micro level of the home. Parents function

**Figure 1:** “An ecological framework depicting the multiple influences on what people eat.”

Figure developed by Story et al.<sup>40</sup>



as role models and ‘gate keepers’ in the home, strongly influencing food and exercise behaviors of children,<sup>48-55</sup> and establishing practices that may increase or decrease their child’s obesity risk.<sup>17,56</sup> For instance, parents determine which foods are allowed in the home, prepare food, allow and deny certain foods, establish meal patterns, provide snacks, set portion sizes, model eating behaviors, discuss foods, and convey attitudes about foods.<sup>57</sup> Changing the home physical and social environment may help children avoid obesity<sup>45,58,59</sup> in the present, as well as in the future, because the eating and physical activity patterns developed during childhood tend to serve as the basis for later behaviors.<sup>60-64</sup>

Factors within the confines of the home environment that are associated with children’s overweight status include: parental overweight status,<sup>65,66</sup> inadequate sleep duration,<sup>67,68</sup> inadequate daily physical activity,<sup>69-71</sup> irregular family meals,<sup>68,72</sup> consumption of sugar-sweetened beverages,<sup>73-75</sup> limited availability of fruits and vegetables,<sup>76-78</sup> television viewing more than two hours daily,<sup>68,72</sup> negative parental feeding practices,<sup>79</sup> poor parental modeling of behaviors,<sup>48,70</sup> and many others. There are also many emerging factors associated with weight status that warrant increased study, such as maternal depression<sup>47</sup> and child temperament.<sup>80</sup>

Given its potentially great influence on the development of behaviors, the home deserves in-depth study to increase our understanding of its role related to obesity risk in children;<sup>40</sup> however, research focusing on the home environment remains limited.<sup>38,81-83</sup> The studies that do exist tend to focus on a small number of factors within the home environment (mostly parent feeding styles, physical activity availability, access to food, and screen time opportunities<sup>84-87</sup>), leaving out potentially vital variables and limiting the ability to explore interactions among variables. Research also is hampered by a lack of validated and reliable environmental measures,<sup>40,88-90</sup> which are necessary to create an accurate understanding of potential predictors and modifiers of obesity risk in young children and their parents.<sup>83</sup>



An increased understanding of factors in the home environment that support or thwart healthy weight status could assist healthcare providers, researchers, parents, and caregivers in creating home environments that support optimal child growth and development. The home environment may be described in numerous ways, including its demographic (e.g., household composition), psychographic (e.g., maternal stress), and behavioral (e.g., sleep duration and physical activity) characteristics, as well as the physical near environment (e.g., home and neighborhood). Inclusion of the entire family is important for successful health promotion programs<sup>91</sup>, yet mothers tend to be food gatekeepers in the home, and thus able to provide adequate appraisal of the home environments.<sup>92</sup> Thus, the purpose of this study is to comprehensively examine the demographic, psychographic, behavioral, and physical environment characteristics that are associated with weight status in preschool aged children (ages 2 to 5 years) and their mothers. The array of variables to be studied will yield a rich data set that will make it possible to generate numerous hypotheses to test.

**The main research questions to be addressed in this study are:**

1. What are the weight-related characteristics of the home environments (i.e., maternal demographic, psychographic, behavioral, and physical environment characteristics) of preschool children?
2. How do weight-related characteristics of home environments differ with the weight status of mothers?
3. A: What intrapersonal, interpersonal, and home environment characteristics were associated with maternal obese vs. non-obese weight status?  
 B: What is the obesity risk of non-obese mothers based on a score derived using the characteristics elucidated in Question 3A?  
 C: How do non-obese mothers' intrapersonal, interpersonal, and home environmental characteristics differ based on their obesity risk score tertile?

## **CHAPTER 2:**

### **REVIEW OF LITERATURE**

This review of literature is divided into the following main sections: The Physical Environment, Food-Related Aspects of the Home Environment; Sleep Length and Quality, Maternal Psychographics, Child Psychographics, Social Cognitive Theory, and Demographics (including obesity risk factors).

The following sections discuss the research evidence that exists for each topic's relation to obesity (or obesity-related behavior) outcomes, as well as commonly used instruments for measuring each variable. Note that unless otherwise indicated, the measures described are conducted using self-report methods. The aspects of the home environment and behaviors of parents and children described are constructs of the Social Cognitive Theory, which provides a guiding framework for this study.

#### **PHYSICAL ENVIRONMENT: PHYSICAL ACTIVITY, MEDIA, AND FOOD AVAILABILITY AND ACCESSIBILITY**

The home environment, which includes areas both inside and outside the home, may encourage or discourage physical activity, time spent in sedentary activities, and consumption of high energy density foods.<sup>39</sup> Key attributes in the home physical environment related to weight and weight-related behaviors include physical activity equipment accessibility and availability, media equipment accessibility and availability, and food accessibility and availability.<sup>35,86,88,90,93,94</sup> (See Appendix A for summary table of the surveys described below.)

##### **Physical Activity Availability and Accessibility**

Physical activity, independent of sedentary behaviors, contributes to healthier body weights as well as healthier blood pressure, better motor skills, and greater self-confidence in children.<sup>71,95-101</sup> There are multiple ways that environmental attributes in the home can affect

behaviors related to physical activity and sedentary behaviors, including providing opportunities for physical activity, providing cues to (not) engage in activity, and signaling values, support, and modeling of activity by parents or other household members.<sup>102</sup> For instance, having exercise equipment in the home is positively related to physical activity among adolescent girls,<sup>103</sup> and obese sixth graders reported less physical activity home equipment than their non-obese counterparts (although not statistically significant).<sup>104</sup> There is also evidence for children and adolescents that having physical activity equipment in the home alone is inversely related to TV viewing.<sup>102</sup> Of the limited studies available, most focus on adolescents with few studies investigating how the home physical activity environment affects younger children.<sup>48</sup>

Among adults, a recent review found numerous physical environment factors that predicted physical activity in adults. These included having exercise equipment at home, access to recreation facilities, satisfaction with recreational facilities, and community-level influences, such as neighborhood safety, hilly terrain, frequently observing others engaged in physical activity, and having enjoyable scenery.<sup>105</sup>

The amount of physical activity that parents participate in and their attitudes toward activity are correlated with increased activity in their children.<sup>100</sup> Hence, parental activities, such as role modeling and transporting children to activities, play a significant role in the activity of children between the ages of 4 and 12.<sup>106-108</sup>

Many previous home environment assessments have only focused on availability, despite the importance of accessibility.<sup>109</sup> Accessibility may help to promote “ease of use and cueing of behavior”<sup>93</sup> and is thus important as a prompt to engage in specific behaviors (e.g., use available equipment or consume certain foods). A review found that access to facilities and programs was consistently related to children’s physical activity.<sup>100</sup>

The environment immediately surrounding the home in the close neighborhood also may play an important role in determining the extent of physical activity and, thus, body weight. There

is growing evidence that the neighborhood environmental characteristics near the home are also related to physical activity.<sup>110-112</sup> Children that reside in inner city areas engage in significantly less physical activity than suburban children, and their parents express more anxiety about neighborhood safety, which is correlated with their activity levels.<sup>113</sup> There is also evidence that neighborhood patterns such as traffic safety and walkability may affect obesity outcomes<sup>102</sup> and physical activity levels in adolescents.<sup>114-116</sup>

The effect of the neighborhood environment on younger children's obesity and related behaviors, however, is mixed.<sup>48,114</sup> It may be that certain features of the neighborhood and home physical activity environment have a greater impact on activity levels than others, or that interactions between certain features have not yet been identified.<sup>48</sup>

Neighborhood characteristics may also promote or deter adults from engaging in physical activity.<sup>117</sup> A review found not having facilities where one can be active (e.g., recreation centers) to be one of the strongest predictor barriers to physical activity among adults.<sup>118</sup> If a parent is not engaging in an activity, then he/she is not modeling the behavior for his/her children.

**Assessing Home Physical Activity Availability and Accessibility.** The use of ecological models of behavior change in studying physical activity only became prominent in the 1990s, hence the history of physical activity environment measures is relatively brief.<sup>90</sup> To determine how the home environment may affect physical activity behaviors, easy to use, reliable, and valid measures are needed.<sup>102</sup> Adults and children also do physical activity in a variety of locations and participate in different types of activities in these different places.<sup>115</sup> Commonly used measures for evaluating physical activity equipment availability and accessibility in home and neighborhood environments are described below.

The Home Physical Activity Equipment Scale<sup>102</sup> is a 14-item yes/no response checklist that was adapted for use with families with 5- to 11-year-olds from another similar scale created for use with adults.<sup>119</sup> The scale asks about the availability of 14 types of physical activity

equipment in and around the home, including: bikes, basketball hoops, jump rope, sports equipment (e.g., balls, racquets, bats), swimming pool, roller skates, fixed play equipment (e.g., swing set, play house, jungle gym), home aerobic equipment (e.g., treadmill, cycle, cross trainer, stepper, workout video), weight lifting equipment, water or snow equipment, yoga/exercise mats, exercise/play/recreation room, trampoline, and stairs. The scale is scored with one point given for each of the 14 types of equipment, with total possible score ranging from 0 to 14. The scale was validated with parents of 5- to 11-year-olds who used a 2-item scale that assessed youth moderate-to-vigorous physical activity level. (Note: this 2-item scale used to assess validity of the Home Physical Activity Equipment Scale was significantly correlated with accelerometer data [ $r=.40$ ] with adolescents in a previous study,<sup>120</sup> and was modified for the validation study to be answered by parents of children). Test-retest reliability for the equipment scale was generally good (ICC range 0.53 to 0.85), and construct validity indicated that home physical activity equipment was negatively associated with television viewing time ( $\beta = -0.23$ ,  $p < 0.05$ ) and BMI z-score in children ( $\beta = -0.19$ ,  $p = 0.07$ ).<sup>102</sup> No association, however, was noted between home equipment availability and adolescent girls' BMI and percent body fat.<sup>121</sup> Two items (e.g., laptops without Internet and swimming pools), had test-retest reliabilities that were below acceptable and may be removed in future use of the scale.<sup>102</sup> The construct validity was assessed using hierarchical linear regression models, including adjustment for gender, child age, race/ethnicity (white or non-white), household income (more or less than \$50,000 per year), and the number of children in the household. The authors noted that it was important to adjust for household income as this may influence a family's ability to purchase physical activity equipment.<sup>102</sup>

The Neighborhood Environment Walkability Scale-Youth (NEWS-Y)<sup>122</sup> is a 66-item survey, adapted from the original NEWS<sup>123</sup> survey to research the impact of the built environment on physical activity among youth. The NEWS-Y assesses perceptions of parents of 5- to 11-year

old children. NEWS-Y includes nine subscales: land use mix-diversity (20-items; e.g., “how long does it take to walk to the post office”), pedestrian and automobile safety (7-items), crime safety (6-items; e.g., worry about being outside alone because of being taken or hurt by a stranger), neighborhood aesthetics (3-items), walking/cycling facilities (3-items), street connectivity (3-items; e.g., “...there are many different routes for getting from place to place”), land use mix-access (6-items; e.g., “stores are within easy walking distance of my home”), residential density (4-items), recreation facilities (14-items). An overall neighborhood environment score is generated by calculating z-scores for each of the nine subscales and summing them, with higher scores indicating a more walkable environment.<sup>122</sup> The survey was validated against two validated questions that assessed physical activity of the children as reported by the parents (same as the Home Physical Activity Equipment Scale validation above).<sup>120</sup> Test-retest reliability was generally good (ICC range .56-.87; street connectivity was the lowest), and internal consistency was also good (Cronbach alpha range .75-.87). There were no associations between any of the scales and children meeting recommended physical activity levels, indicating that children may be doing more activity in the home or school. There were, however, significant relationships between certain types of physical activity in children and subscales of the survey. These included children more likely to be active in the street if the crime safety score was lower (less perception of crime) and more likely to walk to school if the residential density was higher.<sup>122</sup> Another study used the NEWS-Y in Belgium only found accessibility of walking to be correlated to likelihood of children to actively commute to school.<sup>109</sup>

The International Physical Activity Study Environmental Module<sup>124</sup> (also known as the Physical Activity Neighborhood Environment Survey-PANES) is a 17-item survey that assesses aspects of the neighborhood environment (defined as the area within a 10- to 15-minute walk from home) which previous research has shown to be related to physical activity. The 17 items include questions that assess: types of houses in the area, amount of shops within walking

distance, sidewalk availability, facilities to bicycle to nearby, presence of low-cost recreation facilities, and crime rates. Participants are asked about the type of housing and number of motor vehicles in the home as open-ended questions, and other items are asked using Likert-type scale responses ranging from strongly disagree to strongly agree. Test-retest reliability was evaluated in a sample of adults (n=135) from varied income and ‘walkable’ neighborhoods in Cincinnati, San Diego, and Boston and showed fair to good reliability (ICC ranged from 0.64 for recreation facilities to 0.84 for sidewalks presence).<sup>124</sup> Results from a study of adult activity levels in 11 countries (including the U.S.) residing in cities with at least 30,000 residents found increased physical activity prevalence as measured by the validated and reliable International Physical Activity Questionnaire (IPAQ) to be significantly related to five of the seven environmental variables assessed by the IPS Environmental Module, including: many shops nearby (OR=1.29 [95% CI=1.15, 1.44]); transit stop in neighborhood (OR=1.32 [95% CI=1.16, 1.54]); sidewalks on most streets (OR=1.47 [95% CI=1.32, 1.65]); bicycle facilities (OR=1.21 [95% CI=1.10, 1.33]); and low-cost recreational facilities (OR=1.16 [95% CI=1.05, 1.27]).<sup>124</sup> It should be noted that the survey has not been validated with rural-residing populations or specifically with adults who have children.

The Parental Perceptions of the Neighborhood Environment survey<sup>125</sup> was created to assess parental perceptions about their local environment. The survey includes 7-items which assess parent perceptions of traffic, stranger danger, road safety, crosswalks and crossing streets, sporting venues, and public transportation. The survey was assessed for reliability among parents of 5- to 6-year olds from varied socioeconomic backgrounds in Australia, and showed test-retest reliability was fair to good (ICC range 0.60 to 0.89). It should be noted, however, that few parental beliefs about their environment were related to their children’s walking or bicycling at least 3 times per week. Among girls, parents who owned more than one car and perceived there to be limited public transportation had significantly less odds of walking or cycling.<sup>125</sup>

The Children's Leisure Activities Study (CLASS) Physical Environment, Barriers to Physical Activity, and Rules and Restrictions Scales<sup>126,127</sup> includes three scales that assess factors related to physical activity of parents and their children aged 5- to 6-years-old and 10- to 12-years-old.

- **Physical environment scale:** 48-item environmental audit of the home and yard; sedentary opportunities within the home, and accessibility of public amenities such as shops, schools, and parks within their local communities. Takes approximately 10 minutes to complete.
- **Barriers to physical activity scale:** explores reasons why children do not participate in more activity than they currently do.
- **Rules and restrictions scale:** examines how often parents restrict their children's participation in physical activities, television viewing, and electronic game use and how often these activities are supervised by the parent.

Reliability and validity for another scale that assessed *actual* activity amounts as part of the CLASS survey have been published,<sup>110</sup> but no data on reliability/validity of the 3 scales described here were located. Among the CLASS study parents, over 80 percent said that dangers posed by strangers and roads were barriers to exercise.<sup>126</sup> Contrary to expectations, lack of time to transport child to activities' was not reported by many parents. Parents of younger children who reported having concerns about road safety were more likely to have children in the low physical activity category. Children aged 5- to 6-years whose parents perceived there to be heavy traffic and limited public transport in the local neighborhood were less likely than other children to walk or bicycle at least 3 times per week. Children who had 7 or more physical activity equipment items in the home were 2 to 4 times more likely to be in the highest physical activity category.

The Physical Activity and Media Inventory (PAMI)<sup>93</sup> assesses 50 physical activity equipment items and 5 media equipment items (television, VCR/DVD, digital video recorder, video game system, and computer). The tool was designed to determine both availability and accessibility of equipment and other resources that may affect family participation in active and



sedentary behaviors. Parents are instructed to look for items in all areas of their homes, including storage areas, yards, and garages. A PAMI household density score is calculated for both physical activity and media equipment by dividing the total number of items by the total number of rooms/locations in the home. A higher density score means greater availability of equipment. Accessibility is determined by multiplying each item by an accessibility factor (i.e., 1 = put away to 4 = in plain view and easy to reach). Two summary scores are based on availability and accessibility of the physical activity equipment (Physical Activity Availability and Accessibility Summary Score) and media equipment (Media Availability and Accessibility Summary Score). Higher summary scores reflect greater overall presence in the home (both availability and accessibility). A third summary score, referred to as the Activity-to-Media Ratio Score, is the ratio of the Physical Activity Availability and Accessibility Summary Score to the Media Availability and Accessibility Summary Score. A higher ratio indicates a home is more conducive to being physically active and less to sedentary behaviors. Test-retest reliability with families having at least 1 child between the ages to 10- to 17-years was good (physical activity equipment ICC = 0.76 to 0.99; media equipment ICC = 0.72 to 0.96). Validation was assessed by researcher observation of the home and participant completion of the survey, and showed moderate to strong validity ( $r = 0.67$  to  $0.98$ ). PAMI is currently being used by the IDEA study, but no reported data using the PAMI tool could be located.<sup>128</sup>

The Physical and Nutritional Home Environment Inventory<sup>86</sup> includes 33 items hypothesized to be associated with either children's physical activity or sedentary behavior (called physical home environment items) and 42 items hypothesized to be associated with children's dietary patterns (called nutritional home environment items). The physical home environment characteristics include parental role-modeling, presence of community facilities in close proximity, extra-curricular activities for preschool children, family rules about use of television, and use of labor saving devices. No information could be located regarding the reliability of the

inventory. Findings using the inventory, however, indicate that amount of outdoor play equipment and size of backyard were associated with children having more outdoor play, whereas having fewer rules about TV watching and presence of a PlayStation were associated with more indoor sedentary time.<sup>86</sup>

The 113-item Healthy Home Survey (HHS)<sup>129</sup> assesses components of the home environment that influence healthy weight behaviors in children, including diet and physical activity. The specific domains assessed with regard to physical activity, physical activity environment, physical activity policies, media environment, and media policies. Telephone interviews and home visits of 85 families (mostly middle class, white) with at least one child between the ages of 3 and 8 years in North Carolina were used to establish reliability and validity in a sample. The majority of the domains demonstrated almost perfect agreement between the two phone interviews and between the first phone interview and a home assessment (Kappa statistics varied 0.36 to 0.88, and percent agreement 42 to 98%). The majority of items on the survey had moderate to high reliability, except restrictions on outdoor play. The HHS was shortened to 61 items and used with a sample of Hispanic and African-American caregivers of children enrolled in Head Start.<sup>130</sup> It took them approximately 30 to 45 minutes to complete (was self-administered), is available in English and Spanish, and is written at a 4<sup>th</sup> grade reading level. No further information on its reliability or validity was given.<sup>130</sup> The items that were removed from this version were eliminated because they overlapped with items administered in another Head Start questionnaire.

The Home Environment Survey (HES) was developed to assess the availability, accessibility, parent role modeling and parent practices related to physical activity resources, fruits and vegetables, and sugar-sweetened drinks and snacks.<sup>131</sup> The HES comprises 126-items in 10 scales: 1) physical activity availability, 2) physical activity accessibility, 3) fruit/vegetable availability, 4) fruit/vegetable accessibility, 5) fat/sweet availability, 6) fat/sweet accessibility, 7)

parental role modeling of physical activity, 8) parental role modeling of healthy eating, 9) parental policies to support physical activity, and 10) parental policies to support healthy eating. Parents of overweight and obese children aged 8 to 12 (63% white, 24% Hispanic) completed the HES to validate it with physical activity and dietary consumption questionnaires. The HES overall showed good internal consistency and reliability compared to other similar questionnaires.<sup>132</sup> The constructs that showed the greatest associations with child physical activity were parent role modeling of activity, parental policies to support child physical activity, and the availability of physical activity toys. The constructs most strongly related to healthy child diet were family eating policies, parental role modeling, and the availability/accessibility of foods in the home.<sup>131</sup>

The Neighborhood Environment for Children Rating Scales is an 8-item scale, designed to measure social disorder, adapted from another questionnaire about the neighborhood environment.<sup>133,134</sup> This scale includes questions for adults regarding how often they saw events in their neighborhood such as gang activities, loitering adults, or similar types of activities in their neighborhood. The original scale used a 10-point response scale, and the adapted version uses four Likert-type response options that are given values (1=never, 2=rarely, 3=sometimes, 4=frequently). The mean value of all eight responses is the score of perceived neighborhood safety, with lower scores indicating more perceived safety. The internal reliability of the scale was 0.91 in a large, population-based study of mothers.<sup>133</sup> This study used the scale and found that the prevalence of obesity increased as neighborhood safety was perceived as less safe.<sup>133</sup>

The Project on Human Development in Chicago Neighborhoods (PHDCN): Home and Life Interview<sup>135</sup> is a 136-item survey of variables within the home environment. The scales assess parental warmth and responsiveness, provision of learning activities, parental supervision and monitoring, parental communication skills, routines, and quality of physical environment.<sup>136</sup> The survey was conducted with 2,685 families (17% European American, 34% African American,

and 45% Latin American), randomly selected from 80 neighborhoods and varying in racial/ethnic and socioeconomic composition. After controlling for child and parent demographic factors, positive associations were seen between children's verbal skills and scales in the provision of learning activities domain (Developmental Stimulation, Access to Reading, and Outings/Activities).<sup>136</sup> Only internal reliability was assessed, and most scales were adequately reliable (defined as  $\rho > 0.70$ ).<sup>136</sup>

An in-home validation and reliability study<sup>137</sup> was conducted using adapted and modified items from various surveys described above.<sup>70,86,129,131,133,135,138-140</sup> The questionnaire assesses the availability, accessibility, and frequency of use of space and/or equipment for active play by families with young children. It was modified from existing, validated instruments to shorten it and reduce participant burden and include play equipment examples appropriate for young children.<sup>70,86,129,131,133,135,138-140</sup> It is designed to be completed by parents of young children (ages 2 to 5). Parents were recruited to complete the survey while trained researchers also completed the survey while in the home. Parents were then contacted 2 weeks later to again complete the survey for test-retest reliability. Results are currently pending.

### **Media Availability and Accessibility**

Although there is evidence that watching certain kid-centered television shows can help teach children skills like counting<sup>141-144</sup> and sharing,<sup>145,146</sup> 68 percent<sup>147</sup> view television more than the 2 hours per day limit recommended by the American Academy of Pediatrics for children age 2 years and above.<sup>148</sup> This two-hour limit not only includes television time, but all screen-time for children. Screen-time is defined as time watching television or videos/DVDs, playing video or computer games, and using a computer for purposes other than school work.<sup>148,149</sup> Exposure to too much screen time is associated with the following outcomes in children: shorter attention spans and learning problems,<sup>150-152</sup> aggression and misbehavior,<sup>153-158</sup> sleep problems and feelings

of tiredness,<sup>159-161</sup> consumption of less healthy meals and snacks,<sup>152,162-174</sup> participating in too little physical activity,<sup>155,175-178</sup> and having above-normal weight for age.<sup>87,179,180</sup>

Screen time devoted to watching television, in particular, is positively related to the prevalence of childhood obesity.<sup>181,182</sup> Children with televisions in their bedrooms watch significantly more television (among 5-to 11-year-olds) and have significantly higher BMI z-scores than those who do not have a bedroom TV.<sup>102</sup> Parents who restrict TV watching during meals may have children that spend less time watching TV.<sup>183</sup> Hence, limiting and setting rules about the use of TV in the home and availability of TV in children's bedroom may be an important variable to consider when assessing home environment attributes related to childhood obesity.<sup>102</sup> Assessing measures of media accessibility may have an important effect as one study of 10- to 16-year olds found media accessibility to have a stronger association with energy balance than the number of media-playing items in the home.<sup>128</sup>

**Measures for Assessing Media Availability and Accessibility.** The instruments assessed below are simple, parent-completed surveys that use mostly checklists or Likert-type scales that are applicable to preschool-aged children. Commonly used measures for evaluating media equipment availability and accessibility in home environments are described below.

The Home Electronics Equipment scale<sup>102</sup> is a 21-item survey that uses an open-ended format to record the count of each type of electronic equipment available in the home and their child's bedroom. There are 3 subscales:

- **Electronics available in the home:** 8 items included televisions, VCR/DCD, digital television recorder, music players, desktop computer with Internet, desktop computer without Internet, video game player, and telephone (non-cell phone).
- **Electronics available in the child's bedroom:** 8 items (same items as above)
- **Portable electronics:** 5 items including music players, video game player, laptop with Internet, laptop without Internet, and cell phones.

Responses to each item on the subscales are summed to create subscale scores expressing the total number of electronics in the home, bedroom, and portable electronics. Subscale scores are summed to create an overall home electronics availability score. Test-retest reliabilities with parents of 5- to 11-year-olds for the three subscales were good, ranging from 0.71 to 0.92. The “electronics available in the home” subscale and the number of TVs in the home were positively associated with increased child television viewing time.<sup>102</sup> This scale was adapted by Van Dyck et al to assess the number of televisions and computers in the home in a study of adults (n=419, mean age 48.5 years) in Belgium, and failed to show any association between numbers of hours watching TV and number of televisions and computers in the home.<sup>184</sup>

The Sedentary Opportunities at Home<sup>183</sup> instrument inventories 8 items in the home environment that are related to children’s screen-based behaviors or low levels of activity. The inventory was developed for use with parents of primary school-aged children (mean age 11 years). Seven yes/no items assess whether the household has pay TV (cable), free-to-air TV (regular free channels with an antenna), video/DVD player, electronic games (e.g., PlayStation, Nintendo), computer, Internet access, and a TV in the child’s bedroom. The last item determines the number of TVs in the home. All items had high test-retest reliability (percent agreement, 91% to 99%; Cohen’s Kappa 0.6 to 0.9).<sup>183</sup> Use of this inventory with adolescent girls found a positive association between number of media resources and percent body fat after adjustment for the girls’ age, race/ethnicity, parental education attainment, and family environment measures (three scales that assessed family physical activity environment, family TV use and the family food environment) using linear regression models.<sup>121</sup>

An in-home validation and reliability study<sup>137</sup> was conducted using adapted and modified items from various surveys described above.<sup>70,86,129,131,133,135,138-140</sup> This questionnaire assesses the availability, accessibility, and frequency of use of media promoting sedentary behavior by families with young children. It was modified from existing, validated instruments to shorten it

and reduce participant burden and include examples appropriate for young children.<sup>86,129,131</sup> It is designed to be completed by parents of young children (ages 2 to 5). Parents were recruited to complete the survey while trained researchers also completed the survey while in the home. Parents were then contacted 2 weeks later to again complete the survey for test-retest reliability. Results are currently pending.

### **Physical Activity and Sedentary Behaviors Among Parents and Children**

Among a healthy adult population, obtaining adequate amounts of exercise provides numerous physical and mental-health benefits.<sup>185,186</sup> Physical activity is related to several biological mechanisms that assist in reducing risk of chronic disease and premature death.<sup>186</sup> One such way that risk is improved is through redirected abdominal adiposity and improved weight control.<sup>186</sup> Routine physical activity also is associated with improved psychological well-being which has implications in the management of chronic diseases such as diabetes, hypertension, obesity, and cancer.<sup>186</sup>

Children also benefit from participating in physical activity. Among preschool-aged children, most of their physical activity is in the form of play using gross motor movements and may be called “exercise play” or “activity play.”<sup>187</sup> Adequate physical activity levels in young children are important for physical, cognitive, social and emotional development and skills.<sup>100,187,188,99,189,190</sup>

To benefit from the health promoting benefits of physical activity, children should be active for at least 60 minutes every day in moderate- or vigorous-intensity aerobic physical activity,<sup>191</sup> and adults for at least 150 minutes a week of moderate-intensity or 75 minutes a week of vigorous-intensity aerobic physical activity or an equivalent combination.<sup>192</sup> The amount of time that children spend in sedentary activities is also positively correlated with BMI.<sup>193</sup> The amount of time children spend outdoors has consistently been found to be associated with physical activity in children.<sup>48,100</sup>

A review of 96 studies<sup>48</sup> from 2007 and earlier found father's activity levels may be related to their child's activity, regardless of the child's gender,<sup>194,195</sup> but mothers' activity seems to be more often associated with girls' than boys'.<sup>194</sup> There is also evidence that, among adolescents, parental support may be associated with physical activity levels.<sup>48</sup>

**Measures to Assess Parental and Child Physical Activity, Sedentary Activity, and Parent Modeling.** The International Physical Activity Questionnaire (IPAQ)<sup>196</sup> was designed to be used internationally to obtain comparable estimates of physical activity. It includes a short version (7-items) and long version (27-items). The questionnaire may be scored categorically with 3 levels of physical activity: low, moderate, and high. It may also be scored continuously as MET-min per week. It is available in numerous languages, including English and Spanish. The website where the questionnaire is published gives recommendations for adapting and pilot testing the questionnaire to fit a demographic group.<sup>197</sup> IPAQ has produced repeatable data (Spearman's  $\rho$  clustered around 0.8) in both short and long form, for a 12 country study of population-level physical activity among a diverse group of 18- to 65-year olds.<sup>196</sup> Two studies have used the short form of the IPAQ with children in Brazil (ages 11 to 14 years).<sup>198,199</sup> The questionnaire has been used internationally in over 30 publications and generally shows acceptable validity of levels and patterns of physical activity in adults.<sup>200</sup> A group in Belgium had a large proportion of their sample over-report physical activity with the IPAQ, and as such, recommend instituting a validation protocol prior to using the questionnaire.<sup>201</sup>

The Children's Leisure Activities Study (CLASS) (discussed above) assesses parent's physical activity and sedentary pursuits, children's physical activity, children's sedentary pursuits, and parental perceptions of their child's physical activity scales.<sup>126,127</sup> The CLASS survey was developed to be answered by parents of children aged 5-to-6-years-old and 10-to 12-years-old in Australia. It assesses usual physical activity Monday to Friday and Saturday to Sunday with open-ended responses. Reliability was assessed with intra-class correlation



coefficients and 95% CIs and survey answers were modified to be reported in units of time and were compared to accelerometer data from children. Test-retest reliability ranged from 62% to 94%, showing substantial agreement.<sup>127</sup>

The Physical and Nutritional Home Environment Inventory<sup>86</sup> (previously described in more detail) includes items that assess parental modeling of physical activity. There are 4 questions that assess how frequently mothers and fathers participate in physical activity on their own, and 1 question to assess how often the child walks with the parents to do errands. Results found that the more frequently mothers and fathers' walked >30 minutes per day and the more frequently mothers' participated in organized sports were significantly associated with increased child's physical activity outdoor playtime.<sup>86</sup>

The Parental Measures- Support, Enjoyment and Importance Scales<sup>70,139</sup> was developed to determine correlates of physical activity in children in grades 4 through 12. The four scales assess parents' activity levels, parents' perceived importance of children's physical activity, parental enjoyment of activity, and parental support of their child's physical activity. With these four scales, parents complete answers to the questions, allowing creation of a composite parental score for each variable.<sup>70</sup> Trost et al used these scales in assessing parental attitudes influence on adolescents' physical activity levels. It is worth noting that neither Trost nor Sallis validated the survey for their samples, but Trost did assess test-retest reliability.

- **Parental physical activity:** Items assessing frequency that parents participated in physical activities. (1-week test-retest reliability R=0.78).
- **Parental support for physical activity:** Items assessing weekly frequency parents encouraged, participated with, watched, transported child to physical activity events or told child activity was good for his/her health. (Internal consistency, Cronbach alpha 0.78; 1-week test-retest reliability R=0.81)

- **Importance of physical activity:** Items assessing how important parents felt it was for children to participate in physical activities. (1-week test–retest reliability was  $R=0.67$ )
- **Parental enjoyment of physical activity:** Items assessing how much parent enjoyed physical activity or exercise. (The 1-week test–retest reliability was  $R=0.76$ )
- Parents’ perceived importance of physical activity was not related to their own participation in or enjoyment of physical activity, indicating that supportive parents find physical activity important regardless of how much they participate.<sup>70</sup>

The Parent Support for Physical Activity Scale<sup>202</sup> (above) includes 5-items that assess parental encouragement, participation with child in physical activity, provision of transportation to be physically active, watching child participate in activity, and praise. Frequency of engaging in each of the behaviors during a typical week is rated on a five-point scale with possible response options of: ‘never’; ‘rarely’; ‘sometimes’; ‘most days’; ‘everyday’. The reported Cronbach’s alpha for the Parent Support Scale is 0.78, and test-retest reliability  $r = 0.81$ .<sup>202</sup> The scale was used in a study of diverse children aged 7- to 9-years-old and found that parental support was significantly associated with time that boys (but not girls) spent in moderate- to vigorous-levels of physical activity.<sup>203</sup>

The National Survey of Children’s Health<sup>204</sup> includes 1-item for parents to answer about the total hours of television their child watches daily.

### **Food Availability and Accessibility**

Foods that are available in the home are a key influencer of food intake.<sup>89</sup> A study that assessed home food intake in the 1990s indicated that Americans consume about 68% of their total calories from foods prepared within the home.<sup>205</sup> Other data show that in the United States, the home environment provides between 72 and 93 percent of the food, by weight, eaten by individuals.<sup>206,207</sup> There is evidence that the home food environment is an important influence on

weight-related food intake behaviors, with differences existing between households with and without overweight family members.<sup>208</sup>

Fruits and vegetables are frequently cited as a target of dietary improvement in interventions for children and adults<sup>209-212</sup> because adequate intakes reduce risk for chronic diseases in adults<sup>213-221</sup> and they are helpful in weight control.<sup>76</sup> Children are more likely to eat fruits and vegetables when they are available<sup>78,222-224</sup> and are in accessible locations (i.e., easy for the child to reach) and accessible sizes (e.g., apple wedges, carrot sticks).<sup>222</sup> A recent review of 98 quantitative studies concluded that high availability and accessibility of fruits and vegetables at home was associated with high intake of fruits and vegetables among children.<sup>225</sup> The availability of fruits and vegetables in the home also is a major factor that may affect the outcomes of a school-based intervention or other interventions to increase intake in children and adults.<sup>78,226</sup>

The excess consumption of sugar-sweetened beverages (SSB) such as soft drinks is associated with increased energy intake and body weight.<sup>75,227,228</sup> Children aged 3- to 5-years old who drink more SSB also have reduced milk and calcium intakes.<sup>229</sup> Sugar sweetened beverages include soft drinks, juice drinks, sports drinks, and sweetened teas. Availability of soft drinks in the home also has been strongly associated with soft drink consumption among children.<sup>230</sup> A home-based study that delivered non-caloric beverages to displace sugar sweetened among adolescents significantly decreased SSBs and decreased BMI of adolescents in the highest BMI tertile,<sup>231</sup> demonstrating the importance of limiting SSBs in the home.

**Measures to Assess Home Food Availability and Accessibility.** The growing acknowledgement that the home food environment influences food intake and weight has led to the development of several instruments to assess food availability in the home.<sup>232,233</sup> However, the availability and accessibility of most other foods in the home, with the exception of sugar sweetened beverages and fruits and vegetables, have received limited attention and requires

further assessment to determine their role in health outcomes and usefulness in assessing the effectiveness of nutrition education interventions.<sup>226,232</sup>

The Home Shelf Inventory<sup>234</sup> was created to assess the impact of a community nutrition intervention for cancer prevention, but has been adapted for use in studies of teens<sup>235</sup> and food security.<sup>236</sup> Participants indicate which of 80 foods in 12 categories are available in their home using a yes/no checklist. The checklist included only “relatively perishable foods” likely purchased in the past two months, and canned foods were not included, nor were frozen foods other than frozen vegetables, strawberries, blueberries, and meats. A comparison of this inventory with a short food frequency questionnaire (FFQ) with middle class, white adults revealed that the inventory had relatively good reliability with percent agreements between the inventory and FFQ for all foods at 74% (ranging from 58% for baked desserts to 84% for breads).<sup>234</sup> The overall inventory sensitivity was 0.86-0.87 and specificity was 0.92-0.90 in two validation studies.<sup>234</sup>

A condensed version (i.e., 43 items) used in the Teens Eating for Energy and Nutrition at School (TEENS) study<sup>235</sup> used the Home Shelf Inventory as a measure of their intervention effectiveness. While the study found parents of teens in the intervention group made healthier grocery shopping choices compared to control parents, no effect of the intervention was seen using the Home Shelf Inventory.<sup>235</sup> Another study used a combination of the Home Shelf Inventory and another food inventory to assess relationships of hunger and food insecurity to food availability in rural mothers aged 15 to 40 years, demonstrating the Inventory’s utility with a low income sample.<sup>236</sup>

The Home Food Inventory (HFI)<sup>233</sup> assesses the availability of 13 major food categories (dairy, vegetables, meat and other nondairy protein, fruits, added fat, frozen desserts, prepared desserts, savory snacks, microwavable/quick-cook foods, bread, dry breakfast cereal, candy, beverages) and two categories assessing kitchen and refrigerator accessibility. Within each category, there are different types of foods (i.e., dairy includes cheese, milk, yogurt, other dairy)

as well as space to answer if each item is regular or reduced fat (a description of what a label will say to know if reduced fat is provided) or high or low sugar (for beverages and cereals). There are 71 total items that are assessed using a yes/no checklist type format to answer if food items are available, and has a space to check if fruit, vegetable, and bread items were fresh, frozen, dried, or canned. The number of yes responses to regular-fat, regular sugar and the score of foods deemed unhealthy that are easily accessible in the kitchen and refrigerator are totaled to provide a “obesogenic food availability” score, with a higher score representing greater availability of ‘obesity-promoting’ foods. The obesogenic home food availability score potential range is from 0-71. The inventory takes approximately 30-45 minutes to complete, according to the authors, depending on the amount of food in the home.<sup>233</sup>

The HFI was tested for reliability and validity with two samples. One sample included adults who completed the HFI (n=51), and another sample of families with at least 1 child aged 10- to 17- years (n=342) completed the HFI and a dietary history questionnaire (food frequency questionnaire developed by the National Cancer Institute)<sup>237</sup> and diet recalls for validation. Kappa statistics for all major food categories and two categories assessing kitchen and refrigerator accessibility ranged from 0.61 to 0.83, indicating substantial agreement. Sensitivity ranged from 0.69 to 0.89, and specificity ranged from 0.86 to 0.95. Spearman correlations between researchers and participant food category scores ranged from 0.71 to 0.97. Construct validity showed that all of the HFI major food categories significantly and positively correlated with food category intakes among parents answering the HFI and the diet history questionnaire.<sup>237</sup> The obesogenic home availability score is also significantly and positively associated with increased parent and adolescent energy intake.<sup>233</sup>

The HFI is currently being used in the Healthy Home Offerings via the Mealtime Environment (HOME) study involving English-speaking parents of 8- to 10- year olds<sup>238</sup> and a pilot test found that the HFI was easy for parents to complete and assess home food availability.

Another study currently using the HFI as a measure is the Identifying Determinants of Eating and Activity (IDEA) study which includes adolescents aged 10- to 16-years old and a parent from the Minneapolis region which was over 93 percent white and well-educated.<sup>128</sup>

The Meal Screener<sup>239</sup> contains 2 scales that assess the types of foods served at meals in the home setting and generates home meal food quality scores.

1. **Five Food Group Score:** assesses foods offered at meals from these food groups:

meat/protein, milk, vegetable, fruit, and grains.

2. **Healthfulness Score:** assesses the relative healthfulness of foods based on types offered, preparation method, and added fats.

The screener includes an open-ended area for parents to write the foods served at the evening meal (with examples provided regarding what is included, e.g., main course, side dishes, etc.). Then participants are asked specific questions regarding the food categories (meat or protein, bread or cereal, starches other than bread, salad, vegetables other than potato, fruit, dessert, beverages) with a checklist yes/no format if served. The participant is then prompted to another checklist within each food group listing types of foods within the group using a yes/no checklist (e.g., apples, avocado, banana, in fruits group) and a yes/no checklist for preparation options (e.g., baked, fried) and added fats (e.g., butter, sauce). One point is awarded for serving at least one food in each of the main food groups and one point is given for foods prepared with a healthy method (e.g., baking) and a point is subtracted if a high-calorie sauce was added. The screener typically took 5 to 15 minutes to complete, depending on the number of ingredients in the meal.

<sup>239</sup> Validation of the screener was conducted with parents of children between the ages of 8- and 18-years who were mostly white and had a college education.<sup>239</sup> Kappa statistics (criterion validity) between participant and researcher assessments of the Five Food Group averaged 0.74 to 0.87. Average Kappa values for method of preparation ranged from 0.53 to 0.77 and values for added fats ranged from 0.59 to 0.81. This meal-screening tool has high validity for use in

assessing types of foods served at home meals.<sup>239</sup> This tool has not been used in other projects or with other populations given its relatively recent publication (i.e., 2012).

The Physical and Nutritional Home Environment Inventory<sup>86</sup> includes 42 items hypothesized to be associated with children's dietary patterns (called nutritional home environment items). The nutritional home environment characteristics include parental food providing behaviors, number of snacks per day, use of food as a reward, encouraging eating, and restricting access to foods. The nutritional home environment scale did not include measures of food inventories and instead focused on feeding behaviors of parents with their children. No information could be located regarding the reliability of the inventory. Pilot testing of the inventory found a strong positive association between the amount of fruit and vegetables available in the home, and higher fruit and vegetable intakes. However, having greater amounts of fruit juice kept in the home was associated with lower fruit and vegetable intake. There was also a positive association between children's fruit and vegetable intake and certain parental behaviors, including: larger overall size of mealtime portions served, less acceptance of wasted food, less reminders to 'eat up', less use of food rewards and incentives, not allowing the child to eat in front of the TV, and more frequent restriction of 'extra' foods such as juices and second helpings.<sup>86</sup>

As described previously (page 8) in the section "Assessing Home Physical Activity Availability and Accessibility", the Healthy Home Survey (HHS)<sup>129</sup> assesses components of the home environment that influence healthy weight behaviors in children, including 40-items assessing food availability, eating environment, and policies. Reliability and validity showed the majority of the domains demonstrated almost perfect agreement two phone assessments and a home assessment (Kappa statistics varied 0.36 to 0.88, and percent agreement 42 to 98%).<sup>129</sup> The majority of items on the survey had moderate to high reliability, except for lower scores noted on

the variety and quantity of fresh fruit, fruit in view, seconds policy, set meal times, and parent eats healthy.<sup>129</sup>

A new questionnaire that assesses food items available and accessible in the home was created for the HomeStyles creating healthy home environments project.<sup>240</sup> The purpose of this survey is to describe the types of foods available in homes (i.e., fruits, vegetables, high fat foods, salty and sweet snacks, sugar sweetened beverages, and breakfast cereals). Another purpose is to determine how easy it is for young children to access these foods in their homes. It was modified from the Block Fruit-Vegetable-Fiber Screener,<sup>131,241</sup> Block Dietary Fat Screener,<sup>131,241</sup> the Block Kids' Screener,<sup>242</sup> a fast food/beverage screener,<sup>243</sup> and a survey for college-students (by West et al)<sup>244</sup> to assess household food inventories. This questionnaire used the screeners as a basis for assessing availability of fruits, vegetables, vitamin C, dietary fiber, total fat, saturated fat, and cholesterol in household food supplies. It also allows for estimated servings of beverages, calories and sugar from beverages, and servings of typical breakfast foods available in the home. It is also designed to assess how easy it is for children to access food items, and for parent policies related to food accessibility and choice for snacks.<sup>240</sup>

## **FEEDING-RELATED ASPECTS OF THE HOME ENVIRONMENT**

The home is where parents teach children, intentionally or unintentionally, the most about food and eating. For instance, parents teach young children about food by providing certain foods and not others, deciding when and how much food to eat, establishing the contexts in which eating will occur, and engaging in practices to promote or discourage eating.<sup>57,245</sup> A recent position statement by the American Heart Association calls for more research to further understand the mechanisms influencing children's weight-related behaviors.<sup>46</sup> The food related-aspects of the home environment may include parenting styles and practices related to feeding, parent modeling of healthy food behaviors, parent concern about weight, family mealtime



frequency and environment, and meal preparation and planning responsibilities and barriers. (See Appendix A for summary table of the surveys described below.)

### **Parent Feeding Styles and Practices**

The dynamics of the parent-child dyad are important elements affecting childhood weight status and must be addressed from a bi-directional perspective.<sup>246</sup> Ventura and Birch have provided a conceptual mediation model of the influence of parents' practices and styles and child eating and weight (Figure 2).<sup>245</sup> The model identifies 3 bi-directional pathways, emphasizing that parents not only influence child behaviors and weight, but child behaviors and weight in turn influence parenting.

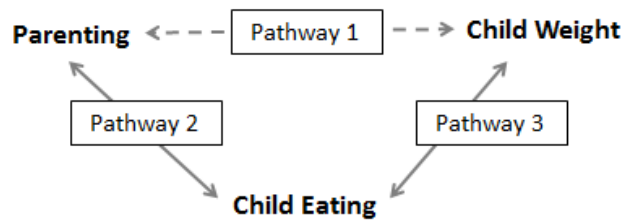
Parenting style is an overall philosophy about how children should be raised and goals parents have for their children.<sup>57,245,247</sup> Parenting style reflects parental attitudes and beliefs that create the broad emotional climate for parent-child interactions.<sup>247-250</sup> Parenting style classifications are based on parental responsiveness and demandingness.<sup>251-253</sup> Responsiveness is also conceptualized as parental warmth or supportiveness,<sup>254</sup> and refers to “the extent to which parents intentionally foster individuality, self-regulation, and self-assertion by being attuned, supportive, and acquiescent to children’s special needs and demands.”<sup>252</sup> Demandingness is also conceptualized as behavioral control,<sup>254</sup> and refers to “the claims parents make on children to become integrated into the family (as a) whole, by their maturity demands, supervision, disciplinary efforts, and willingness to confront the child who disobeys.”<sup>252</sup> Parents may be categorized according to whether they are high or low on their demandingness and responsiveness creates four parenting styles: indulgent/permissive, authoritarian, authoritative, and uninvolved.<sup>253</sup> Each of these styles reflects a different and naturally occurring pattern of parental values, practices, and behaviors.<sup>252</sup> These parenting styles have been adapted to address specific feeding behaviors or strategies that a parent uses to influence food intake in his/her child, including pressure to eat, restriction, monitoring/controlling child’s food intake, and

the use of rewards.<sup>247</sup> Parent behaviors surrounding feeding of their child also include the amount of foods served to the children, as well as the actual foods that are available, accessible, and consumed within the home. It is important to note that a parent may fall into a style with regard to feeding, however, she or he may not necessarily have the same style across other parenting domains.<sup>57</sup> Regarding feeding styles, the parenting styles as defined by Baumrind<sup>252</sup> and Maccoby and Martin,<sup>253</sup> are:<sup>247,255</sup>

- Authoritarian: low responsiveness and high demandingness. Mealtimes focus on disciplinary encounters rather than harmonious interactions. Specific strategies authoritarian parents used to influence child dietary intake are pressuring children to eat and controlling feeding practices.<sup>247,256</sup>
- Authoritative: high responsiveness and high demandingness. High expectations of the child's diet and eating behavior, usually combined with parental modeling, communication, negotiation, and a warm emotional feeding interaction.
- Indulgent/Permissive: high responsiveness and low demandingness. Lax, lacking rules or expectations about the quality or quantity of diet, with limits on consumption only being those of availability (may be indulgent or neglecting).
- Uninvolved: low responsiveness, low demandingness. Tend to use fewer child-centered parenting techniques such as child determining amount of food to eat and generally uses more physical punishment.<sup>257</sup>

Authoritative parent feeding has been generally shown to be the most positively associated (and Authoritarian the most negatively) with availability and intake of fruits and vegetables in the homes of with preschoolers (from low-income families)<sup>258</sup> and adolescents.<sup>259</sup> Compared to Authoritarian parents, Indulgent/Permissive and Uninvolved low-income parents have children with the lowest intake of fruits and vegetables and less optimal eating behaviors,<sup>84,260</sup> and these

**Figure 2:** A conceptual mediation model for the influence of parenting and feeding practices and styles on children's eating behavior, dietary preferences, intake and subsequent weight status.  
Figure 2 created by Ventura et al.<sup>245</sup>



parents also engage in less monitoring of children's unhealthy food intake.<sup>256</sup> Evidence from diverse groups of families has shown that young children with Indulgent/Permissive parents are most likely to have a higher weight status.<sup>257,261,262</sup> The four feeding styles also display ethnic variability, with an Indulgent/Permissive feeding style being more common in Hispanic and East Asian parents and Uninvolved style more typical of African American parents.<sup>257,263</sup> It is also important to note, however, that many studies have shown parental feeding practices are mediated by the child or parent weight status.

Although individual studies show some evidence that parenting styles affect child weight status and eating behaviors, a recent review indicated that the evidence overall is mixed.<sup>248,264</sup> Discrepancies in the data may be a result of the need to better conceptualize parenting styles, or the interplay of specific parental feeding practices and child eating temperaments (discussed later). Another review of parent feeding styles and child outcomes reported that studies that measured parental feeding restriction, as opposed to general feeding control or another feeding domain, were more likely to report positive associations with child eating and weight status.<sup>265</sup> Hence, there is a need to include other measures of parent feeding behaviors and practices.

Parental concern about their children's weight, as well as pressure and restriction put on eating has also been associated with child eating and weight outcomes. Parents who put more pressure on their young child to eat have children who eat fewer fruits and vegetables (and the parents also have lower vegetable intake).<sup>85,266</sup> This has been verified in experimental research that using pressure to eat certain foods is associated with a lower consumption of those pressured food items.<sup>267</sup> Yet, several studies have shown that mothers who pressure their children to eat tend to have leaner children.<sup>268-270</sup> It is also possible that mothers pressure their thinner children to eat more, and are more concerned about heavier children, as shown by results that mothers reported significantly greater weight concern and reduced pressure to eat towards heavier than thinner children within families.<sup>271</sup> Parental pressure to eat and concern for child's weight

explained 15% of the variance in total fat mass in African American and white boys and girls (mean age 11).<sup>268</sup> Parental use of feeding restriction may also influence child overweight.<sup>272</sup> A review of parental feeding and child outcomes found that parental feeding restriction, but no other feeding domain, was associated with increased child weight status.<sup>265</sup>

There is evidence that parents who use inappropriate feeding practices may decrease a child's preference for fruits and vegetables, and children have increased consumption if their parents encouraged them or rewarded them for taking a bite of all food items on their plate.<sup>273</sup> Birch found that parental practices such as restricting foods, pressuring children to eat, or using foods as rewards may inadvertently promote behaviors counter to their intentions.<sup>274</sup>

Parental feeding practices may also be assessed using measures of the amount of control a parent has over their child's eating. There is some evidence that control is associated with lower BMI in children,<sup>275</sup> and higher intakes of healthy snack foods.<sup>276</sup> Other evidence shows that parental control in general may have no impact in some populations,<sup>277</sup> indicating a need to assess different types of control. Some investigators argue that imposing too much control over a child's food intake interferes with his/her ability to establish internal food regulation cues,<sup>278</sup> yet others state that more control may be more beneficial to prevent obesity.<sup>275</sup> Ogden and Reynolds et al<sup>279</sup> examined the difference between overt control (can be detected by the child), and covert control (cannot be detected by the child). Covert control, in which the parent secretly limits their child's availability to junk foods by avoiding certain environments or by moderating how much of these foods are eaten, may be a beneficial form of control,<sup>280</sup> as it is associated with decreased intake of unhealthy snacks compared to parents who used overt control.<sup>279</sup>

Greater maternal control has been associated with higher BMI in the children of obese mothers, yet showed no significant association with child BMI in children of non-obese mothers.<sup>270</sup> Other research, however, has found no difference between obese versus non-obese mothers to deal with emotional distress, using food as a reward, or encouraging a child to eat

more than he/she wanted to.<sup>275</sup> Parents of children perceived as heavier are more likely to use covert control, while those of a higher socioeconomic status (SES) were more likely to use overt control of snack food intake.<sup>279</sup> This indicates that parents may use different types of control based on different types of food intakes.<sup>279</sup>

**Instruments for Assessing Parenting Feeding Style and Practices.** Parental influence on child dietary practices may be classified and analyzed at several levels of parenting practices or style measures, but there is little agreement regarding how the influence of parenting should be measured.<sup>264</sup> Most weight-related parenting practices are assessed via self-report questionnaires,<sup>38,248-251,281,282</sup> with few observational studies with younger children.<sup>281,282</sup> The cost of performing observational studies often limits researchers, thus resulting in the need for parental self-report questionnaires to assess parental feeding styles. A recent systematic review yielded 56 unique instruments to measure parenting food practices.<sup>283</sup> Numerous instruments measure food parenting, yet several decades of their use has failed to yield a clear picture of optimal food parenting, or specific guidelines for parents to follow.<sup>57,247</sup> Consensus on the various types of parental influence on child eating behaviors is emerging to promote cohesive use of terminology and measurements. The most commonly used methods to assess parenting feeding styles and specific feeding behaviors are discussed below.

The Caregiver's Feeding Style Questionnaire (CFSQ)<sup>255,257</sup> assesses parental demandingness and responsiveness to feeding practices and categorizes a parent's feeding style as Authoritarian, Authoritative, Indulgent, or Uninvolved. The instrument is a 19-item, Likert-type, self-report survey. The dimensions of demandingness and responsiveness are derived through 7 child-centered (promote child autonomy such as reasoning, complimenting, helping child to eat) and 12 parent-centered feeding directives (attempt to control children's eating through external pressure such as demands, threats, and reward contingencies). The CFSQ has been validated with white, black, and Hispanic families and is available in Spanish. Test-retest reliability for the

items has been established as very good (0.82 and 0.85 for child- and parent-centered directives), and convergent validity has been established through associations with other validated measures of parenting (Parenting Dimensions Inventory PDI-S<sup>284</sup>, and aspects of parental control in feeding in the Child Feeding Questionnaire CFQ<sup>285</sup>). Construct validity evidence includes results that parents with indulgent/permissive feeding style were more likely to have overweight children compared to authoritarian parents.<sup>257</sup> It should be noted that in studies using the CFSQ, some parents score near cut-off points for a certain feeding style, indicating that a style is less distinct in that parent.<sup>255</sup> Researchers have encouraged the potential use of continuous measures based on this instrument to examine differences between parents who have a distinct feeding style and those who fall on the border of two styles.<sup>255</sup>

The Child Feeding Questionnaire (CFQ)<sup>285</sup> is a 31-item self-report, Likert-type survey to assess parental beliefs, attitudes and practices regarding child feeding and parents' perceptions and concerns regarding obesity in their children. The CFQ also may be used to assess inappropriate child feeding practices.<sup>85,273,286</sup> The concept underlying this survey is that parents do not have a single, consistent parenting style, but that parenting styles differ within parents, and across domains of child development and children in the same family.<sup>277</sup> The hypothesis is that high levels of parental control imposed in feeding may impede the development of children's self-control based on responsiveness to hunger and satiety cues, thereby increasing their risk of obesity.<sup>277</sup> The CFQ includes 7-subscales that explore parental attitudes and behaviors around child feeding. These sub-scales may be analyzed to characterize parents into one of four feeding styles (authoritative, authoritarian, indulgent/permissive, uninvolved), or to assess other feeding behaviors (pressure, control, restriction). Below is a brief description of the subscales:

- Responsibility: 3-items measuring how responsible the parent feels for feeding his/her child, determining portion sizes, and providing a healthy diet.
- Parent's perception of his/her own weight: 4-items assessing the parent's own weight during his/her childhood, adolescence, 20s, and at present.
- Parent's perception about child's weight: 6-items assessing parent's perception of child weight during the child's first year of life, between age 1 and 2, between age 3 and 5, kindergarten through 2<sup>nd</sup> grade, 3<sup>rd</sup> through 5<sup>th</sup> grade, and 6<sup>th</sup> through 8<sup>th</sup> grade.
- Parental concern about his/her child's weight: 3-items to assess the degree to which the parent is concerned that her child is or will become overweight and be forced to diet.
- Food restriction: This is an 8-item scale that measures the mother's attempts to control her child's eating by restricting access to palatable foods. It concerns the restriction of both the type and amount of food.
- Parental pressure on child to eat: 4-items that measure the degree to which the mother encourages the child to eat by using behaviors such as insisting that the child eat everything on his or her plate.
- Parental monitoring of child's diet: 3-items that assess the degree to which a mother keeps track of her child's consumption of sweets, snack foods, and high-fat foods.
- The survey has been used with parents of 2- to- 11-year old children and with white, black, Hispanic, Japanese, Australian, and Hmong parents.<sup>268,269,271,280,285,287-290</sup> Ethnic and cultural differences have emerged when using the CFQ to assess parental behaviors and attitudes surrounding child feeding, as African American mothers report higher levels of monitoring, feelings of responsibility, restrictive practices, pressure to eat, and concern for child's weight compared to white mothers.<sup>268</sup>

The CFQ survey in full, shows that the 7-subscale model fits the data well for white samples of parents/children.<sup>285</sup> A Hispanic sample required modification (dropping of 2 items



from Pressure to Eat and 2 items from Restriction) for good fit.<sup>285</sup> Another study of 3- to 5-year old Hispanic and African American parents and their children used an adapted CFQ with 5 subscales (dropped the perceived parent weight and perceived child weight subscales) and fitted the model completely at the item level rather than parceling the items.<sup>289</sup> Other groups have used subscales of the CFQ for various purposes. A survey of low-income African American mothers of preschool-aged children used the parental restriction of child's eating and parental pressure on child to eat subscales as they focused more on behaviors rather than attitudes and have been found to be related to maternal or child weight specifically.<sup>270</sup> Other work has used the perceived child weight subscale to assess relationships with parental perceptions of their child weight and health outcomes.<sup>291</sup> The CFQ is generally the most widely used and studied/validated survey of parental feeding practices.<sup>265,292</sup>

The Parental Feeding Style Questionnaire (PFSQ)<sup>275</sup> is a Likert-type parental self-report questionnaire to assess parental feeding style. The final questionnaire contains 25-items with four scales:

- Emotional feeding: e.g., I give my child something to eat to make him feel better when he is upset.
- Instrumental feeding: e.g., I reward my child with something to eat when she is well-behaved.
- Prompting and encouragement to eat: e.g., I praise my child if she eats what I give her.
- Control over eating: e.g., I decide how many snacks my child should have.

Scale scores are obtained by calculating the means of the items comprising each scale. The questionnaire was tested with normal and obese parents of children (mean age 4.4 years), taken from a sample of U.K. residents with diverse education and occupations participating in the Twins Early Development Study (TEDS).<sup>293</sup> The questionnaire showed good internal reliability coefficients (Cronbach alpha ranging from 0.65 to 0.85 for each sub scale) and good test-retest reliability (Pearson correlations ranging from 0.76 to 0.83).<sup>275</sup> Use of the PFSQ has shown that

obese mothers of children in the TEDS were no more likely than normal-weight mothers to offer food to deal with emotional distress, use food as a reward, or encourage children to eat more than he/she wanted to.<sup>275</sup> There was, however, no association between parental feeding and child weight status.<sup>275</sup> The questionnaire also has been tested in low-income African American families.<sup>270</sup> The PFSQ does not appear to be widely used in its full form in the literature. One study used the 10 questions from the control subscale, and found that among a low-income African American sample, maternal control was positively associated with preschool child's BMI z-score for obese mothers but not non-obese mothers.<sup>270</sup>

The Feeding Demands Questionnaire (FEEDS)<sup>294</sup> is an 8-item questionnaire designed to measure the extent to which parents endorse demand or control cognitions around feeding with their children, and assesses 3 underlying factors of parental feeding: anger/frustration, food amount demandingness, and food type demandingness. Parental beliefs around what they demand their child to do when eating (i.e., "my child must eat what I serve") may inspire certain feeding practices they do with their children. No other instruments could be located to assess parental beliefs surrounding children complying with parental rules for eating, which may be important to understand restrictive feeding practices.<sup>294</sup> The instrument was written at a 4.8th grade level, making it possible to be administered to adults from diverse educational backgrounds. The instrument was validated with a sample of parents of 3- to 7-year old children (from diverse backgrounds) and showed acceptable internal consistency ( $\alpha$  ranging from .70 to .86). The item was validated using the CFQ,<sup>257</sup> the 10-item Fear of Fat Scale<sup>295</sup> (to measure attitudes towards being overweight), and a Depression Inventory<sup>296</sup> (The Center for Epidemiological Centers of Depression Inventory). Convergent validity showed mothers with higher FEEDS scores were more likely to pressure children to eat and to monitor child fat intake ( $P < 0.01$ ). Mothers with higher scores on the food amount demandingness subscale were more likely to restrict child eating, pressure children to eat, and monitor child fat intake. Mothers with

higher scores on the food type demandingness subscale were more likely to monitor child fat intake. Discriminant validity showed that FEEDS total and subscale scores were not significantly associated with mother's fear of fat or depression.<sup>294</sup>

A study that used the FEEDS questionnaire found that the amount demandingness and type demandingness subscale scores were significantly different among East Asian, African American, and other races/ethnicities of parents. African American parents had significantly higher mean scores on the amount demandingness subscale and type demandingness subscales compared to other parents, indicating they placed more demands on their young children for the type and amount of food to consume.<sup>263</sup>

A survey that assesses Overt and Covert Parental Feeding Practices<sup>279</sup> was developed to expand conceptualization of parental control of feeding. The survey assesses parental "overt" control of feeding as 'controlling a child's food intake in a way that can be detected by the child' and "covert" control as 'controlling a child's food intake in a way that cannot be detected by the child.' The 10-item survey includes 5-items assessing overt control and 5-items assessing covert control. The survey reliability was tested with parents (92.8% mothers) of 4- to 11-year old school children in England that were mostly white and middle class. Factor loading results showed that the "covert" control items all loaded onto factor 1, indicating covert control could be assessed with one question instead of five (e.g., "how often do you avoid having snack foods such as sweets and crisps in the house?") (5 items for covert control Cronbach alpha=0.79). Four of the overt control items loaded onto factor 2, and the 5<sup>th</sup> did not load satisfactorily, indicating that it should be removed from the scale (four items for overt control Cronbach alpha=0.71).<sup>279</sup> The results also indicate that parents with lower BMI and who perceive their children as heavier are more likely to use covert control than those with higher BMIs or who do not perceive their children as heavier,<sup>279</sup> which was also confirmed in a study using a similar demographic group of parents of 4- to 7-year-olds.<sup>297</sup> Parents from higher SES also are more likely to use overt control.

<sup>279</sup> Among the study of 4- to 11-year olds, children whose parents used covert control were more likely to consume less healthy snacks,<sup>279</sup> yet no relationship between the overt or covert control practices are associated with child BMI.<sup>297</sup>

**Measures of Maternal Concern About Weight.** Evidence suggests that parents who feel their child's weight is a health problem are more likely to make changes than those who do not think it is a problem.<sup>298</sup> Many parents do not consult growth charts to determine if a child is overweight, instead relying on physicians or signs of inactivity or teasing of their child.<sup>299,300</sup> Many mothers also believe that their children will eventually shed excess weight as they age,<sup>300</sup> and that excess weight as a baby or young child is not a problem. A study found that 37% of parents (69% Hispanic and African American) agreed that "a chubby baby is a healthy baby."<sup>301</sup> Assessment of parent and maternal concern about weight and healthfulness of weight status may influence feeding practices.

The Child Feeding Questionnaire (CFQ)<sup>285</sup> includes 3 items that may be used to measure the degree to which a parent is concerned that his/her child is or will become overweight and be forced to diet. The CFQ is a very widely used measure of parental feeding practices.

#### **Parent Modeling of Foods**

The food that parents consume has a direct effect on the foods their children consume. Due to their function as purchasers of food and gatekeepers, parents determine the foods available and served in the home. There is also evidence that parents can influence their children's diets by acting as role models.<sup>302-304</sup> Parental modeling of poor dietary habits, such as low consumption of fruits and vegetables, is associated with lower consumption of fruits and vegetables by their children.<sup>305</sup>

**Measures of Parental Modeling of Foods.** The foods that a parent generally consumes in front of a child may be used to determine how a parent models his or her diet to his/her child. The 6-item Parental Dietary Modeling Scale<sup>306</sup> was developed to assess how often parents model dietary

behaviors to their children, in particular the constructs of modeling defined by Rosenthal and Bandura<sup>307</sup> (observational learning, disinhibiting-inhibiting behavior, facilitating similar responses, and setting cognitive standards for self-regulation). The final score of parental dietary modeling behavior is calculated by adding the individual 6-items and dividing by the number of items to achieve an average. The full scale had an alpha of 0.59, suggesting moderate reliability to measure parental modeling of diet. Other measures of covert and overt control<sup>279</sup> (described previously) may be used to determine how parents overtly model healthy eating behaviors in front of their children.

### **Family Meals Frequency and Environment**

There is evidence linking the benefits of increased frequency of family meals to higher intake of dietary components related to improved health (i.e., fruits, vegetables, fiber, calcium-rich foods, vitamins B6, B12, C, and E) and lower intake of components that are recommended to be consumed in limited quantities (i.e., sugar-sweetened beverages, saturated fat).<sup>238,308-317</sup> The American Academy of Pediatrics recommends families regularly eat meals together as part of childhood obesity prevention.<sup>318</sup> Children aged 2- to 5-years-old who eat family meals more frequently have healthier diets than those who have less frequent family meals,<sup>68,310,313,319</sup> and may have reduced obesity risk.<sup>68,308,311,313,320-322</sup>

The frequency of family meals is higher when children are young and declines as children move into adolescence and high school years. For instance, over half of 4-year-olds,<sup>68</sup> 9-year-olds,<sup>312</sup> and sixth to eighth graders<sup>321,323</sup> ate family dinner every day, whereas only approximately one-third of 14- to 18-year-olds did so.<sup>312, 324</sup> Educational and cultural factors may affect family mealtime frequency. Parents with a college degree or higher reported having family meals 5.4 times per week compared with 3.8 meals per week for parents who had not completed high school.<sup>325</sup> Foreign-born parents also reported greater frequency of family meals than those born in the U.S.<sup>325</sup>

The effect of family mealtime environment on obesity and obesity-related health behaviors has been studied mainly in older children/adolescents and parents. Among adults, arguments during dinner about eating behavior were associated with higher fat consumption.<sup>326</sup> Adolescents who reported positive family meal environments were less likely to engage in disordered eating behaviors than those who did not have positive family mealtime environments.<sup>327-329</sup> Yet, among a sample of 4-year old children and their parents, more meal conflicts also were predictive of less time watching TV in the children,<sup>330</sup> and that never arguing at mealtimes was associated with a higher daily energy intake, in comparison to often or always arguing at mealtimes.<sup>331</sup> Among older children (ages 8 to 16 years), parents of obese youth report less positive family mealtime interactions.<sup>332</sup> It appears that calm family mealtime environments may be more beneficial for adolescents compared to young children, yet the results require further investigation.

Mealtime distractions, such as watching TV during meals, can negate the positive benefits of family mealtimes and result in unhealthy eating patterns.<sup>324,333-336</sup> People may overeat while watching TV<sup>161,163,173-175,337-340</sup> and learn unhealthy food habits from TV ads for sugary, fatty foods.<sup>152,167,168,170,172-174,341</sup>

**Assessing Family Meal Frequency and Environment.** Frequency of family meals is typically measured via self-report survey questions asking how many days in the past week most or all family members ate together. There does not appear to be a standard method for assessing family meal frequency. Some questionnaires define a family meal to participants completing the survey as any meal eaten together in a typical week<sup>342-345</sup> and other questionnaires ask participants to answer how frequently they share family dinners.<sup>68,311,312,323</sup> This makes generalization comparisons difficult across all studies if some are including shared meals such as breakfasts and others only include shared dinners as a measure of how frequently family meals are consumed. Methods for assessing family mealtime frequency and environment are described below.

The Project EAT Questionnaire<sup>346</sup> includes a single question that assesses family meal frequency, and is directed at teens and young adults. The full survey is based on the Social Cognitive Theory, adolescent focus groups, a review of existing surveys, expert review, and pilot testing. Within the survey, there is a single question to determine family meal frequency “During the past seven days, how many times did all, or most, of your family living in your house eat a meal together?” Response options are “never,” “1-2 times,” “3-4 times,” “5-6 times,” “7 times,” and “more than 7 times”.<sup>342-345,347,348</sup> Numerous studies and papers have used this single question to assess family meal frequency,<sup>311,320,321,324,327,342,344-350</sup> yet does not appear to have been validated in adults or adolescents to accurately assess frequency of family meals. The question is designed to be answered by adolescents or adults and has been used widely in cross-sectional studies and in longitudinal analyses of adolescents and young adults (by the research group that designed the questionnaire).<sup>346</sup> A phone interview that used this question emphasized that the greater than 7 times per week response allowed respondents to report meals beyond shared dinners.<sup>350</sup>

The National Longitudinal Survey of Youth (NLSY), 1997 includes a family dinner question to determine family meal frequency.<sup>351</sup> This nationally representative interview of adolescents and their parents asked the following open-ended question, “In a typical week, how many days from 0 to 7 do you eat dinner with your family?” The general survey is a nationally representative sample of adolescents in the year 1997 that were born between 1980 and 1984. No data could be located that discusses the validity of the family dinner question or the NLSY survey in general. One study that assessed cross-sectional data found approximately 66 percent lower odds of being overweight, compared with normal weight, for those who had 5 or 6 family dinners per week compared to those who had none for non-Hispanic white adolescents, but no associations for black and Hispanic.<sup>322</sup>

The 13-item Family Mealtime Questionnaire<sup>314</sup> assesses family mealtime patterns. Data collected includes number of family members present at each meal on a typical day, the number

of days of the week the family ate breakfast, lunch, or dinner together (0-7 days for each meal), who was responsible for meal preparation, and activities the family participated in during meals. The survey was reviewed by registered dietitians and pilot-tested with limited resource families (mean age of children 6.74 years, with a range from 6 months to 17 years old). Test-retest was performed and reliability was determined with a Pearson correlation of  $r=.83$ . No other published studies could be located that used this questionnaire.

The Project EAT survey<sup>328,346</sup> includes three 4-point (strongly agree to strongly disagree) Likert-type scales to assess family mealtime environment characteristics (Atmosphere at Family Meals; Priority of Family Meals; Structure/Rules at Family Mealtimes). The scales are scored by averaging responses on the scale. The test-retest reliabilities for individual items ranged from  $r=.54$  to  $r=.70$ .

- Atmosphere at Family Meals: includes 4-items asking if the family member enjoys sharing meals with the family. The internal consistency of the atmosphere scale was Cronbach alpha = .73.
- Priority of Family Meals: includes 5-items to assess the importance that family members give to sharing meals. The internal consistency of the priority scale was acceptable (Cronbach alpha = .82).
- Structure/Rules at Family Meals: includes 5-items to assess where family meals are consumed and how parents expect children to behave at mealtimes. The internal consistency of structure/rule scale was lower than the others (Cronbach alpha = .60); this was probably owing to the assessment of different types of rules around eating.

The survey has been used to identify family functioning at mealtimes in families with children suffering from chronic disease.<sup>352</sup> Another study used a modified version with two subscales (Positive Mealtime Interaction and a revised Resistance to Eating scale that excluded 6-items about under-nutrition), which showed adequate internal consistency (revised Resistance to



Eating,  $\alpha = 0.69$ ; Positive Mealtime Interaction,  $\alpha = 0.82$ ).<sup>332</sup> This study found that mothers of obese 8- to-16-year-olds reported significantly higher Mealtime Challenges and lower Positive Mealtime Interaction scores than did comparison mothers of normal weight children.

The Mealtime Environment Scale<sup>353</sup> was developed for the Québec Longitudinal Study of Child Development<sup>354</sup> and includes 6 questions about the family mealtime environment.. The six mealtime environment questions are addressed to be answered by the parent most knowledgeable about the child (usually the mother). The questions are answered using a 4-point Likert-type scale and asks mothers to rate how often mealtime may be described as:

- are enjoyable for everyone
- are a rush
- give us time to talk to each other
- include arguments between the children
- include arguments between adults and children
- include arguments between adults

Items are summed (reverse coded for enjoyable and time to talk) to create a total score of family conflicts during mealtimes, with a higher score indicating more conflicts. Internal consistency of the survey was moderate with Cronbach Alpha 0.55 with a pre-tested sample of parents of preschool children in Quebec (n=150).<sup>353</sup>

A sample of children from the Québec Longitudinal Study of Child Development found that more mealtime conflicts were associated with higher weight, and (contrary to prediction) healthier eating habits.<sup>330</sup> Also contrary to expected result was that more meal conflicts were predictive of less time watching TV in the children.<sup>330</sup> Burnier et al<sup>331</sup> also found with the same study sample that never arguing at mealtimes was associated with a higher daily energy intake, in comparison to often or always arguing at mealtimes.<sup>331</sup> Results from the survey warrant greater

analysis to whether arguments are associated with parental feeding styles and if the results are replicable.

### **Meal Preparation and Planning Responsibilities and Barriers**

Many parents report that time scarcity and fatigue are barriers to meal planning and preparation.<sup>355-357</sup> Understanding existing barriers and current responsibilities around mealtimes may assist researchers in understanding family dynamics that affect food-related behaviors.

**Measures of Meal Preparation and Planning Responsibilities and Barriers.** Qualitative studies have identified barriers and perceived responsibilities of meal planning in families. Quantitative items have been developed to assess meal preparation responsibilities and involvement of children, as well as measures of time scarcity and fatigue as barriers to meal planning and preparation.

The Project EAT Survey (described in detail previously) includes several items to assess meal preparation responsibilities and involvement of children.<sup>316,346</sup> The survey asks respondents to identify the family members responsible for grocery shopping, meal planning, and meal preparation.

A 9-item scale to identify time scarcity and fatigue around meal planning or preparation has been used with parents of children aged 2-6 years.<sup>355</sup> Parents were asked how often they felt that time and energy affected meal planning and preparation during the past two weeks. Responses were given on a 5-point scale from never to always. Respondents for this study were mostly well-educated, Caucasian mothers. Spearman correlations showed adequate discriminant validity as time scarcity ( $r=0.25$ ) and fatigue ( $r=0.25$ ) had low correlations with other measures of time and energy for meal planning. The time scarcity and fatigue scale also correlated negatively with a measure of healthy food availability, suggesting adequate concurrent validity.<sup>355</sup> The scales specifically assess time and energy as it relates to food activities and suggest that time and energy for meals may be more strongly related to child nutrition compared to meal planning.<sup>355</sup>

## MATERNAL PSYCHOGRAPHICS

Psychographic factors (i.e., perceived social support and stress)<sup>358</sup> that influence decisions of families related to weight-behaviors are important components of understanding how mothers choose foods and activity behaviors for themselves and their families.<sup>356</sup> These factors include: parent eating styles, perceived weights and teasing, maternal depression, stress, and social support, perceived quality of life/health status and body satisfaction, perceived family functioning, and need for cognition. (See Appendix A for summary table of the surveys described below.)

### Parent Eating Styles and Behaviors

Parents act as gatekeepers to the home food environment for young children. This environment includes the influence of the parents' own eating behaviors.<sup>302-304</sup> There is evidence that parents own eating behaviors can influence their children's eating behaviors, in turn influencing weight patterns.<sup>49</sup> There is evidence that parents who have difficulty controlling their own food intake may adopt feeding practices to attempt to prevent overweight in their children.<sup>49</sup>

**Measures of Parent Eating Styles and Behaviors.** Dimensions of parent eating styles and behaviors may influence how their children approach eating. Various measures have been created to identify how parents eat.

The Three-Factor Eating Questionnaire (TFEQ) assesses dietary restraint, disinhibited eating, and emotional eating constructs.<sup>359</sup> The original questionnaire includes 51 items, 36 as true/false questions and 15 items as 4-point Likert-type scales with varying answer choices.<sup>360</sup> The TFEQ has been modified by other researchers using items from the scale that have the strongest factor loadings.<sup>361</sup> The three scales are described below:

- The Emotional Eating scale assesses how emotions influence an individual's urge to eat (e.g., When I feel lonely, I console myself by eating).

- The Disinhibited Eating scale assesses uncontrolled eating behaviors (e.g., Sometimes when I start eating, I just can't seem to stop).
- The Dietary Restraint scale assesses the intention of individuals to restrict or regulate food intake to prevent weight gain (e.g., I avoid "stocking up" on tempting foods).
- Higher scores indicate greater dietary restraint, disinhibition, and perceived hunger.<sup>360</sup> The TFEQ has been used in samples of college students and middle-aged men and women.<sup>361,362</sup> It has good reliability and validity.<sup>360</sup>

The Eating Habits Subscale from the Project EAT survey<sup>344</sup> consists of 9 items concerning meal skipping during the past week, location where dinner was eaten, frequency of eating at fast food restaurants, frequency of grocery shopping, and frequency of snacking and eating salty snacks. The survey was originally developed for adolescents, but has been used with samples of low-income pregnant women with success.<sup>363</sup> In this adult female sample, items from the Eating Habits Subscale were further distinguished into 2 subscales, the first (3-items) consisting of meal skipping frequency, and the second (2-items) of items related to control over meal planning, with a higher score indicating less control over meal planning and more meal skipping.<sup>363</sup> The other items from the Eating Habits Subscale were not included in this study. In this low-income postnatal parent sample, mothers with less nutritious diets indicated less control over meal preparation and were more likely to skip meals.<sup>363</sup> No other use of the scale with adults could be located.

The Dutch Eating Behavior Questionnaire (DEBQ)<sup>364</sup> is a 33-item instrument developed to improve understanding of emotional and external eating patterns in a variety of populations. It includes three scales to measure the three types of eating behaviors associated with excess weight gain: eating in response to negative emotions (emotional eating), eating in response to the sight or smell of food (external eating), and dietary restraint (eating less than desired to lose or maintain weight). The DEBQ has been translated into numerous languages and all show good factorial

validity and reliability. In addition to use with adults, it can be used with young children to assess how a child eats, including assessment of eating in the absence of hunger, dietary restraint or disinhibited eating or pickiness, and has also shown high validity with college students (Cronbach alpha, 0.88 to 0.94).<sup>365</sup>

### **Maternal Perception of Weights and Teasing**

Evidence suggests that parents who feel their child's weight is a health problem are more likely to make changes than those who do not think it is a problem.<sup>298</sup> Many parents do not consult growth charts to determine if a child is overweight, instead relying on physicians or signs of inactivity or teasing of their child.<sup>299,300</sup> A systematic review of 23 international studies (n=16,128 parent-child dyads) showed conclusive evidence that in developed countries (i.e., the United States), in 19 of the 23 studies, less than half of parents were able to identify their child as overweight.<sup>366</sup> Individual studies show that anywhere from 1.9%<sup>367</sup> to 44%<sup>368</sup> of parents correctly perceive their children as overweight. These results are also interesting as most mothers have an accurate perception of their own weight.<sup>369</sup>

Children who are overweight are also at risk of being treated unfairly or teased.<sup>370-375</sup> Teasing can cause lifelong eating, weight, and self-esteem problems.<sup>370,376,377</sup> Research has shown that anti-fat attitudes can begin as early as preschool-aged children.<sup>378,379</sup>

**Measures of Maternal Perception of Overweight.** Among studies that have examined parental perceptions of their child's weight, most do not use questionnaires or surveys that have been validated or tested for reliability.<sup>369</sup> There is, however, one valid and reliable scale that may be used to assess parental perception of child's weight and other visual scaling options.

The Child Feeding Questionnaire (CFQ)<sup>285</sup> includes 2 scales that may be used to measure parent's perceptions of his/her children's weight and concern about it. The CFQ is a very widely used measure of parental feeding practices. Below is a brief description of the subscales:

- Parent's perception of his/her own weight: 4-items assessing the parent's own weight during his/her childhood, adolescence, 20s, and at present.
- Parent's perception about child's weight: 6-items assessing parent's perception of child weight during the child's first year of life, between age 1 and 2, between age 3 and 5, kindergarten through 2<sup>nd</sup> grade, 3<sup>rd</sup> through 5<sup>th</sup> grade, and 6<sup>th</sup> through 8<sup>th</sup> grade.

Visual scales also have been used to assess parental perception of their child's weight.<sup>299</sup> The scale type that is often used consists of a 10-centimeter line with ends labeled "extremely underweight" and "extremely overweight." Parents are asked to "Please mark the place on the line which best describes your child's weight."<sup>299</sup> Research in other public health and clinical areas have used this scale with success and found it to be a reliable and valid measure.<sup>380-382</sup> Use of a visual analogue scale produces more normally distributed data and variety in scores than Likert-type or discrete choice scales.<sup>299</sup> The scale is scored using a ruler to measure the distance from the left end of the line (extremely underweight), to the parent's mark and the percentile is calculated. For example, if a parent marked 5cm from the left side, this would be interpreted as the parent perceiving their child's weight as near the 50<sup>th</sup> percentile.<sup>299</sup> This method of scoring the result provides a reasonable assessment of the direction and magnitude of the differences between perceived and actual BMI.<sup>299</sup>

Other visual scales include pictures of children and parents that participants may choose to indicate their own perceived or idealized weight as portrayed by an illustration.<sup>383,384</sup> The scale by Collins et al has been used by preschool children to identify their perceived appearance.<sup>385</sup>

**Measures of Maternal Perception of Teasing.** While the problems and frequency of weight teasing has been studied in children, few have used parent-reported teasing of their children, which may be important in studies of younger children. Only one study was located that assessed teasing of children based on the report of parents.<sup>386</sup>

A study of parents of school-aged children used two questions to assess if their children were teased for their weight, or otherwise.<sup>386</sup> The questions were “Do others tease, joke, or make fun of your child because of his/her<sup>385</sup> weight?” and “Do others tease, joke, or make fun of your child because of other reasons?” and answered with yes or no responses. There is no description of these questions undergoing cognitive testing or analysis for reliability or validation, and this is the only study located that used parent responses to assess child teasing.

### **Maternal Depression**

The impact of maternal prenatal and postnatal depression has been associated with negative impacts on fetal development and weight-related outcomes in infants and young children.<sup>387,388</sup> Numerous studies have found prenatal depression in mothers to be associated with small-for-gestational age and failure to thrive in newborns.<sup>389-391</sup> Rapid weight gain in childhood among children born small-for-gestational age may increase the risk of obesity, high blood pressure, type 2 diabetes, and cardiovascular events later in life.<sup>392-395</sup> It has been proposed that infants of depressed mothers experience neurobehavioral dysregulation early in life that may impact weight gain patterns in the first years of life.<sup>396</sup> The low weight gain may last for several years after birth. A large study in the U.S. found that children exposed to prenatal maternal depression have a lower BMI z-score at age 3 yet higher central adiposity compared to children of mothers who did not experience depression and there was no dose-response relationship noted.<sup>397</sup> Another study found reduced weight gain in Latino infants from birth to 2 years of age in mothers with chronic depression.<sup>398</sup> Maternal distress/depression was found to be moderately positively associated with screen time in a review of children aged 3 and under.<sup>399</sup>

There is also conflicting evidence regarding the role of postpartum depression. A study of 6-month olds found that infants exposed postnatally to maternal depression have higher overall adiposity compared to those who did not experience postnatal depression.<sup>397</sup> Other studies, however, fail to find associations between exposure to postpartum depression in the 0 to 6 month

period and overweight in children at age 2<sup>400</sup> and 7.<sup>401</sup> As children age, the interaction between child weight and parent depression may change. African-American and non-Hispanic white mothers of obese youth (ages 8 to 16) report significantly greater psychological distress as measured by the Global Severity Index than mothers of non-obese children.<sup>332</sup> A study on the influence of sleep on obesity outcomes later in life included maternal depression as a potentially confounding factor of the association with BMI in early adulthood and sleeping problems during childhood.<sup>402</sup>

Aspects of maternal depression, including timing, and length of a child's exposure to the depression appear important in determining outcomes in children as infants exposed to chronic postnatal maternal depression are at greater risk for poor growth before age 1 compared to those exposed to episodic depression.<sup>389</sup> Obesity in children and depression in mothers also may be moderated by parenting styles.<sup>403</sup>

**Measures of Maternal Depression.** There are numerous methods of measuring depression in adults that range from very simple to more complex, depending on the clinically desired information (and for diagnosis). Some of the methods are described below.

The Center for Epidemiologic Studies Depression Scale (CES-D)<sup>296</sup> is a 20-item scale that is designed to measure depressive symptomatology in the general population. The items in this scale include symptoms associated with depression that have been used in previously validated longer scales. Symptoms are assessed using a 4-point Likert-type scale that measures degree of experience of depressive symptoms in the past week, such as "My sleep was restless" "I felt lonely" "I did not feel like eating."<sup>296</sup> It has been tested in household interview surveys and psychiatric settings and has been shown to have good reliability and validity. Reliability studies with mothers have found good internal consistency (Cronbach alpha coefficient 0.90<sup>403</sup>). A German version of the CES-D was used with parents of overweight and obese 7- to 15-year olds with good internal consistency (Cronbach alpha 0.89).<sup>404</sup> The CES-D was used as an indicator of



depression in a study in the rural U.S. which found depressed mothers to have more permissive parenting styles that was predictive of child obesity in first graders.<sup>403</sup>

The Edinburgh Postnatal Depression Scale (EPDS) (if used with non-postnatal women with older children, called the Edinburgh Depression Scale)<sup>405,406</sup> is a 10-item questionnaire that was developed for primary care physicians to help detect maternal depression before, during, and after pregnancy. The questions are assessed with frequency-based responses to how often a respondent felt a depressive symptom in the past 7 days. It takes approximately 5 to 10 minutes to complete and has been used with both antepartum and postpartum mothers and validated in non-postnatal mothers of older children.<sup>405</sup> Scoring of the EPDS uses a cut-off to indicate the presence of depression. The EPDS has good sensitivity, with the proportion of depressed women who were true positives at 86%, and specificity using true negatives was 78%. The EPDS also is sensitive to changes in depression of mothers over time.<sup>406</sup> A randomized controlled multicenter study in 5 European countries used the EPDS to assess depression at ages 2,3, and 6 months and 24 months.<sup>400</sup> The study found evidence that children whose mothers scored high on the EPDS weighed less at birth, but showed no difference in weight for length and BMI at age 2.<sup>400</sup>

The Patient Health Questionnaire-9 (PHQ-9)<sup>407,408</sup> is a 9-item screening tool used to assess severity of depression using a 4-point Likert-type scale using a global score for depression calculated from respondent answers to questions on each of the 9 DSM-IV criteria for clinical depression. The PHQ-9 has been modified to shorter versions including the PHQ-8 and PHQ-2. The PHQ-8 includes removal of a question regarding suicide ideation, thereby making it more applicable for use in self-report surveys. Both the PHQ-8 and PHQ-9 are reliable and valid instruments that may be briefly and easily administered. The PHQ-9 and PHQ-8 have been used in various settings, may be self-administered,<sup>409,410</sup> and are effective at detecting depression symptoms in various races and ethnicities.<sup>411</sup> The PHQ-8 was notably used in the 2006 Behavioral Risk Factor Surveillance System (BRFSS) survey of over 160,000 adults in the U.S.

This study found that adults with current depression had a significantly higher likelihood of being obese and being physically inactive.<sup>412</sup>

The PHQ-2<sup>407</sup> is a further simplification and may be used to simply screen for depression, not to assess depression severity using the first 2 questions of the 9. The PHQ-2 score can range from 0 to 6. A score of 3 or greater has a sensitivity for major depression of 83% a specificity of 90% and a positively likelihood ratio of 2.9.<sup>407</sup> The PHQ-2 has shown good sensitivity and specificity for detecting depression in a variety of settings and populations including: mothers,<sup>413</sup> adolescents,<sup>414</sup> postpartum mothers of 0 to 1 month olds,<sup>415</sup> and adults<sup>416</sup> in clinical settings.

The Beck Depression Inventory (BDI)<sup>417</sup> is a 21-item survey that uses a 4-point Likert-type scale to assess severity of depressive symptom-attitudes (i.e., mood, sense of failure, guilt feelings, etc.). The BDI is scored by summing the ratings of individual items. Higher scores on the inventory indicate higher depression severity. The BDI may be self-administered and completed in 5- to 10-minutes. The BDI has good reliability and validity as an indicator of depression severity,<sup>418</sup> but has not been widely used to assess associations with obesity and obesity-related behaviors.

The Zung Self-Rating Depression Scale (SDS)<sup>419</sup> is a 20-item scale that quantifies the symptoms of depression using diagnostic criteria of the presence of a depressed affect and associated physiological symptoms. The SDS takes less than 10 minutes to complete. Participants rate each item on the scale from 1 (a little of the time) to 4 (most of the time) and scores are calculated by summing item scores. A score that exceeds 50 indicates the likelihood of depression. The SDS has good reliability and validity,<sup>420</sup> but has not been used widely to assess associations with obesity and obesity-related behaviors.

The National Center for Health Statistics collects data on depression via the National Health Interview Survey each year. One question assesses whether or not a person has ever been

told by his or her physician that he/she has depression.<sup>421</sup> The data is used by the U.S. Department of Health and Human Services to monitor trends in illness and diseases.

## **Stress**

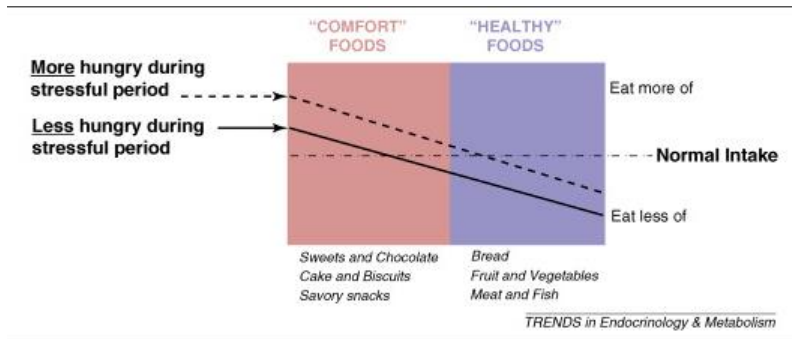
Research has shown that there are negative weight-related outcomes of chronic stress. When stressed, a neural-stress response network is activated in the brain, causing previous automatic habits to be used instead of a more thoughtful approach and response to the situation.<sup>422</sup> Chronic life stress seems to be more associated with a greater preference for high calorie and nutrient dense foods, and may be linked to weight gain.<sup>423,424</sup> This occurs due to elevated stress hormones creating feedback signals in the brain that reduce perceived stress when palatable (e.g., sweet, high fat) foods are eaten, which can in turn reinforce stress-induced eating of these unhealthy foods.<sup>422,425</sup> Stress-induced eating also can happen in normal weight women who desire to remain slim using ‘dietary restraint’ if the mental effort required to restrain eating serves as a stressor.<sup>426</sup>

Figure 3 below shows the change in types of food eaten during stressful periods, independent of hunger. There is a shift towards ‘comfort’ foods independent of whether total caloric intake is increased or decreased from normal.<sup>425</sup>

**Measures of Stress.** Much of the research on the role of stressors (psychological and environmental) has relied on objective stressor measures as well as surveys that measure the number of stressful life events. Although these have benefits, such as being simple to ask, drawbacks may be that it does not take context and intensity into effect.<sup>427</sup> Measures of stress that include context and intensity may be valuable in determining more about the types of stress and how they interact with obesity outcomes. Some measures of stress perception in adults are discussed below.

The Perceived Stress Scale (PSS)<sup>427</sup> is a 14-item instrument that measures global perceived stress and the degree to which respondents find their lives to be unpredictable,

**Figure 3:** Stress Response, Food Consumption and Hunger. (Figure 3 created by Gibson.)<sup>422,425</sup>



uncontrollable, and overloading. The survey also asks direct questions about current levels of experienced stress. The PSS is sensitive to chronic stress from ongoing life circumstances, as well as worry about future events. According to the authors, it is easy to administer, only takes a few minutes to complete, and is easy to score. Items are summed to obtain a total stress score. The higher the total score, the more stressed the individual is considered to be. It should be noted that because stress is influenced by constantly changing events, the predictive validity of the PSS is likely to drop rapidly after 4 to 8 weeks. The PSS showed adequate reliability in two samples of college students and community-based smoking cessation participants. It was found to measure a different and independently predictive construct when compared to a depressive symptom scale.<sup>427</sup> The PSS has adequate internal and test-retest reliability and is correlated with a range of self-report and behavioral criteria. In another study, the coefficient alpha for the PSS was .91 in a sample of older mothers.<sup>428</sup> The PSS has been widely used in the literature and has been used in obesity-related studies, including a study of mixed-demographic low-income parents (Cronbach alpha = 0.73) that used 6 of the 14 questions and found that parental stress was inversely correlated with frequency of having family meals.<sup>429</sup> The PSS also has been used to positively correlate stress to increased BMI among adolescents.<sup>430</sup>

There is a 4-item version of the PSS that has lower internal reliability and provides a less adequate approximation of perceived stress than the entire scale (items 2, 6, 7, and 14 of the full scale). The PSS may provide utility as an economical tool for assessing chronic stress level using the 4-item or full 14-item.<sup>427</sup>

The Ways of Coping Checklist<sup>431</sup> is a measure of stress coping that includes the statement “I tried to make myself feel better by eating, drinking, using medication, etc.” to assess if people use food or beverages as a stress-relief, and also contains a checklist of stressful situations that were experienced during the last month. The statement about use of food and beverage as coping mechanism may be used to assess how people manage their stress. A study that assess stress-

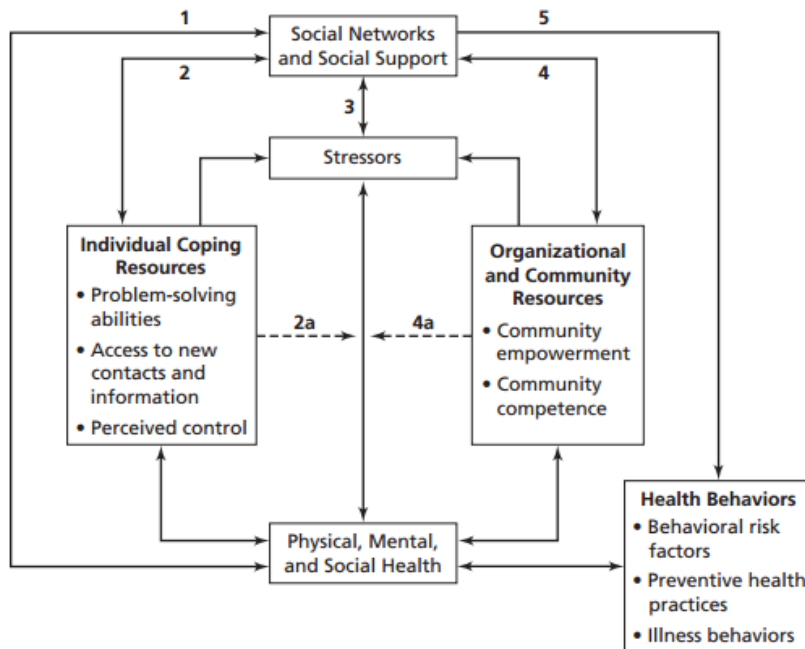
related eating in a large, population-based cohort in Finland used the answer of “used quite a bit or a great deal” to classify stress-driven eaters and drinkers, and those who responded with “not used” were classified as non-stress driven eaters and drinkers. Those who answered “used somewhat” were recorded as being slightly stress-driven eaters and drinkers. The adults who were stress-driven eaters and drinkers had higher body mass index than adults who were not stress driven eaters and drinkers.<sup>432</sup>

### **Social Support**

The provision of social support is one of the important functions of social relationships.<sup>433</sup> The concept of social support is very broad, and includes many different characteristics of social support, such as reciprocity, intensity and strength, formality, and density of support, among many others.<sup>433</sup> There are also different types of support that overlap, but may be broadly categorized as emotional, instrumental, informational, and appraisal support.<sup>433,434</sup> Social support may come from various people, including friends, family, and coworkers. These different people may have different effects on behaviors and have been identified as an important aspect of social support influence.<sup>435</sup>

There is evidence that having social support through individuals and/or social networks may influence health-related behaviors, such as weight-management and adherence to medical treatment.<sup>436-438</sup> Figure 4 below indicates the hypothesized effects that social support and networks have on health behaviors. Pathway 1 shows the hypothesized direct effect of social networks/social support on health. Pathways 2 and 4 indicate the hypothesized effect of social networks and social support on individual coping resources and community resources. Pathway 3 indicates that social networks/social support may influence frequency and duration of stressor exposure. Pathway 5 indicates the hypothesized direct effects of social networks/social support on health behaviors. A review found social support to be a consistently important correlate of physical activity among adults.<sup>118</sup>

**Figure 4: Conceptual Model for the Relationship of Social Networks and Social Support for Health.** Figure 4 created by Heaney and Israel.<sup>433</sup>



Observational and longitudinal data show the positive and negative effects of social support on weight-related behaviors and weight-maintenance directly. For instance, in a weight loss trial, women who reported ‘never’ experiencing family support were the least likely to lose weight, and those who experienced frequent family and friend support were the most likely to lose weight.<sup>436</sup> In a study of 84,828 subscribed members of a web-based intervention, participants with more social ties to other participants on the site, opened more emails, visited websites more often, and reported completing more of the actions they were prompted to perform, compared to those without social ties.<sup>439</sup> There is conflicting evidence, however, that shows increased social support does *not* benefit weight-loss and related behaviors, and a more autonomous and independent style is a stronger predictor of success.<sup>440,441</sup> Family and friends sabotaging attempts to change behavior may have a role in this effect. There may also be measurement difficulties that contribute to these mixed findings. Women participating in a weight-loss program reported infrequent social support for healthy eating and physical activity behaviors at baseline.<sup>436</sup> This may be a result of the participants not being aware of their existing support networks.<sup>436</sup> These results imply that objectively assessing support may be a better measure of social support, however, data show that perceptions of support are more strongly linked to the recipient’s health than objective behaviors that show support<sup>442</sup> and are easier to assess.

*When* support is given also has an effect on health. For example, a person experiencing major life stressors may benefit more from different types of support during different stages of coping with the stressor.<sup>433</sup>

**Measures of Social Support.** Social support is a potentially essential part of behavior and lifestyle change, yet measures are rarely included in weight-loss<sup>436</sup> and health promotion programs.<sup>443</sup> Many studies that have assessed social support use observational methods, which



are prohibitive for use in large studies.<sup>444</sup> There is also room for improvement of social support measurement scales, particularly those that assess sabotage.<sup>436</sup> Frequently used measures of social support are described below.

The “measures of perceived social support specific to health-related eating and exercise behaviors,” survey (parental measures- support, enjoyment, and importance scale)<sup>440,445</sup> was created to assess the effect of social support on individuals participating in weight loss studies. Sallis et al<sup>504</sup> developed the first survey in 1987, and it was modified by Ball and Crawford<sup>484</sup> later to include 4 subscales to assess perceived social support for physical activity and healthy eating: support for healthy eating (6 items: e.g., how often have family complimented me on my eating habits); sabotage of healthy eating (3 items: e.g., offered me high fat or unhealthy foods); support for physical activity (6 items: e.g., participated in physical activity with me); and sabotage of physical activity (3 items: e.g., suggest we do things that are physically inactive). Each of the 4 subscales is answered twice; once about how often “family” has said or done the behavior, as well as how often “friends” have said or done the behavior. Response options for all these items were never, rarely, sometimes, or often (scored 1 to 4, respectively). Scores on the sabotage scale items were originally reversed so that for all subscales, a higher score reflected great social support (either greater support or less sabotage). Three studies assessed the internal reliability of the subscales using Cronbach  $\alpha$ , and generally found adequate to excellent ranges (0.58 to 0.78,<sup>440</sup> 0.61-0.91,<sup>445</sup> and 0.61-0.84<sup>436</sup>), with the social support items usually having the highest reliability scorings. One study found that the sabotage item about refusal to participate in healthy behaviors was infrequently endorsed, and removing it improved the internal consistency of subscales.<sup>436</sup> These authors concluded that the sabotage subscale could be improved. The survey has had conflicting validation results. Sallis et al<sup>445</sup> found that social support was correlated with self-reported diet and exercise habits in men and women.<sup>445</sup> Among another sample of women, frequency of support from friends for healthy eating was the best predictor of

weight loss. Women in the Australian Longitudinal Study on Women's Health (n=790), however showed that social support was associated with a higher BMI, and having more friend's sabotage was associated with lower BMI.<sup>440</sup>

Modified general social support and strain subscales have been created to assess supportive and strained interactions around diet and physical activity with friends, family, and spouse. These include 28- items and six subscales based on those by Sallis et al.<sup>440,445 436,446,447</sup> The general social support scale includes 4 items each for friends, family, and spouses (e.g., "how much can you rely on them for help if you have a serious problem?" and two additional items for spouses (i.e., "how much does he or she appreciate you? and "how often do they make too many demands on you?"). The general subscales have excellent psychometrics (e.g., Cronbach  $\alpha$  = 0.79–0.88) when tested with large, population-based samples.<sup>446,447</sup>

Kiernan et al recommend several changes to the scales, including improvement of the sabotage subscales and test for sensitivity to change.<sup>436</sup> They recommend adding a 5<sup>th</sup> response category and changing the labels to range from "almost never" to "almost always," rather than "never" "n/a", etc. By using "almost always" as a "fifth option to avoid a built-in ceiling effect (and coding response options from one to five), each option will continue to have a label (increasing reliability) with matching labels at each end (almost never, rarely, sometimes, often, and almost always)."<sup>448</sup> They also recommended using means rather than totals for subscale scores to directly reflect response labels and thus simplify interpretation.<sup>436,448</sup>

The Multidimensional Scale of Perceived Social Support (MSPSS)<sup>449</sup> was created to assess several aspects of social support, including the subjective assessment of social support adequacy and perceptions of adequacy from 3 sources: family, friends, and significant other. The scale includes 12-items that with response options on a 7-point scale ranging from "very strongly disagree" (1) to "very strongly agree" (7). A total social support score may be derived by summing the coded responses. Two studies with college students that were factor analyzed

showed that subjects were able to clearly differentiate between the 3 sources of perceived support identified by the 3 subscales.<sup>449,450</sup> Cronbach alpha was good to excellent for the subscales (all  $>.80$ ).<sup>449,450</sup> Test-retest reliability performed 2 to 3 months later showed .72, .85, and .75 for the significant other, family, and friends subscales, and .85 for the full scale. Construct validity for the scale as a whole was negatively related to depression, as expected ( $r=-.25$ ,  $p<.01$ ). The MSPSS has been used in a number of studies to assess teen and adults' perceptions of support.<sup>451-453</sup> Work with parents has shown social support for mothers is related to decreased psychological stress.<sup>451</sup> One study used the MSPSS to measure social support in a longitudinal study of adults engaged in a behavioral weight loss program but final results regarding influence of social support could not be located.<sup>454</sup> Although there is limited use of the MSPSS with weight-related behaviors, it has been described as an easy to use, self-explanatory, and time-effective scale,<sup>449,450</sup> and has been recommended as a simple questionnaire in clinical use.<sup>452</sup>

The Perceived Social Support (PSS) questionnaire<sup>435,455</sup> includes two 20-item questionnaires, one that assesses perceived family support (PSS-FA) and another that assesses perceived friend support (PSS-FR). Item responses are yes/no, with a response given 1 point to indicate support, or 0 points to indicate no support (depends on the direction of the question). Each scale has a 0 to 20 range with higher scores indicating more family or friend support. This survey has been tested for reliability and validity in college student samples,<sup>435,455</sup> and a diabetic and chronic-psychiatric sample.<sup>435</sup> Internal consistency using Cronbach alphas ranged from .84 to .92.<sup>435</sup> Criterion validity using the CES-D scale was significantly correlated with depression in chronic-psychiatric patients in the PSS-FA ( $r=.49$ ,  $p<.01$ ), but not the PSS-FR.<sup>435</sup> For the diabetic sample, both PSS-FA and PSS-FR correlated with the General Wellbeing Index total score.<sup>435</sup> These differences indicate the importance of using scales that discriminate between the sources of support. The PSS has been used in samples of adolescents and adults. Only 1 study could be

located that used it as measure in of a weight-related intervention, and suggested that body weight in adolescents is not associated with a lower perceived social support.<sup>456</sup>

### **Health Status/Quality of Life**

Understanding quality of life assessment among adults may be useful in assessing how psychological outcomes affect health. Research has shown that self-assessed health status is a more powerful predictor of mortality and morbidity than some objective measures of health.<sup>550,457</sup>

**Health Status/Quality of Life Measures.** Health-related quality of life is a person's subjective assessment of his/her own physical health.<sup>458</sup> Measuring health-related quality of life may assist in determining the relationship with risk factors,<sup>458</sup> such as activity limitations found in people who respond to having low quality of life.<sup>459</sup> A widely used measure is described below.

The Centers for Disease Control and Prevention Health-Related Quality of Life 14-item (HRQOL-14), and 4-item measures (HRQOL-4) may be used to briefly assess quality of life in adults.<sup>460</sup> The 4-item version includes questions from the "Healthy Days" module of the questionnaire (e.g., "would you say that your health in general is excellent, very good, good, fair or poor). The HRQOL-4 has been used since 1993 in the Behavioral Risk Factor Surveillance System (BRFSS), since 2000 in the National Health and Nutrition Examination Survey (NHANES), and since 2003 in the Medicare health Outcome Survey. Other modules include "activity limitations" and "healthy day symptoms." The survey is also available in Spanish and takes under 3 minutes to complete.<sup>461</sup> Numerous studies have confirmed its validity and reliability, and it has been shown to be able to detect change over time.<sup>461</sup>

### **Perceived Family Functioning and Organization**

There are other aspects of the family environment that may affect childhood obesity directly or affect behaviors in family members that are associated with obesity. These aspects include how families function with conflict and cohesion, and household organization and chaos.

Family functioning can include the physical, emotional, and psychological activities of the members of a family and is associated with many physical and mental health outcomes in children. It is typically defined by dimensions that include support, conflict, cohesion, and control in the family.<sup>462</sup> It is unclear exactly how poor family functioning may lead to childhood obesity, or if it is the presence of a child with obesity that puts stress on the family. The data are also mixed regarding whether there is no difference<sup>463</sup> or evidence of more problematic family functioning in families with obese youth.<sup>332,462</sup> Given the mixed information, however, it is recommended that parenting style and functioning be promoted and measured to inform interventions to prevent child obesity.<sup>462</sup>

Household organization and chaos is also an important aspect of health-related outcomes in children and adults and includes many variables. The concept of “household chaos” describes an environment that is high in noise and crowding and low in routines.<sup>464</sup> There is evidence that a disorganized and chaotic home environment is a risk factor for poor child behavior that may work directly through the child or indirectly through the caregiver. Household chaos (i.e., inconsistent routines and organization) can have a direct, negative influence on cognitive performance, and is related to behavior problems in preschool-aged children.<sup>465-467</sup> Caregivers also may be affected by household chaos. Among caregivers in households with high levels of chaos, there is lower parenting self-efficacy<sup>468</sup> and caregivers are less responsive and involved with children and more negative parenting in general.<sup>469</sup> Focus group data has indicated that among parents of preschool-aged children, chaos among family members in the home increases stress.<sup>357</sup>

**Measures of the Family Functioning and Organization.** Surveys and questionnaires have been developed that are suitable for the task of documenting perceived family functioning and household organization and chaos. Some of the most widely used surveys are described below.

The Family Environment Scale<sup>470,471</sup> is a 90-item questionnaire measuring the family environment as perceived by family members. It includes these 10 subscales (9-items in each):

cohesion; expression; conflict; independence; achievement-orientation; intellectual-cultural orientation; active-recreational orientation; moral-religious orientation; organization; and control. Family members answer each statement using “strongly agree, agree, disagree, or strongly disagree” for their family. Each subscale displays adequate test-retest reliability over 8 weeks (estimates average .80) and 12 weeks (estimates average .75) with adequate internal consistency (average  $\alpha=.73$ ).<sup>470</sup> Intercorrelation between subscales average .20, indicating that they each measure distinct aspects of the family social environment. The full scale was used in a study of eating disorder associations with family environment,<sup>472</sup> and with mothers of obese 8- to 16-year-olds.<sup>332</sup> Among mothers of obese youth, they characterize their family functioning as being higher in interpersonal conflict and lacking in cohesion and structure (conflict subscale factors higher).<sup>332</sup> The scale is only available at a cost that increases with the number of administrations.<sup>473</sup>

The Family Assessment Device-General Functioning Subscale<sup>474,475</sup> is a 12-item scale measuring the general function of the family. It has been used in numerous population-based surveys to assess overall family functioning and provides a summary score of family functioning. The scale has good reliability in various sample groups (Cronbach  $\alpha=.92$ <sup>474</sup>)<sup>475</sup> and factor analysis shows that the subscale summarizes family functioning well.<sup>476</sup> A longitudinal study of Australian mothers from varied demographics used the scale to assess relationship of family functioning to maternal obesity risk behaviors.<sup>477</sup> The researchers converted all statements to positive form, summed them, and divided by the number of statements with a response to provide a score between one and four, with one representing healthy family functioning and four being unhealthy family functioning. The unhealthy functioning includes concepts such as having lots of bad feelings about the family, and not being able to talk to each other for support.<sup>477</sup> The Australian study found that family functioning was significantly associated with the number of

maternal obesity risk behaviors (e.g., television hours per day, soft drinks per day, fast food meals per week).<sup>477</sup>

The Confusion, Hubbub, and Order Scale (CHAOS) was developed to assess the parental perceptions of the degree of “environmental chaos in the home.”<sup>465</sup> The CHAOS survey includes 15-items, answered with true/false responses that are summed to provide a score, with a higher score indicating a more chaotic, disorganized, and hurried home characteristic. The CHAOS questionnaire was created for and used in the Louisville Twin Study that assessed children and their families from infancy to adolescence in a mostly white but varied SES sample).<sup>465</sup> Among this group, the coefficient alpha for the 15-item scale was 0.79. A subsample (n=42) showed test-retest correlation was 0.74 over a 12-month period and there was no significant change in the mean or variance for the score over the 12-month interval.<sup>465</sup> The correlations of observed home environment chaotic conditions with maternal perceptions in the Twin study were also correlated.<sup>465</sup> The scale has been modified by other researchers to include just 6-items assessed with a 5-point scale (1=definitely untrue and 5=definitely true),<sup>478,479</sup> and was used in a study of English families with 4- to 6-year old children from a mostly white sample of varied education and SES.<sup>479</sup> Within this sample, the alpha was lower than the longer version of the scale and the correlation between mothers’ and fathers’ ratings was  $r=.52$ .<sup>479</sup> This study showed that household chaos would predict children’s behavior “over and above parenting,” and can exacerbate negative parenting.<sup>479</sup> The CHAOS scale is also being used to assess general parenting practices in the MyParenting SOS obesity prevention study (no results available at this time).<sup>480</sup>

### **Need for Cognition**

Having a need for cognition is understood to be reflective of having more enjoyment with and engaging in critical thinking compared to others.<sup>481,482</sup> There is evidence that people who have a high need for cognition use more processing of messages and may be more influenced by the quality of arguments in such a message compared to those with a low need for cognition.<sup>483</sup>

One study found that dieters with a high need for cognition are more affected by name changes to make a food sound more healthy.<sup>484</sup> The literature, however, appears to have few other examples of using need for cognition to assess weight-related outcomes and behaviors.<sup>485</sup> It is possible that understanding a person's need for cognition may influence how he or she interacts with the environment, which may in turn affect weight outcomes.

**Measures of Need for Cognition.** One measure could be located to assess a person's level of need for cognition.<sup>481,482</sup> This measure has been used sparingly. The Need for Cognition Scale<sup>482</sup> was created to assess "an individual's tendency to engage in and enjoy effortful cognitive endeavors."<sup>482</sup> The scale originally included 34 items which asks participants to rank their level of agreement with statements such as "Thinking is not my idea of fun." Factor analysis with a sample of college students was conducted to reduce the scale to a more manageable 18 items.<sup>482</sup>

## **CHILD PSYCHOGRAPHICS**

Child psychographic factors (i.e., child temperament and eating styles)<sup>358</sup> influence how parents choose foods and feed their children.<sup>356</sup> These factors include child temperament and eating styles. (See Appendix A for summary table of the surveys described below.)

### **Child Temperament and Eating Styles**

A child's temperament and eating styles may be related to the way the parent approaches feeding his/her child. Temperament may reflect how a child eats, which then influences how a parent reacts to the child. For example, difficult infant temperaments have been associated with negative mealtimes and food refusal in young children,<sup>486</sup> as well as the feeding practices that parents then use as the children grow (stable from infancy to two years of age).<sup>487</sup> Feeding difficulties have been identified in unsociable, difficult, and demanding children.<sup>488,489</sup> Children's emotionality trait of their temperament may be related eating behaviors that are related to obesity risk<sup>490,491</sup> and parent weight status.<sup>199</sup> A prospective study of parents and children suggests that child temperament may not be an influencer, and instead, parental attributes are all that influences



a child's eating behavior. Duke et al<sup>492</sup> followed 135 children from birth to seven years of age and found that parental attributes related to disordered eating (i.e., maternal history of eating disorders, body dissatisfaction, drive for thinness, dietary restraint) at infancy assessed by questionnaire predicted parental pressure on their children to eat at age seven.<sup>492</sup> A recent review found that the relationships between temperament and weight outcomes are becoming more well established,<sup>80</sup> yet there is still no evidence of the mechanism by which temperament is directly associated with obesity in children.

The quantity of food eaten by children is not only dependent on the sensitivity of parents to the children's hunger and satiety cues, but also to a child's individual preferences and ability to self-regulate intake.<sup>245,493</sup> It is generally assumed that infants have a good inborn ability to self-regulate their food intake, but feeding practices from infancy through the first years of life may affect this self-regulation ability.<sup>493</sup> There is evidence that a chronic mismatch of infant inborn regulation and caregiver feeding behavior may alter the child's inborn self-regulation of eating and increase risk for overweight.<sup>494</sup> Early eating behaviors remain relatively stable as children get older (from ages 4 to 10),<sup>495</sup> yet children lose their ability to self-regulate and it is not clear when exactly this occurs. Children's inability to self-regulate their own behavior has been linked to rapid weight gain and obesity in middle childhood.<sup>496</sup>

**Measure of Child Temperament.** Few measures exist to assess a child's temperament in a concise parent-report survey. Two such measures are described below.

The Child Behavior Questionnaire (CBQ)<sup>497,498</sup> was developed for caregivers to complete to assess temperament of children aged 3- to 8-years old. The domains included in the original 195-item instrument include positive and negative emotion, motivation, activity level, and attention. In the CBQ, parents are asked to rate their child on a 7-point scale (extremely untrue of your child to extremely true of your child). Short and very short forms of the CBQ have been created.<sup>497</sup> The very short form includes 3 scales (36-items total) that have shown good internal

consistency: urgency (.70-.76) (i.e., “seems always in a big hurry to get from one place to another”), negative affect (0.66-0.70) (i.e., “gets quite frustrated when prevented from doing something s/he wants to do”), and effortful control (0.62-0.77) (i.e., “is good at following instructions”). The full questionnaire has been widely used in research of children and obesity-related behaviors. The “GO4fit Study” to intervene in childhood obesity in the Netherlands, is currently using the very short form to assess child temperament.<sup>499</sup>

The EAS (Emotionality, Activity, and Shyness) Temperament Survey<sup>500</sup> for children includes 20 items to assess four dimensions of children’s temperament, including: shyness (e.g., Child takes a long time to warm up to strangers); emotionality (e.g., Child gets upset easily); sociability (e.g., Child likes to be with people); and activity (e.g., Child is always on the go). Parent responses are provided given on a 5-point Likert scale to indicate how characteristic a behavior is of their child. Scores are summed and a mean score is calculated for each subscale, with higher scores indicating that a trait is more typical of the child. The survey shows good reliability with Cronbach’s alpha values ranging from 0.58 (sociability) to 0.83 (emotionality) with a sample of 3 to 8 year olds.<sup>490</sup> and good internal consistency and interrater reliability with a sample of Dutch children ages 4 to 13 years old.<sup>501</sup>

**Measures of Child Eating Styles.** Various questionnaires exist for parents to report their child’s eating behaviors. There are limited methods, however, to assess self-regulation of energy intake in preschool-aged children, especially using non-observational tools. Measures that may be used to identify child eating behaviors and self-regulation ability are described below.

An 8-item scale about Self-Regulation in Eating was developed by Tan and Holub<sup>502</sup> based on previous research<sup>503</sup> for use in a study of parents of children aged 3- to 9-years old from mixed ethnic and income families. The items include: (1) My child knows how much food s/he should eat, (2) My child stops eating when s/he is full, (3) My child knows when s/he should stop eating, (4) If my child is full, s/he will not eat snacks, (5) My child eats even when s/he is not

hungry (reverse scoring), (6) If my child is full, s/he will not ask for more food, (7) My child knows when s/he is full, (8) My child eats even when s/he is already full (reverse scoring). Parents responded using a 5-point Likert scale (1=disagree, 5=agree). High scores reflect energy regulation. The internal consistency for this scale was good (Cronbach alpha=0.87). A study with 3- to 8-year olds found that when parents believe their child could self-regulate, they used less restrictive feeding practices.<sup>502</sup>

The Children's Eating Behavior Questionnaire (CEBQ)<sup>504</sup> is a 35-item questionnaire which examines children's food approach and food avoidant eating behaviors. The food approach subscales are: food responsiveness (e.g., If allowed to, my child would eat too much); emotional over-eating (e.g., My child eats more when worried); enjoyment of food (e.g., My child looks forward to mealtimes); and desire to drink (e.g., My child is always asking for a drink). The four food avoidant subscales are: satiety responsiveness (e.g., My child gets full up easily); slowness in eating (e.g., My child takes more than 30 minutes to finish a meal); emotional under-eating (e.g., My child eats less when upset); and food fussiness (e.g., My child is difficult to please with meals). Participants respond on a 5-point Likert scale (never to always) and some items are reverse scored. Mean scores are calculated from the responses to each subscale and higher scores indicate a greater prevalence of that particular eating behavior. The CEBQ has been found to display good internal validity with child BMI and reliability when completed by parents of young children who vary in ethnicity and location.<sup>490,504,505</sup> A longitudinal study found that the CEBQ subscales had significant correlations between two time points, but lower correlation coefficients with satiety responsiveness, slowness in eating, food responsiveness, enjoyment of food, emotional overeating and food fussiness ranging from  $r=0.44$  to  $.55$  and emotional under eating  $r=0.29$ ,<sup>490,504</sup> but did not find an association between child BMI and their temperament.<sup>490</sup> The CEBQ also shows some inability to distinguish between food pickiness and food neophobia.<sup>506</sup>

The Feeding Problem Questionnaire<sup>507</sup> assesses pickiness (4-items), defined as poor and selective eating, and disturbing mealtime behaviors (4-items), which measure the amount of disturbing behavior during mealtime. The items are introduced, as “did the child exhibit one or more of the following behaviors at mealtime during the last week?” and are scored on a five-point scale (always, often, half of the time, seldom, or never). Feeding problem severity is scored based on the numbers of times parents rate “always” and “often” on each item. The questionnaire was developed for use with a mostly Dutch sample of parents of children aged 1- to 36-months (n=422). The pickiness items had relatively high factor loadings (range 0.59-0.74) and internal consistency (Cronbach alpha 0.78), and disturbing mealtime behaviors had fair factor loading (range 0.43-0.55) and good internal consistency (Cronbach alpha 0.61). No other study could be located that used this questionnaire.

The 25-item About Your Child’s Eating-Revised (AYCE-R)<sup>352</sup> questionnaire assesses caregiver beliefs and concerns about children's eating and family mealtime interactions. Caregivers indicate how often a variety of situations related to children’s eating take place in their family using a 5-point Likert-type scale (never to nearly all the time). The AYCE-R consists of three subscales with good internal consistency: Resistance to Eating, Positive Mealtime Interaction, and Child Aversion to Mealtime. Significant correlation with another environment scale in expected directions showed that the AYCE-R factors had good convergent validity. Validity and reliability was assessed in samples of children 8- to 16-years<sup>352</sup> and 2- to 6-year olds.<sup>508</sup> The AYCE-R has been used in a study of preschool-aged children and their parents enrolled in an obesity-prevention program and has shown improved resistance to eating and positive mealtime interactions between baseline and 6-months after the initiation of the intervention.<sup>140</sup>

## **SOCIAL COGNITIVE THEORY**

The Social Cognitive Theory (SCT), developed by Bandura,<sup>509</sup> defines human behavior as a dynamic and reciprocal interaction of personal, behavioral, and environmental factors. Constructs from this theory may help to identify parental behaviors and attitudes that are associated with increased obesity and obesogenic environment promotion in their home. The theory also conceptualizes multiple influences on behavior, focusing specifically on cognitive and social factors and has been used in a wide array of health behavior research domains.<sup>510</sup> Key constructs from these theories that are related to weight-related outcomes in children and adults include self-efficacy and outcome expectations. (See Appendix A for summary table of the surveys described below.)

### **Self-Efficacy**

Self-efficacy is an individual's belief that she/he has the ability to perform a given task.<sup>428,509</sup> Self-efficacy also may be described as confidence that one has to produce a certain outcome or as a person's belief in his/her ability to accomplish a task may affect behavior,<sup>509</sup> and a person's belief in him/herself to overcome difficulties inherent with a specific task in a specific situation.<sup>511</sup> Parents' perception of their efficacy, or 'perceived parental efficacy', may be defined as the "beliefs or judgments a parent holds of their capabilities to organize and execute a set of tasks related to parenting a child."<sup>512</sup> There is evidence that high parental self-efficacy predicts parents having better parenting practices.<sup>513</sup> Parenting self-efficacy with infants has been associated with maternal age and number of children, with older mothers and those with more children having higher self-efficacy.<sup>514</sup> Self-efficacy of physical activity and diet-related behaviors is a strong predictor of positive weight-related behaviors, and is the most consistent correlate of physical activity behaviors.<sup>118,222,511</sup> Greater self-efficacy for avoiding future weight gain also is associated with lower BMI in women.<sup>440</sup>

**Measuring Self-Efficacy.** Self-efficacy varies in magnitude, strength, and generality, "necessitating a need to study it in these ways for optimal outcome measurement."<sup>511</sup> Self-

efficacy magnitude is how capable a person feels of being able to perform a task, and strength is how certain the person is about accomplishing the task. Generality is the number of domains a person sees themselves being effective with. A person's self-efficacy to perform one behavior may enhance or detract from ability self-efficacy of other behaviors.<sup>511</sup> Surveys and scales commonly used to measure health-behavior self-efficacy are described below.

The Parent Expectations Survey (a measure of perceived self-efficacy)<sup>428</sup> measures perceived self-efficacy in early parenting, but may be modified to be used with parents of older children. Content validity was established with expert input and Bandura's input of phrasing and scaling recommendations. Then, it was tested with 105 first-time mothers with a mean age of 37 years. It is a 20-item survey 11-point Likert-type format (0=cannot do to 10=certain can do) that asks respondents to select the answer that most closely represents how she feels about herself as a new parent. It took about 10 minutes to complete and showed good concurrent validity with other similar scales (0.40 to 0.75) and predictive validity. Internal consistency was .91 at one month postpartum and .86 at 3 months postpartum. According to the authors, the measure is easy to administer, complete, and score.

Ball and Crawford used a 9-item self-efficacy scale<sup>440</sup> to assess confidence in the ability to prevent weight gain (2 items, e.g., how confident are you that you could avoid putting on any extra weight over the next 5 years?), physical activity (4-items, e.g., how confident are you that you could exercise for 30 minutes most days of the week, for the next year?), and healthy eating (3-items, e.g., how confident are you that you could stick to eating healthy nutritious foods over the next year?). Response options range from 1 (not at all confident), to 4 (very confident) and are summed to give three summary scores, with higher scores representing more self-efficacy. These scales had adequate internal reliability (Cronbach's alpha values 0.68-0.91).<sup>440</sup>

The "self-efficacy scales for health-related diet and exercise behaviors"<sup>515</sup> were developed to study how self-efficacy mediates effects in diet and exercise behavior change and to

identify behavior components that may be perceived as difficult to change or identify areas of increased relapse risk. The instrument includes two scales: the self-efficacy for eating behaviors scales (20-items), and the self-efficacy for exercise behaviors scales (12-items). The exercise self-efficacy scale measures beliefs that a person can maintain an exercise program under varying situations (e.g., when feeling tired). The diet self-efficacy scales assess ability to resist opportunities to overeat (e.g., resist food when watching TV). The original scales are assessed with a 5-point Likert-type scale (1= sure I could not do it, 5=sure I could do it) and an option for does not apply. Later use of the scales evaluates them on a 10-point scale from “not at all confident” to “very confident.”<sup>516</sup> Summing scores and averaging them, with higher scores indicating higher self-efficacy, can score the scales. The scales have been used in various populations and are generally considered valid and reliable. The diet self-efficacy scale was used to measure confidence of parents of overweight African-American adolescent girls and their families participating in an online family weight-loss intervention, but showed no association with weight outcomes in this group.<sup>517</sup> The exercise self-efficacy scale was shown, however, to significantly predict weight-maintenance outcomes at 12 and 24 months after a weight loss intervention among overweight and obese middle aged women.<sup>516</sup> The scales also have been used in a number of other studies to assess the influence of self-efficacy on diet and exercise-behavior outcomes.

Van Beurden et al<sup>518</sup> developed a 9-item scale to assess self-efficacy to make dietary changes as part of a cholesterol-lowering education program among adults in Australia. Question 1 was an open-ended question regarding suggestions they had received to make changes, and questions 2 to 9 addressed self-efficacy of making diet changes (e.g., “will you be able to switch to low fat dairy foods?”) with four reply options (no, doubtful, pretty sure, very sure). Correlations between initial and 3-month retests ranged from 0.26 to 0.62. Self-efficacy

responses were found to be good predictors of cholesterol change after the education program was completed. No other studies could be located that used this measure.

Harvey-Berino et al<sup>290</sup> used a 10-point scale (1=very unlikely and 10= very likely) to assess self-efficacy through ability to overcome 10 barriers regarding participation in physical activity.

The Women and Physical Activity Survey<sup>519</sup> includes 3-items which assess self-efficacy and motivation of women and physical activity. The survey did not undergo validity testing but was tested for reliability. Among the diverse adult women that responded (n=344), self-efficacy for exercise questions had good reliability (0.72; 95% CI, 0.66-0.77).<sup>519</sup>

The Parenting Self-Efficacy Subscale<sup>520</sup> of the Parenting Sense of Competence Scale<sup>521</sup> includes 2 questions that assess parenting efficacy and was created to assess parenting satisfaction and efficacy related to behavior problems in children. The parenting efficacy subscale has a Cronbach alpha score of 0.76.<sup>520</sup> The Parenting Eating and Activity for Child Health intervention used the Parenting Sense of Competence Scale to assess parenting variables as they relate to weight reduction in overweight 5-9 year olds. There was significant improvement in parenting efficacy from baseline to post-intervention, but the effect of parenting skill teaching only had a weak effect on BMI z score changes over 18 months.<sup>522</sup>

### **Outcome Expectations and Expectancies**

Outcome expectation is a construct of the SCT that assess beliefs about the “*likelihood* of the consequences of behavioral choices.”<sup>443</sup> Outcome expectancies assess the perceived *value* of the likelihood of behavioral choices. Having beliefs that outcomes were positive have been found to be associated with improved weight outcomes.<sup>440</sup> It is likely then that a person with high outcome expectancies will have stronger persistence and effort to produce an outcome.

**Measures of Outcome Expectations and Expectancies.** Ball and Crawford used a 14-item scale<sup>440</sup> to assess women’s outcome expectations and locus of control about weight control. The



questions begin with the statement “thinking about what has happened to your weight over the past 2 years, do you agree with the following statements?” The items then included statements about outcomes (e.g., doing physical activity alone will prevent me from gaining weight), and items on perceived locus of control (e.g., my weight, to a large extent, is controlled by fate).<sup>440</sup> Six items were found to significantly predict currently elevated BMI in a sample of women.

Harvey-Berino et al<sup>290</sup> used a 10-point scale (1=very unlikely and 10= very likely) to assess 10 outcome expectations, or perceived benefits regarding participation in physical activity. This scale is also used to assess self-efficacy for physical activity behaviors.<sup>290</sup>

## **SLEEP LENGTH AND QUALITY**

There is growing evidence that short sleep duration may be an independent risk factor for weight gain and obesity in children and adults.<sup>467,523</sup> There are numerous studies from a variety of global locations that report associations of less sleep time and increased risk of obesity independent of ethnicity in children.<sup>198,467,524,525</sup> There have been several reviews and meta-analyses<sup>67,467,526,527</sup> conducted, in addition to longitudinal and cross-sectional work. Some studies have even found a prospective relationship between amount of sleep early in life and weight status later.<sup>193,199,402</sup> Although the results are more mixed with adults than with children, there is some evidence that decreased sleep in adults also is associated with increased obesity.<sup>467</sup> This association may decrease as adults age, as a study showed that a sleep duration of 4 or less hours compared to 7 hours resulted in an odds ratio for obesity of 3.21 for those aged 32-49 years, 1.81 for those 50-67 years old, and 1.71 for those 68-86 years old.<sup>528</sup>

A lack of sleep and corresponding feelings of fatigue may lead to reduced physical activity,<sup>468,469</sup> as well as hormonal consequences that increase calorie intake.<sup>473</sup> Decreased leptin levels and elevated ghrelin which occur with a lack of sleep lead to increased hunger and appetite.<sup>473</sup> Studies, however, have not found a link between sleep habits and caloric intake.<sup>525</sup>

There is also no relationship between sleep and physical activity levels during the day (using actigraphy and accelerometers to measure physical activity).<sup>529,530</sup> There is the possibility of reverse causation occurring with sleep and obesity data, as medical conditions associated with obesity can disrupt sleep, including obstructive sleep apnea.<sup>467,531</sup> Studies that have used these medical conditions as covariates in multivariate modeling,<sup>467</sup> however, do not support this, and have found that weight was a better predictor of future sleep duration than sleep duration was of future weight.<sup>532</sup> It is possible that sleep alone or other not yet elucidated factors may be the source of the association of sleep duration and weight status.

Sleeping time of young children is likely to be a reflection of family lifestyles.<sup>525</sup> A lack of sleep is significantly associated with TV watching, playing video games, sports activities, eating snacks with TV, which may account for the risk of lack of sleep and overweight/obesity.<sup>525</sup>

There are numerous benefits to obtaining adequate sleep for children, as it helps improve memory and cognitive skills such as language and motor skill development.<sup>533-537</sup> Sleep duration requirements change through childhood, making studies that examine a variety of ages difficult to compare. There is also difficulty comparing ‘sleep exposure’,<sup>467</sup> as three different studies classify a 6-year-old with 9 hour sleep duration as short, intermediate, or long sleep duration.<sup>198,525,538</sup>

### **Measuring Sleep in Children and Adults**

The gold standard in sleep measurement and monitoring, polysomnography, is difficult to implement in free-living children, hence parental report of sleep duration via a diary or survey questionnaire is more common. Sleep diaries have been used in samples of young children,<sup>539</sup> yet may be burdensome to parents participating in a multi-faceted intervention. Parental questionnaires, however, may not accurately capture time spent in bed when the child is still awake.<sup>527</sup> The wording of questions also varies greatly across studies and few have been validated.<sup>467</sup> (See Appendix A for summary table of the surveys described below.)

The Nurses' Health Study uses one question to assess sleep time among adults, and showed good correlation of their question ( $r=0.79$ ) with 1 week of sleep diaries.<sup>540</sup> The survey asked over 82,969 women "How many hours of actual sleep do you get in a 24-hour period?" via a mailed survey. This question has been used in cross-sectional and longitudinal associations of sleep and overall mortality,<sup>540</sup> coronary heart disease,<sup>541</sup> and diabetes.<sup>542</sup>

Several studies assess usual sleep time by asking parents to give the time that their child usually goes to bed and usually wakes up in the morning.<sup>198,525,543</sup> These questionnaires have been administered to parents of children ranging from 5 to 15 years old from large cohort studies via telephone and paper-pencil survey.<sup>525,543</sup> Parents are asked, "When does your child usually go to bed during the week?" with options given as time intervals (e.g., before 8pm, between 8 and 9 pm, etc.) and "When does your child usually get up in the morning during the week?" with options again given as time intervals (e.g., before 6am, between 6 and 7, between 7 and 8, etc.). If the time selected by a parent was an interval (i.e., between 7 and 8am), the time was set as the lower time plus 30 minutes (i.e., 7:30am). If the time was given as before or after a time (i.e., before 6am), the time was set as the exact hour (i.e., 6am). Sleeping time of children was calculated as the difference between the evening and morning times. No studies have examined reliability and validity for this method of sleep time calculation. Studies that have used this method have found significant associations with decreased sleep duration and increased odds of being overweight and obese, yet they have used different methods of statistically analyzing duration of sleep (i.e., some use  $\leq 10$  hours, 10.5-11 hours, and  $\geq 11.5$  hours,<sup>525</sup> others use  $< 8$  hours, 8-9 hours, 9-10 hours,  $\geq 10$  hours<sup>198</sup>).

The Pittsburgh Sleep Quality Index (PSQI)<sup>544</sup> was developed "(1) to provide a reliable, valid, and standardized measure of sleep quality; (2) to discriminate between 'good' and 'poor' sleepers; (3) to provide an index that is easy for subjects to use and for clinicians and researchers to interpret; and (4) to provide a brief, clinically useful assessment of a variety of sleep

disturbances that might affect sleep quality.” (page 194, Buysse)<sup>544</sup> The full index includes 24 questions (some branched questions), and has good reliability and validity, including populations of adults with chronic disease.<sup>545,546</sup> The full PSQI, however, includes branched questions which may be difficult for some people to comprehend, and has rather cumbersome scoring techniques.<sup>546</sup> An adapted version of the PSQI which includes only 2 questions to assess sleep time and perceived-quality has been used in adolescent samples.<sup>547</sup>

The Children’s Sleep Habits Questionnaire (CSHQ)<sup>548-550</sup> is a retrospective, 45-item questionnaire and screening tool to examine sleep behavior in young children. The CSHQ also includes questions about the child’s bedtime, usual amount of sleep each day, length of night wakings, and time that the child usually awakens in the morning. An abbreviation of the study by Owens et al reduced the CSHQ to 33-items with 8 sub-scales that reflect sleep domains: 1) Bedtime Resistance, 2) Sleep Onset Delay, 3) Sleep Duration, 4) Sleep Anxiety, 5) Night Wakings, 6) Parasomnias, 7) Sleep Disordered Breathing, 8) Daytime Sleepiness. The items are answered on a 3-point scale of ‘usually’ if the behavior occurred 5- to 7-times per week, “sometimes” for 2- to 4-times per week, and “rarely” for 0- to 1-time per week. A Total Sleep Disturbance score is the mean of all items.<sup>548</sup> Internal consistency for the 33-item CSHQ ranged from 0.36 to 0.70 in a community sample of 4- to 10-year old children, and test-retest reliability estimates over a 2-week interval ranged from 0.62 to 0.79.<sup>548</sup> Another study omitted 4 items due to poor correlations when determining total scores.<sup>551</sup> The CSHQ has also been assessed in younger children aged 2- to 5-years old and shown good reliability.<sup>552</sup>

## DEMOGRAPHIC CHARACTERISTICS

Assessing demographic characteristics of any sample is necessary as these characteristics often influence outcomes within a sample and some are known to influence obesity risk. Ethnic and socioeconomic status (SES) differences are known to modulate obesity/overweight and

disease risk,<sup>553-559,560 554,561</sup> although the association between socioeconomic status and obesity has weakened over the past 30 years with the broad increase in obesity rates.<sup>554</sup> There are also ethnic and racial influences on associations of other variables with obesity risk. Education attainment of parents is another important modifier, as numerous studies have found mother's education to be strongly associated with obesity in their children.<sup>193</sup> Differences in parents' country of birth may also affect outcomes of behaviors related to obesity in families.<sup>325</sup> Other demographic characteristics that are known to affect risk of obesity/overweight and chronic disease include family history of obesity<sup>562</sup> and weight-related problems (i.e., type 2 diabetes).<sup>563</sup> The literature also indicates that a mother's employment status may affect a young child's risk of obesity through various mechanisms, including the potential of women working away from home having less time for meal preparation and instead choosing more prepared or take away foods.<sup>564</sup> Maternal employment is consistently not associated, however, with screen time use in infants and toddlers in a review.<sup>399</sup> Food insecurity is associated with developmental deficits in young children<sup>565</sup> and is related to some risks for obesity among adults and children.<sup>566,567</sup> A 2-item measure of food insecurity risk that has been shown to be valid with low-income families with young children can quickly identify households at risk for food insecurity.<sup>568</sup>

### **Socioeconomic Status**

**Family Affluence.** Socioeconomic status has been implicated as a mediator of obesity risk in children and adults. The Family Affluence Scale (FAS) I was created as an alternative 4-item measure of family wealth in the WHO Health Behaviour in School-aged Children Study.<sup>569</sup> Comparison of the FAS to Gross Domestic Product (GDP) in 35 counties showed good criterion validity with rank order correlation of 0.87, indicating its application in analysis of relationships between socioeconomic status and health.<sup>569</sup> The FAS II was updated to ask about computers instead of telephones in the home and includes an item that asks about family holidays. The FAS II has shown good validity in other studies as a measure of socioeconomic status.<sup>570,571</sup>

**Occupational Prestige.** Socioeconomic status is also measured using occupational prestige as an indicator.<sup>572</sup> Occupational prestige measures both current employment as well as potential for income using educational attainment as a proxy.

### **Chronic Disease Status/Measures**

Chronic disease status may influence obesity risk, as having a disease may decrease ability to participate in physical activity or be treated with special diets (e.g., diabetes and carbohydrate counting). Assessment of chronic disease in adults and in children is important as they may be confounding variables of overweight and obesity risk. They may also contribute to risk of obesity, especially for children. A mother who has gestational diabetes, for example, increases her child's risk of overweight at adolescence.<sup>573</sup>

Chronic disease status may be measured using the telephone-based survey "Behavioral Risk Factor Surveillance Survey" (BRFSS) uses self-reported information to obtain information about health on a sample representative of the general U.S. population.<sup>574</sup> It includes measures of self-report health status of blood pressure, cholesterol, diabetes, and self-assessed health quality. The 'core' BRFSS questions have shown good construct validity<sup>459</sup> and reasonably good criterion validity when compared to the Rand Corporation's Medical Outcomes Study Short Form 36 in both healthy and disabled populations.<sup>575,576</sup>

### **Anthropometric Measures**

Numerous studies have shown that low or high weight at birth is highly associated with obesity risk later in life.<sup>573,577,578</sup> Children born at low birth weights who are raised in an energy-rich environment are at risk of obesity later in life.<sup>578,579</sup> The intrauterine environment appears to have influence over later risk of obesity and weight-related chronic disease that may be influenced by the environment and is a necessary consideration of obesity risk assessment.<sup>579</sup>

Weight and height is used to calculate BMI of children and parents, which then is used to diagnosis obesity and overweight. There is substantial evidence that parental obesity is

associated with youth obesity,<sup>332,65, 291, 193,332,580</sup> making this an important variable that needs to be captured. While usually underreported (especially with overweight and obese adults), the use of self-reported weight and height for BMI in adults is generally considered valid in large, population-based studies.<sup>581-584</sup> There is evidence, however, that parents are somewhat inaccurate when measuring the height and weight of their child.<sup>585,586</sup>

Waist circumference (WC) is a measure of abdominal or central adiposity, and is a good predictor for risk of obesity-related disorders, including diabetes.<sup>581,587</sup> It also may be useful for clinically identifying overweight and obesity in addition to, or in place of BMI, as BMI does not reflect fat distribution in the body. Excess abdominal or central fat is associated with an increased risk of cardiometabolic disease.<sup>587</sup> To precisely measure abdominal fat, however, requires invasive and costly imaging techniques.<sup>587</sup> The use of self-reported waist circumference is a cost-effective method of obtaining information in a large group of people and is recommended for use in clinical medicine practices to assess efficacy of weight loss interventions.<sup>587,588</sup>

A study of Dutch, overweight workers used the question “what is your waist circumference?” in centimeters and the statement “use the tape measure and instructions that were sent to you along with the questionnaire.” The subjects were instructed to measure their WC twice in a row to the nearest centimeter, at the midpoint between the lower border of the ribs and the upper border of the pelvis, on bare skin with clothing removed, during exhalation, while standing straight-up with the legs 25 to 30 cm apart. They were also told to measure themselves, not have it done by someone else and to first mark the points of measuring on skin with a pen, and hold the tape horizontally, and take the average of two readings. This study found that although biased to over-report WC (especially in male, heavier and shorter subjects), self-reported WC is satisfactorily accurate for assessment of prevalence of overweight or obesity when compared to researcher-measured WC.<sup>581</sup>

Another study used a training video to instruct adult participants on accurate measurement of waist circumference compared to written instructions. Although both groups underestimated their waist circumference, using training videos to instruct anthropometric measures may be useful as an inexpensive method.<sup>589</sup> Data also show that if adults measure at the level of the umbilicus, this may result in a larger measure than if measured midway between the lower rib and iliac crest (natural waist).<sup>590</sup> Studies indicate that self-reported waist circumference is feasible and relatively reliable indicator of fat distribution.

### **Birth Mode of Delivery**

A growing body of evidence is emerging that posits the mode of delivery at birth may influence health outcomes later in life, including risk for overweight and obesity in children and adolescents,<sup>591,592</sup> as well as adults.<sup>591,592</sup> A recent review and meta-analysis that examined 15 studies with a combined population of 153,753 concluded that there is a strong association between increased offspring adult BMI, overweight, and obesity when born via caesarean section (average BMI increase 0.5kg/m<sup>2</sup> for vaginal versus caesarean delivered offspring).<sup>593</sup> While the mechanism for this difference is still unknown,<sup>594</sup> it is proposed that babies born via caesarean section acquire different composition of intestinal flora, potentially contributing to development of obesity.<sup>595</sup>



### **CHAPTER 3**

#### **METHODOLOGY**

The logic model shown in Figure 5 provides an overview of the short-term, as well as medium- and long-term, goals of this research related to obesity prevention in preschool-aged children and their mothers. The inputs include time (i.e., researchers' and participants' time) and money (e.g., incentives for participants; purchase of supplies to assist in data collection and analysis). The main outcomes are greater understanding of weight-related characteristics of the home environment of preschool children and how these characteristics differ with weight status and obesity risk of preschoolers and their mothers.

Short-term outcomes include increased awareness among health care providers and parents regarding factors in the home environment that increase or reduce obesity risk by sharing research findings via journal articles and/or other media sources. Medium-term outcomes are improvements in home environments that support healthy weights. The long-term outcomes of this study include a contribution to efforts to decrease in the prevalence of obesity in young children and their families.

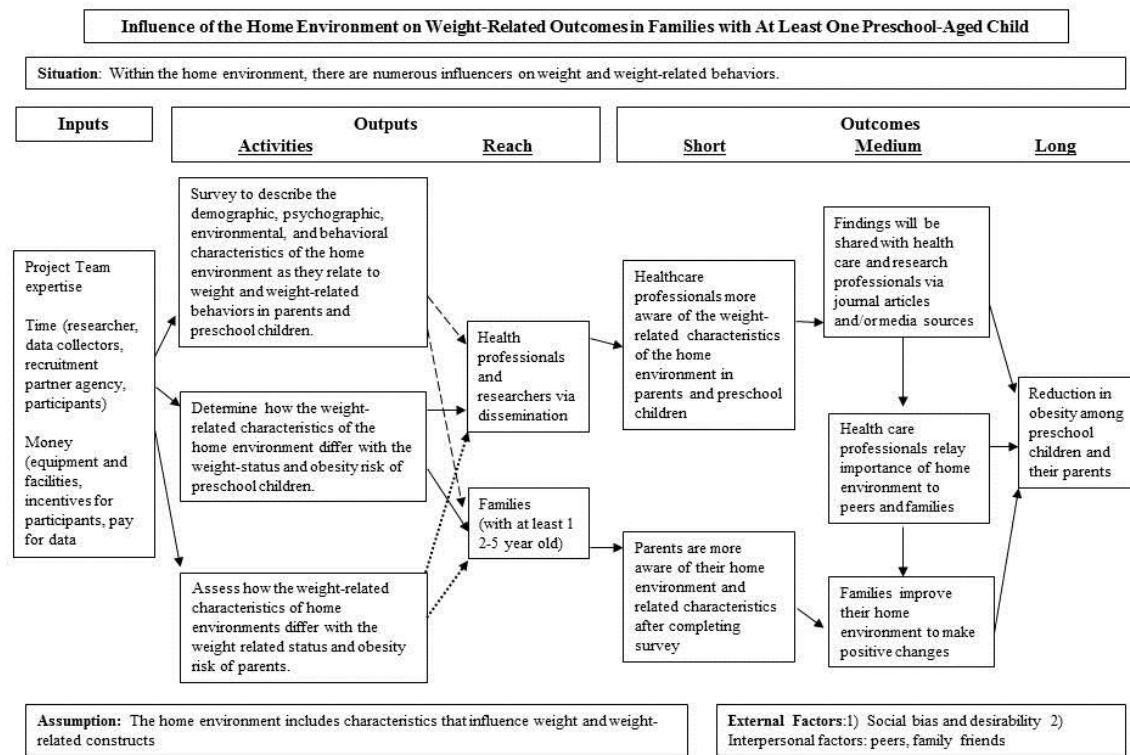
A timeline for the methodology of this study is shown in Figure 6. This study was approved by the Rutgers University Institutional Review Board.

#### **STUDY DESIGN**

The main research questions for this study are:

1. What are the weight-related characteristics of the home environments (i.e., parental demographic, psychographic, behavioral, and physical environment characteristics) of preschool children?
2. How do weight-related characteristics of home environments differ with the weight status of mothers?

Figure 5: Logic Model



(\*NOTE: some arrows dashed to increase clarity of figure)

**Figure 6: Research Timeline**

<b>Date of Activity</b>	<b>Activity</b>
May 2011 to February 2013	Conducted literature review Wrote Introduction and Literature Review
March to May 2013	Developed Methodology Identified and selection of survey scales
June 2013	Defend proposal Conduct expert review/cognitive testing instruments
June-August 2013	Submit to IRB Conduct pilot test and clean survey
December 2013	Collect data
August 2013-2016	Analyze data Complete final dissertation draft
2016	Defend Dissertation Prepare manuscripts for peer-reviewed publication

3. A) What intrapersonal, interpersonal, and home environment characteristics were associated with maternal obese vs. non-obese weight status?
- B) What is the obesity risk of non-obese mothers based on a score derived using the characteristics elucidated in Question 3A?
- C) How do non-obese mothers' intrapersonal, interpersonal, and home environmental characteristics differ based on their obesity risk score tertile?

This cross-sectional study used valid, reliable instruments to conduct a comprehensive survey of the weight-related behavioral, psychographic, demographic, and physical environment characteristics of the home environment of preschool-aged (i.e., 2 to 5 years) children and their mothers. These data were used to explore associations of weight-related characteristics of the home environment with weight status and obesity risk of preschool children and their mothers and to create a score of personal and environmental obesity risk for families with young children. The characteristics to be investigated have been reported by others as important contributors to obesity risk and/or weight status. To date, studies have included only a narrow array of factors and no comprehensive analysis of the home environment, intrapersonal characteristics, and interpersonal characteristics has been conducted to create an obesity risk score. This study aims to increase the array to provide a more comprehensive understanding of characteristics affecting obesity risk and weight status.

### **SURVEY PILOT TESTING**

The **H**ome **O**besogenicity **M**easure of **E**nvironment**S** (HOMES) survey was first pilot tested to ensure functionality of the online survey, determine normal time to complete, and assess any areas of the survey that may be too difficult or long for parents to complete in the targeted 60- minute time frame. The HOMES instrument was pilot tested with a convenience sample

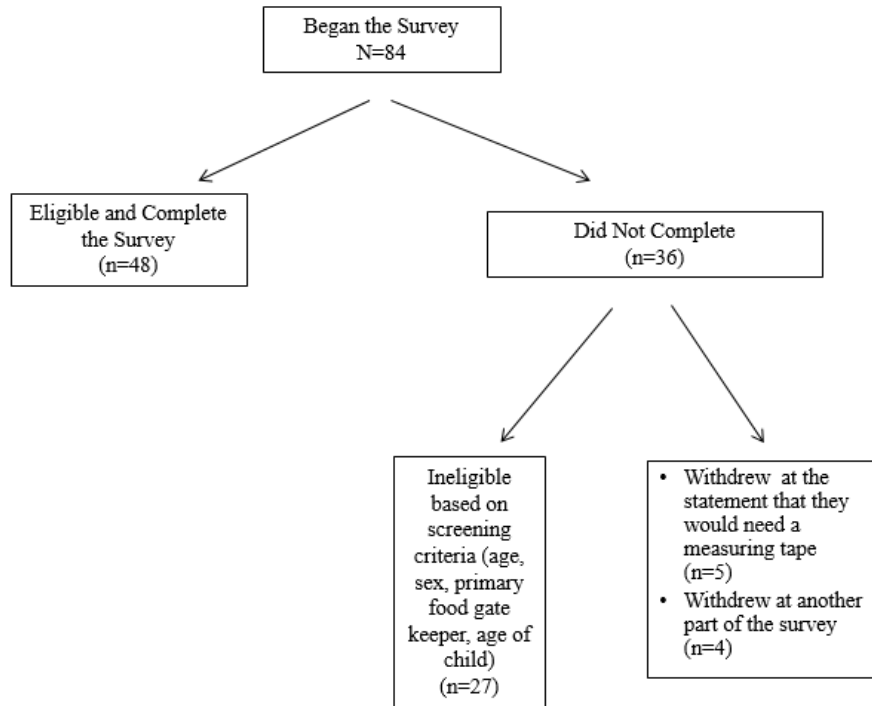
(n=48) who met the same eligibility criteria and the final sample of mothers. They were recruited via emailed notices sent to a campus listserv. The pilot test parameters were set to allow participants up to 72 hours to complete it (i.e., participants could start, stop, and restart the survey at the point where they left off for up to 72 hours). Pilot testing results indicated that the survey took approximately 60 minutes to complete and was operating correctly. Survey completion times ranged from 32 minutes to more than 48 hours, with mean completion time of  $89.32 \pm 91.97$ SD minutes and a median time of 60 minutes. This provided rationale that some people may choose to stop and start the survey (i.e., those who took more than 48 hours) and that the survey should take no less than 30 minutes to complete. Reasons for the pilot survey non-completion are shown in Figure 7. Non-completion information was used to explore whether certain questions were difficult to answer or for other reasons contributed to mothers leaving the survey, yet no consistent issues were identified, and thus no changes made (see Figure 7). The results indicated that the survey was able to be completed in a reasonable period of time (i.e., about 1 hour) and that the survey format was satisfactory in its layout and formatting.

## **SAMPLE AND RECRUITMENT**

### **Recruitment Process**

The survey participants were recruited with the assistance of Survey Sampling International (SSI). SSI is a for-profit organization that retains a panel of individuals that have provided some basic demographic information for screening purposes and complete surveys sent to them by SSI based on their characteristics (e.g., age, number of children, typical stores used for grocery shopping, etc.). Surveys are completed in exchange for “points” which may be redeemed for various gift cards and other payments. SSI was

**Figure 7: Pilot Testing Reasons for Non-Completion**



selected because of the large population of survey-takers in their panel who met this study's eligibility criteria. They also were able to target the panelists who would receive the link to the survey to those who met eligibility criteria and ensure that a sample with similar demographic patterns of people in the United States could be met (i.e., percentages of educational attainment, race/ethnicity were similar to the general United States population for parents in the targeted age range). SSI targeted eligible panelists with an email solicitation to take a survey, and then directed them to the survey Qualtrics link to complete the survey.

The survey was opened to SSI panelists who met eligibility criteria on Saturday, December 7, 2013 at 10:30am and closed at 5pm on Sunday, December 8, 2013 after an adequate number of complete responses were received.

Mothers with at least one child aged 2- to 5-years old were targeted with survey link emails by SSI to complete the full study survey. To be eligible, mothers must: be a parent of at least one child between the ages of two and five years; between the ages of 18 and 45; not employed in a health-related profession; not have a spouse or live-in partner employed in a health-related profession; be the main household food gatekeeper; and be English speaking. Data were closely monitored to ensure an array of demographics which mirrored the general U.S. population and that participants met inclusion criteria. As data completion neared its end, SSI was contacted to target more participants with less education and from minority groups as they were needed to more closely match population demographics.

This age group of children was chosen because of the importance of parents' influence on their children's weight-related behaviors at this age and evidence that habits developed during the preschool years track into later childhood and adulthood.<sup>21-24,65</sup> Thus, by learning which factors contribute to increased obesity risk it may be possible for parents to make targeted changes that help children grow up at a healthy weight.

Mothers were instructed in the beginning of the survey to report information about themselves as well as one of their children between the ages of 2 and 5 years. If a mother had

two or more children that were eligible, she was asked to answer questions on the child with the first letter of his/her first name closest to “U” (letter chosen using random letter generator<sup>596</sup>). If more than one child had the same first initial, the child whose birth date is closest to June 7th should have been used (date chosen using random date generator<sup>596</sup>).

Once a parent was deemed eligible, the online informed consent page was the first page in the Qualtrics survey. It detailed the time to complete (about 60 minutes) and the incentive for completing the survey (300 points with SSI). The next page aided in reducing social desirability bias by reminding mothers that there are no right or wrong answers and that they are all confidential. Respondents were also told that they may stop and return to the survey within 48 hours (this was not used; however, as the target number of completions was reached in 18.5 hours of the survey being available). Mothers were then instructed that they survey should be completed on a computer or tablet as it is difficult to read on a smart phone, and that they should get a non-metal measuring tape if they had one for later survey questions.

### **HOME OBESOGENIC ENVIRONMENTS (HOMES) SURVEY DEVELOPMENT**

Development of the HOMES survey began with a comprehensive literature review to identify salient weight-related demographic, environmental, behavioral, and psychographic characteristics. Self-report scales assessing these characteristics, preferably those previously used and validated with a diverse sample of U.S. adults and preschool children, also were identified. When multiple scales for assessing a characteristic were found, each was reviewed to determine which was most relevant to the study sample, easy to administer and score, and had good reliability and validity. In addition, previously published psychometric and factor analysis data were examined to determine whether scales could be shortened to reduce participant burden while preserving instrument integrity. In the few cases where published psychometric data could not be located, three experts in nutrition and tests and measurements reviewed scales to identify the most



salient items. If no instrument could be located in the literature to assess a characteristic of interest, or none that fit the needs of the study could be located, items were developed *de novo*.

The process used to develop and refine scales follows Redding et al's recommendations for sequential approach to measurement of health behavior change constructs.<sup>597</sup> That is, for scales with items heavily modified from their original form or developed *de novo*, ~5 experts in subject matter areas appropriate to the scale content (e.g., nutrition, physical activity, psychology, child development, obesogenic environment) and survey design reviewed them to ensure scale clarity and content validity (i.e., items in the scale reflect the characteristic being measured).<sup>598</sup> Content validity measures the degree that elements of an instrument are "relevant to and representative of the targeted construct..."<sup>599, P239</sup>. Expert comments were used to refine the scales; if refinements were extensive; the scales were again subjected to iterative expert review and refined until only minor refinements were needed.

The substantially modified or *de novo* items then underwent cognitive testing with participants with characteristics similar to the study population (who did not participate in the final study) to assess whether they interpreted items as intended,<sup>598</sup> to determine ways to reduce participant burden, and increase acceptability.<sup>600</sup> During cognitive testing, participants were asked to read each item aloud and then repeat in his or her own words what the item was saying, and then answer the question as indicated. In addition, they were asked open-ended, general questions about the ease of understanding and recommendations to make the items easier to understand and faster to complete. The items underwent iterative refinement and cognitive testing until clearly understood by and acceptable to the target audience.<sup>597</sup>

After refining items to reduce time to complete, increase clarity, correct grammar, and improve relevance to the research purpose, the scales were consolidated into a single survey that was posted online (using Qualtrics®) for ease of data collection and convenience for participants. The survey then underwent pilot-testing with 48 participants with characteristics similar to those who participated in the final study (but did not participate in the final study) to gauge completion

time and identify further refinements needed to improve clarity and ease of completion. Qualtrics® also provides information about time to complete each survey item and the full survey, which were used to identify potential areas that were too difficult or time consuming. Pilot test results also were used to ensure the protocols for scoring scales were accurate.

The survey was administered online to help reduce social desirability and increase researchers' ability to reach groups and individuals that would be otherwise difficult to access (i.e., distance from researchers).<sup>601</sup> Online surveys also can be completed at times convenient to participants, efficiently collect and store data, and result in saving time and costs for researchers while maintaining study fidelity.<sup>601</sup> The use of a "preamble" statement at the beginning of the survey to make all responses "acceptable and normal" also may help reduce social desirability bias.<sup>602</sup> The relative anonymity provided by the collection of data via the Internet (i.e., participants do not meet the researcher in person) and assurance of the confidentiality of responses are also benefits that may enable people to more accurately answer questions they may be hesitant to answer in other situations.<sup>601</sup>

#### **HOMES INSTRUMENT COMPONENTS**

The survey instrument included components (Appendix B) investigating the weight-related characteristics of the home environments (i.e., parental demographic, psychographic, behavioral, and physical environment characteristics) of preschool children. Each component is described briefly below; see Appendix B for items on each scale and a description of how scales were adapted for this study.

Parents reported information about themselves as well as one of their children between the ages of 2 and 5. As described previously, parents with two or more children who were eligible were instructed to report on the child with the first letter of his/her first name closest to "U" (letter chosen using random letter generator<sup>596</sup>), and if more than one eligible child had a first initial equidistant from the letter "U", the child whose birthdate closest to June 7th should be used

(date chosen using random date generator<sup>596</sup>). If the children are twins with the same first initial, the child born closest to 1pm on June 7<sup>th</sup> was chosen.

### **Intrapersonal Characteristics**

**Maternal Demographic Characteristics.** The purpose of this section is to describe the various demographic characteristics of mothers of young children. This section includes 21 total items.

The purpose of the demographics section is to describe the personal characteristics of the participant. This section includes sex, age, race/ethnicity, education, number and ages of children under age 18, birth country, language spoken at home, marital status, region of residence, employment, and partner/spouse employment.

**Family Affluence Scale.**<sup>569,570</sup> This scale uses 4 items to measure family affluence. Answers are assigned points and are summed to provide a score of low, middle, or high affluence.

**2-item Food Security Screener.**<sup>568</sup> This screener is a valid 2-item measure which briefly identifies families at risk for food insecurity.

**Maternal Pregnancy History and Health.** This section includes 9-items created de novo for this survey which assess if a mother is currently or has been pregnant. If she has or is currently pregnant, the survey proceeds with questions asking if she has ever given birth to a child or large or small gestational age, age at birth of her first child, and if while pregnant a doctor has ever told her she has high blood pressure, low iron levels (anemia), diabetes, depression during pregnancy or after a birth.

**Maternal and Family Health Status.** The goal of this section is to obtain information on the health of the parent and pertinent family members. This section includes data on smoking status of mothers and pertinent health history. It includes four sub-scales that have been adapted from existing, validated instruments to shorten it and reduce participant burden.

**General Health Rating.**<sup>458,460</sup> This 1-item question assesses general health rating and is an original question from the Center for Disease Control and Prevention's Health-Related Quality of Life questionnaire.<sup>458,460</sup>

**Ever Diagnosed with a Chronic Disease.** This sub-scale assesses if the respondent has ever been diagnosed with a chronic disease that is related to obesity. Participants may select more than one. This sub-scale was adapted from the National Health and Nutrition Examination Survey (NHANES).<sup>421</sup>

**Depression Severity.** This 2-item sub-scale assesses the severity of depression symptoms from the Patient Health Questionnaire-2.<sup>416</sup>

**Health-Related Quality of Life Scale.**<sup>458,460</sup> This sub-scale assesses a person's subjective assessment of his/her own physical and mental health. It includes 3 original items from the Center for Disease Control and Prevention's Health-Related Quality of Life questionnaire.<sup>458,460</sup>

**Smoking Status.** This question was created de-novo and asks how often in the past month one or more cigarette was smoked.

**Health and Dietary Characteristics of Primary Family Members and Those Living in the Home.** These 4 questions were created de-novo to assist in briefly describing the obesity-related health and prescribed dietary characteristics of those living in the home of the respondents.

**Maternal Anthropometric Measurements.** The purpose of this section is to obtain the weight, height, waist, neck, and hip circumferences of mothers of young children.

**Maternal Body Mass Index and Weight Status.** Weight and height of parents and children were asked as a component of obesity and obesity risk. Body mass index (BMI) was calculated as weight in kilograms divided by height in meters squared, rounded to one decimal place. Obesity in adults is defined as BMI greater than or equal to 30. Overweight is defined as BMI between 25.0 and 29.9, normal weight as 24.9 and 18.5, and underweight as 18.4 and less.

**Waist, Hip, and Neck Circumference.** For the circumference measures, mothers were instructed to click a link to download, print, and assemble a PDF-formatted measuring tape to measure waist circumference if a suitable (i.e., flexible) measuring tape was unable for use at the time. A link to a short video that demonstrates how to assemble and use the tape to accurately measure circumferences was provided. (See Appendix C for printable PDF measuring tape.) The

parents were instructed to measure their waist at the level of the umbilicus, which may result in larger measures than if done at the natural waist (between the lower ribs and iliac crest).<sup>590</sup> Data also indicate, however, that using video instruction to measure waist circumference may result in underestimation.<sup>589</sup> A concurrent study was performed which showed reasonable accuracy using this method.<sup>603</sup> Note that if a mother was pregnant, these items were skipped.

#### **Maternal Weight History, Body Satisfaction, and Other Anthropometric Indicators**

The purpose of this section is to assess perceived weight in the past and present, current body satisfaction, and other anthropometric measures (i.e., bra band and cup size) to provide supplemental anthropometric measurements in addition to the measures of height and weight.

**Weight Perception History.** The items in this sub-scale assess if a mother thinks she is currently and has ever been very thin, thin, average, slightly heavy, or overweight. The weight perception items are adapted from the Child Feeding Questionnaire.<sup>285</sup> The originals were modified to include specific ages instead of ranges and has been used in previous research.<sup>8</sup> It also includes visual pictures for the mother to select from to visually describe how she perceives her figure.

**Other Anthropometric Indicators.** The items in this sub-scale were created de novo to describe a mother's body shape as a supplemental anthropometric indicator to circumferences and BMI. It includes items assessing bra band and cup size, and comparison of hip, waist, and bra band measurements.

**Body Satisfaction.** This 1-item sub-scale assesses a mother's contentment with her own body shape. It includes one item from the Eating Disorder Examination Questionnaire.<sup>604</sup>

#### **Maternal Physical Activity Score, Screen Time, and Transportation Mode**

The purpose of this section is to assess physically active levels and screen time of preschool children and their primary mode of transportation.

**Maternal Physical Activity Level- IPAQ Score.**<sup>70,86,139,196</sup> This 3-item scale was modified from two existing, validated instruments (i.e., the Parental Support, Importance, and Enjoyment Scales

and the International Physical Activity Questionnaire.)<sup>70,86,139,196</sup> The IPAQ categorical scoring method was modified to account for relative intensity of activity to enable scoring in categories (i.e., sedentary, moderate, and high).<sup>605</sup> This method correlates well with a small sample of accelerometer data from preschool-aged children.<sup>606</sup>

**Maternal Screentime.**<sup>607</sup> This 1-item question assesses the time that mothers of preschool children spend using screentime and it is assessed to either meet or not meet screentime guidelines.<sup>607</sup>

**Maternal Typical Mode of Transportation.** This 1-item question assesses the type of transportation that mothers of preschool children typically use. They choose the one type they usually use. Non-motorized transportation is considered to be the most active, followed by public transport (subway, train, bus), and motorcycles and car is the least active mode of transportation.

#### **Maternal Sleep Time and Quality**

The questions in this section assess the quantity and quality of sleep of mothers of preschool children.

**Hours of Sleep.** The purpose of this 1-item scale is to assess how much time a parent spends sleeping. It was adapted from a validated, shortened version of the Pittsburgh Sleep Quality Index.<sup>544,545</sup>

**Maternal Sleep Quality.** The purpose of this 1-item scale is to assess the sleep quality of mothers of young children. It was adapted from a validated, shortened version of the Pittsburgh Sleep Quality Index.<sup>544,545</sup>

#### **Maternal Dietary Intake using Food Frequency Screeners**

This section describes the dietary intake of mothers of young children, namely their intake of specific micro and macro nutrients and sugar-sweetened beverages (SSB) using the Block Fruit-Vegetable-Fiber,<sup>131,241</sup> the Block Dietary Fat Screener,<sup>131,241</sup> and an adapted SSB screener.<sup>242-244</sup>

**Fruit, Vegetable, and Fiber Screener.**<sup>241</sup> This 9-item screener provides a score of fruit, vegetable and fiber intake which is used to assess fruit/vegetable servings per day, and intake of fiber, vitamin C, magnesium, and potassium using prediction equations.<sup>131,241</sup>

**Meat/Snack Screener.**<sup>241</sup> This 9-item screener provides a score of meat/snack intake which is used to estimate daily intake of total fat, saturated fat, percent fat, and dietary cholesterol using a prediction equation.<sup>131,241</sup>

**Sugar-Sweetened Beverage Intake.**<sup>242-244</sup> This 6-item questionnaire assesses intake of sugar-sweetened beverages, juice, and milk. It was modified from the Block Kids' Screener,<sup>242</sup> the fast food/beverage screener,<sup>243</sup> and a survey for college-students.<sup>244</sup> The modified survey may be used to estimate servings of beverages, as well as calorie and sugar intake.

#### **Maternal Eating Behaviors**

The purpose of this scale is to assess dimensions of parent eating styles including disinhibited eating, emotional eating, dietary restraint, and food adventurousness. The scales have been shortened based on factor analysis and previous research.<sup>359,361,608</sup>

**Disinhibited Eating.** The purpose of this sub-scale is to assess a parent's temporary loss of control over eating behaviors. The 3 items are adapted from the Three-Factor Eating Questionnaire.<sup>359,361,608</sup>

**Emotional Eating.** The purpose of this sub-scale is to assess how emotions influence a parent's urge to eat or overeat. The 3 items are adapted from the Three-Factor Eating Questionnaire.<sup>359,361,608</sup>

**Dietary Restraint.** The purpose of this sub-scale is to assess the intention of a parent to restrict or regulate his/her food intake to prevent weight gain. The 3 items are adapted from the Three-Factor Eating Questionnaire.<sup>359,361,608</sup>

**Food Adventurousness.** The purpose of this sub-scale is to assess parent acceptance of new or unfamiliar foods. It is adapted from the 1-item Food Adventurousness scale<sup>609</sup> by adding the two highest loading items from the Food Neophobia Scale.<sup>489,610</sup>

### **Maternal Perception of Teasing in her Childhood**

The purpose of this subscale is to assess whether or not the parent was teased because of his or her weight and the impact this had emotionally. It includes two original items from the Perceptions of Teasing Scale<sup>611</sup> to assess frequency of teasing and effect on the mother (i.e., how upset she was).

### **Maternal Psychographic Characteristics**

The purpose of this section is to assess the weight- and health-related psychographics of mothers of young children, including: self-control, need for cognition, stress management, self-efficacy of stress management, parenting self-efficacy, and family support for healthy behaviors. It was modified from existing, validated instruments to shorten it and reduce participant burden. It includes 14 items.

**Self Control.** This 5-item scale assesses ability to demonstrate good self-control in personal areas. It was adapted from a longer scale called the Confusion, Hubbub and Order scale.<sup>465</sup>

**Need for Cognition.** This indicator scale assesses an individual's desire to engage in "effortful cognitive activities"<sup>28,29</sup> and desire to have more intellectual engagement. It is one of the original 5 items from the Need for Cognition scale that have been previously validated and tested.<sup>481,482</sup>

**Stress Management.** The purpose of this scale is to assess how often mothers felt able to manage stress. It is assessed using the original 4-item Perceived Stress scale.<sup>427</sup>

**Self-Efficacy of Stress Management.** This scale assesses parental self-efficacy management of stress. It is one of 2 items from the original 4-item Perceived Stress scale.<sup>427</sup>

**Parenting Self-efficacy.** This 1-item indicator question assesses self-efficacy of parenting skills. It was adapted from a measure of parenting satisfaction and efficacy.<sup>520,521</sup>

### **Maternal Perceptions About Child Overweight**

The items in this section assess parent concern about their child's weight and the healthfulness of overweight. It includes 2 sub-scales.



**Perceptions of Healthy Child Weight.** This 3-item scale includes items created de novo and 1 item adapted from another scale<sup>301</sup> to assess maternal opinions related to healthfulness of heavier weights in babies and young children.<sup>301</sup>

**Concern About Weight.** The purpose of this 2-item scale is to assess parent concern about their child's weight. These items were adapted from the Child Feeding Questionnaire.<sup>285</sup>

#### **Parent Behavior Modeling, Importance, and Encouragement of Physical Activity and Media Use**

This section assesses mothers' importance of physical activity for themselves and their preschool children, as well as their encouragement and importance placed on physical activity, and how often mothers engage in physical activity with their children and model physical activity and screentime behaviors.

**Importance of Physical Activity for Self.** The purpose of this 3-item subscale is to assess the importance that a mother places on her own physical activity. It is adapted from the Parental Support, Importance, and Enjoyment Scales.<sup>70,139</sup>

**Importance of Physical Activity for Child.** The purpose of this 2-item subscale is to assess the importance that a mother places on her child's physical activity. It is adapted from the Parental Support, Importance, and Enjoyment Scales.<sup>70,139</sup>

**Encouragement and Facilitation of Physical Activity.** The purpose of this 5-item subscale is to determine the extent to which a mother encourages and places importance on her child to be physically active. It is adapted from two existing surveys (i.e., the Parental Support, Importance, and Enjoyment Scales and the Physical and Nutritional Home Environment Inventory).<sup>70,86,139</sup>

**Mother and Child Co- Physical Activity Frequency.** This 2-item scale assesses how often a mother participates in physical activity for more than 15 minutes at a time each day in a week with her preschool child.

**Maternal Modeling of Physical Activity.** The purpose of this 6-item subscale is to identify how often a mother models physical activity. It is adapted from four existing surveys (i.e., the

Physical and Nutritional Home Environment Inventory, the Healthy Home Survey, the Home Environment Survey, and the Chicago Neighborhood Inventory).<sup>86,129,131,135</sup>

**Importance of Modeling Physical Activity.** This 2-item scale assesses mothers' importance placed on modeling physical activity to their preschool children.

**Modeling Sedentary Behavior.** The purpose of this 2-item subscale is to identify how often a mother models media use. It is adapted from four existing surveys (i.e., the Physical and Nutritional Home Environment Inventory, the Healthy Home Survey, the Home Environment Survey, and the Chicago Neighborhood Inventory).<sup>86,129,131,135</sup>

#### **Maternal Beliefs and Practices Regarding Screen time in Families with Preschool Children**

The purpose of this section is to assess parents practices and attitudes surrounding limiting television time, talking with their children about media and television, and how they believe television positively affects their child's learning and if they only allow their child to watch what they consider educational programming. It was modified from existing, validated instruments to shorten it and reduce participant burden and include equipment examples appropriate for young children. It is intended for use by parents of young children. It includes 7 total items.

**Limiting TV Commercials and Shows Not Appropriate.** This 2-item scale was created de-novo to assess if parents believe that they limit the amount of commercials their child sees on TV and limits TV and movie watching to that appropriate for young children.

**Belief of Positive Effect of TV on Child Learning.** This 2-item scale was created to assess mother's perceptions of TV having a positive effect on their preschool children's learning.

**Only Educational TV Watching Allowed.** This 1-item indicator question was created de-novo to assess if mothers of preschool children limit TV watching to only educational programs.

**Talking with Kids Regarding TV/Media.** This 2-item scale was created de-novo to assess how often mothers spend time talking with their preschool children about media and advertisements on TV.

### Maternal Feeding Practices

The purpose of this 28-item section is to assess how parents use rewards, overt and covert control, pressure, and restriction as child feeding practices. These items were adapted from the Caregiver's Feeding Styles Questionnaire,<sup>255,257</sup> Parental Feeding Style Questionnaire,<sup>275</sup> Project EAT survey,<sup>343-345</sup> FEEDS survey,<sup>294</sup> Physical and Nutritional Home Environment Inventory,<sup>86</sup> measures of overt and covert control,<sup>279</sup> Home Environment Survey,<sup>10</sup> Child Feeding Questionnaire,<sup>4</sup> and Parent Dietary Modeling Scale.<sup>306</sup>

**Healthy Eating Modeling.** The purpose of this 4-item scale is to assess how parents overtly model healthy eating behaviors in front of their children. These items were adapted from the Parental Feeding Style Questionnaire<sup>275</sup> and the Home Environment Survey,<sup>10</sup> and measures of overt and covert control.<sup>279</sup>

**Restriction.** This 2-item scale aims to determine whether parents use restriction as a strategy for getting children to eat. These items are based on the Parent Feeding Style Questionnaire,<sup>275</sup> an Overt/Covert Control Scale,<sup>279</sup> The Parent Dietary Modeling Scale,<sup>306</sup> the Caregiver Feeding Styles Questionnaire,<sup>255,257</sup> and the Physical and Nutritional Home Environment Survey.<sup>86</sup>

**Pressure.** This 3-item scale aims to determine whether parents use pressure as a strategy for getting children to eat. These items are based on the Caregiver's Feeding Styles Questionnaire,<sup>255,257</sup> Home Environment Inventory,<sup>86</sup> and the Child Feeding Questionnaire.<sup>285</sup>

**Parent Control of Intake.** This scale's purpose is to determine the degree to which parents or children control the foods eaten by the child and the amount eaten. In addition, it differentiates between the types of control parents use (i.e., overt measures that are obvious to the child vs. covert). It is based on a variety of questionnaires including the Caregiver's Feeding Styles Questionnaire,<sup>255,257</sup> Parental Feeding Style Questionnaire,<sup>275</sup> Project EAT survey,<sup>343-345</sup> FEEDS survey,<sup>294</sup> Physical and Nutritional Home Environment Inventory,<sup>86</sup> measures of overt and covert control,<sup>279</sup> Home Environment Survey,<sup>10</sup> and the Child Feeding Questionnaire.<sup>285</sup> It includes sub-

scales which specifically assess overt control of food intake choices, food intake amount, food intake timing, and covert control of food intake choices.

**Rewards.**<sup>255,257,275</sup> The goal of this scale is to determine whether parents use rewards (foods [instrumental feeding] or non-food) as a strategy to get children to eat. The items are slightly modified from the Caregiver's Feeding Styles Questionnaire,<sup>255,257</sup> and Parental Feeding Style Questionnaire.<sup>275</sup>

### **Child Demographic Characteristics**

The purpose of this section is to describe the various demographic characteristics of the preschool children of the respondent mothers. This section includes 6 items, including sex, birth date, ethnicity/race, if respondent mother gave birth to the child, and birth country.

### **Child Health**

This section includes 3 items to assess child health, including 3 items to assesses general, physical, and mental health rating and are original questions from the Center for Disease Control and Prevention's Health-Related Quality of Life questionnaire.<sup>458,460</sup>

### **Child Anthropometrics**

This section includes 6 items to assess a child's current height, weight, if the parent actually measured height and a question to roughly assess accuracy of height measurement, as well as pictures of children<sup>612</sup> to assess mother's perceptions of their child's weight visually. Other items assess parental perception of her child's weight before age 1, between ages 1 and 2 and between ages 3 and 5 (as appropriate given the child's current age). These three items were adapted from the Child Feeding Questionnaire,<sup>285</sup> and modified as used in previous research.<sup>8</sup> Parents were asked to measure their child's height and weight before beginning the survey to increase reporting accuracy (as parents tend to inaccurately estimate their child's height and weight).<sup>585,586</sup>

The definition of obesity for children is not directly comparable with the definition for adults. Obesity in children is defined as a BMI greater than or equal to the age- and sex-specific

95<sup>th</sup> percentiles of the 2000 CDC growth charts and less than the 95<sup>th</sup> percentile but at the 85<sup>th</sup> or more is considered overweight and at risk for obesity.<sup>613</sup>

### **Child Physical Activity and Screen Time Behaviors**

This section assesses a child's physical activity and Screen Time behaviors as perceived by the mother.

**Child Physical Activity Level- IPAQ Score.**<sup>70,86,139,196</sup> This 3-item scale was modified from two existing, validated instruments (i.e., the Parental Support, Importance, and Enjoyment Scales and the International Physical Activity Questionnaire.)<sup>70,86,139,196</sup> The IPAQ categorical scoring method was modified to account for relative intensity of activity to enable scoring in categories (i.e., sedentary, moderate, and high).<sup>605</sup> This method correlates well with a small sample of accelerometer data from preschool-aged children.<sup>606</sup>

**Child Physical Activity Tendencies.**<sup>70,86,139,196</sup> This 4-item scale asks parents about their preschool child's tendency to engage in sedentary behaviors and be less physically active.

**Child Sedentary Time.** This 1-item question assesses the time that mothers of preschool children spend using screentime and it is assessed to either meet or not meet screentime guidelines

### **Child Sleep Time and Quality**

The questions in this section assess the quantity and quality of sleep of preschool children. The sleep quality question was adapted from a validated, shortened version of the Pittsburgh Sleep Quality Index.<sup>544,545</sup> There is 1 question that assess hours of night time sleep and one that assesses day time sleep (i.e., naps).<sup>14</sup> Hours of total sleep obtained can be categorized as insufficient or sufficient for preschool children in a certain age range.<sup>614</sup>

### **Child Beverage Intake**

This 5-item questionnaire assesses intake of sugar-sweetened beverages, juice, and milk. It was modified from the Block Kids' Screener<sup>242</sup>, and the fast food/beverage screener.<sup>243</sup> The modified survey may be used to estimate servings of beverages, as well as calorie and sugar intake.<sup>244</sup>

### **Child Eating Styles**

This scale assesses fussiness, emotional eating, and food responsiveness/self-regulation in three sub-scales.

**Neophobia.** This sub-scale assesses child acceptance of new or unfamiliar foods. It was adapted by selecting the 4 items with the highest factor loading for fussiness in the Children's Eating Behavior Questionnaire.<sup>504</sup>

**Child Emotional Eating.** This sub-scale assesses how a child's emotions influence urge to eat or overeat. It was adapted by selecting the 2 items with the highest factor loading items for emotional eating in the Children's Eating Behavior Questionnaire.<sup>497,504</sup>

**Self-Regulation.** This sub-scale assesses how well a parent perceives a child can respond to satiety signals to regulate his/her eating. Items were adapted by selecting the 2 items with the highest factor loadings for the construct of food responsiveness in the Children's Eating Behavior Questionnaire<sup>504</sup> and two items from Self-Regulation in Feeding questionnaire.<sup>502</sup>

#### **Child Teasing**

The purpose of this sub-scale is to assess maternal perception of whether a child is teased or not and possible reasons why using an open-ended response option. Parent perception of his or her child being teased is an unmodified question from a survey of child teasing.<sup>386</sup>

#### **Paternal Demographics**

This section assesses demographic characteristics of the child's father, including birth country and weight status.

#### **Interpersonal Characteristics**

##### **Family Meals**

This section assess the frequency of breakfast, lunch and dinner meals shared in the household, how family meals are planned, how important mothers perceive family meals to be, the healthfulness of where family meals are eaten, and how calm and happy the atmosphere is at family meals.

**Family Meal Frequency.** The purpose of this 3-item scale is to assess how often most members of a household eat breakfast, lunch, and dinner together. These items were adapted from the Family Meal Time Questionnaire<sup>314</sup> to assess frequency of family meals.

**Family Meal Planning.** The purpose of this 3-item scale is to assess the meal preparation and planning of parents. These items are adapted from the Project Eat Survey<sup>316,346</sup> and two others were created *de novo*.

**Meal Environment.** This 4-item sub-scale assesses where family meals are typically eaten (i.e., in front of the TV or at fast food restaurant) and the purpose is to determine if meals are eaten in locations that are associated with the best health outcomes. Two items are adapted and modified from the Project EAT survey,<sup>343,345,615</sup> the Physical and Nutritional Home Environment Inventory,<sup>86</sup> the Healthy Home Survey,<sup>129</sup> and two are newly created.

**Importance Placed on Family Meal.** The purpose of this 3-item scale is to assess how much value (importance) parents place on having frequent and calm family mealtimes. Two items are adapted from the Project EAT survey<sup>343,345,615</sup> and one item is newly created.

**Family Meals Atmosphere.** This sub-scale assesses how positive the family meal environment is. The 2 items are adapted from the Project EAT survey<sup>343,345,615</sup> and the Physical and Nutritional Home Environment Inventory.<sup>86</sup>

**Time and Energy for Family Meals.** This 2-item sub-scale assesses mother's feelings of having adequate time or energy to cook meals and feed their children. These two items were adapted from a survey of perceptions towards meal preparation.<sup>616</sup>

#### **Family and Household Interactions and Organization**

The scales in this section assess family members conflict and cohesion, how organized the household is, and if mothers interact physically and verbally with their children in the home.

**Family Support for Healthy Behaviors.** The purpose of this scale is to assess how often a family and mother provide social support to each other for healthy diet and physical activity. The

4-item scale was adapted from other existing, validated instruments to shorten it and reduce participant burden.<sup>70,139,440</sup>

**Family Conflict and Cohesion.** This sub-scale assesses conflict and cohesion as a measure of how well a family “gets along.” It includes 5 items adapted from the Family Environment survey.<sup>470,471</sup>

**Household Organization.** This sub-scale assesses household organization as a measure of organization and use of routines in a home. It includes 6 items adapted from the Confusion, Hubbub, Order, and Chaos<sup>465</sup> and the Household Chaos<sup>479</sup> Scales.

**Physical Engagement with Children.** This scale assesses perceived family functioning using measures of household organization and family conflict and cohesion with two sub-scales. The items have been adapted from existing surveys and shortened to reduce participant burden.

#### **Environmental Characteristics**

**Home and Neighborhood Physical Activity Environment: Availability, Accessibility, and Frequency.** The purpose of this section is to describe the availability, accessibility, and frequency of use of space and/or equipment for active play by families with young children. It was modified from existing, validated instruments to shorten it and reduce participant burden and include play equipment examples appropriate for young children.<sup>70,86,129,131,133,135,138-140</sup> It is designed to be completed by parents of young children. This component includes 21 items.

**Home and Neighborhood Physical Activity Availability.**<sup>86,129,131,135 70,86,129,139</sup> The purpose of this 12-item sub-scale is to assess the availability of physical activity equipment and space in the home. It is adapted from existing surveys: The Physical and Nutritional Home Environment Inventory, the Healthy Home Survey, the Home Environment Survey, and the Chicago Neighborhoods Inventory, the Parental Support, Importance, and Enjoyment Scales, the Physical and Nutritional Home Environment Inventory.<sup>70,86,129,139,86,129,131,135</sup>

**Home and Neighborhood Physical Activity Accessibility.**<sup>126,130,132,13586</sup> The purpose of this 2-item sub-scale is to assess the access to physical activity equipment and space in the home, yard,



and neighborhood the neighborhood as identified by parents' perceptions. It is adapted from existing surveys (i.e., the Healthy Home Survey, the Neighborhood Environment for Children Rating Scales, the Chicago Neighborhood Inventory, and the Perceptions of Leisure Time Survey) Physical and Nutritional Home Environment Inventory Home Environment Survey.<sup>129,131,86,129,133,135,138</sup>

**Home Physical Activity Frequency.** The purpose of this 3-item sub-scale is to assess how often children access items for physical activity in the home. It is adapted from the Healthy Home Survey.<sup>129</sup>

**Yard Physical Activity Frequency.** The purpose of this 2-item sub-scale is to assess how often children access items for physical activity in the yard or near the home. It is adapted from the Physical and Nutritional Home Environment Inventory.<sup>86</sup>

**Neighborhood Physical Activity Frequency.** The purpose of this 2-item sub-scale is to assess how often children access neighborhood facilities or areas for physical activity. It is adapted from the Healthy Home Survey.<sup>129</sup>

**Home Media Equipment Availability, Accessibility, and Minutes of Child Screen Time in Families with Preschool Children.** The purpose of this section is to assess the availability, accessibility, and frequency of use of media promoting sedentary behavior by families with young children. It was modified from existing, validated instruments to shorten it and reduce participant burden and include examples appropriate for young children.<sup>86,129,131</sup> It is designed to be completed by parents of young children. It includes 4 scales.

**Media Equipment Availability in the Home.** The purpose of this scale is to assess how much media equipment is available in the home, specifically. Another item is used as an indicator to assess if the family has Internet access in the home. It is adapted from 3 existing scales (i.e., the Physical and Nutritional Home Environment Inventory, the Healthy Home Survey, and the Home Environment Survey).<sup>86,129,131</sup>

**Media Equipment Availability in the Child's Bedroom.** This scale assess if a child is allowed to use media equipment devices (and Internet) in his or her bedroom. It is adapted from 3 existing scales (i.e., the Physical and Nutritional Home Environment Inventory, the Healthy Home Survey, and the Home Environment Survey).<sup>86,129,131</sup>

**Media Equipment Accessibility.** The purpose of this 5-item scale is to assess how often children access media equipment in the home. It is adapted from the same scales as the Media Availability in the Home sub-scale.<sup>86,129,131</sup>

**Minutes of Screentime Child Allowed Per Day.** The purpose of this 3-itemscale is to assess how often children are able to access media equipment (TV, movies, computer, tablets, video games played sitting down and video games played standing up) in the home. It is adapted from the scales in the Media Availability in the Home sub-scale.<sup>86,129,131</sup>

**Availability of Specific Foods/Nutrients in the Home.** The purpose of this section is to describe the types of foods available in homes (i.e., fruits, vegetables, high fat foods, salty and sweet snacks, sugar sweetened beverages, and breakfast cereals). Another purpose is to determine how easy it is for young children to access these foods in their homes. This section includes 59 items.

**Household Availability of Fruits and Vegetables.** This 10-item questionnaire assesses the availability of fruits and vegetables in the home. It was modified from the Block Fruit-Vegetable-Fiber Screener, a food frequency questionnaire for estimating intake of individuals.<sup>131,241</sup> A study using the Block Screeners to assess household food inventories<sup>617</sup> demonstrated the utility of these screeners in assessing availability of fruits, vegetables, vitamin C, and dietary fiber, in household food supplies.<sup>240</sup>

**Household Availability of Salty, Fatty, Sweet Snacks.** This 17-item questionnaire assesses the availability of fatty foods in the home. It was modified from the Block Dietary Fat Screener<sup>131,241</sup> and the Block Kids' Screener<sup>242</sup> both of which are food frequency questionnaires for individuals. As described above in the Fruit and Vegetable Availability section, these screeners are useful in describing total fat, saturated fat, and cholesterol in household food supplies.<sup>240,617</sup>

**Household Availability of Beverages.** This 6-item questionnaire assesses the availability of sugar-sweetened beverages, juice, and milk in the home. It was modified from the Block Kids' Screener,<sup>242</sup> the fast food/beverage screener,<sup>243</sup> and a survey for college students.<sup>244</sup> The modified survey may be used to estimate servings of beverages available, and calorie and sugar availability in the home from beverages.

**Food Accessibility and Policies in the Home.** This section includes two subscales which assess mothers' policies about which foods that are accessible and which foods are easy to see and reach (accessible). It has been modified from the availability surveys previously described and other measures of home food availability.<sup>129,131,241-244,618</sup>

**Child Food Access Policy.** This sub-scale includes 11 food items which parents select if they allow their child to get that food item without help. It is designed to assess how easy it is for children to access food items independently without parental help. It was modified from an existing survey.<sup>129</sup>

**Child Food Accessibility.** This sub-scale includes the same 11 food items as the Access Policy subscale and asks if the foods are kept in places easy for children to see and reach. It is designed to assess parent policies related to food accessibility and choice for snacks. It was modified from an existing survey.<sup>131</sup>

## DATA ANALYSIS

All data from the survey were cleaned to remove duplicate data entries and participants with missing data. All analyses were conducted with IBM Statistics v22 SPSS. All survey questions underwent content validity and cognitive testing for clarity prior to data collection, or have been taken from validated, reliable existing scales.

### Research Question 1

*What are the weight-related characteristics of the home environments (i.e., maternal demographic, psychographic, behavioral, and physical environment characteristics) of preschool children?*

Descriptives (e.g., means, standard deviations) were calculated to describe the weight-related characteristics of the home environment (i.e., maternal demographic, psychographic, behavioral, and physical environment characteristics) of preschool children. Comparison of some results to national data was conducted using t-tests. Cronbach alpha coefficients were calculated for each scale.

### **Research Question 2**

*What are the associations of weight-related characteristics of the home environment with weight-status of preschool children and their mothers?*

To determine which demographic, behavioral, psychographic, and environmental characteristics were associated with obesity in mothers of preschool-aged children, mothers were categorized into BMI categories (i.e., underweight, low normal weight, high normal weight, overweight, and obese). Normal BMI category was divided into two categories as primary data analysis indicated differences exist between mothers with a low normal and high normal BMI category. Children were also categorized into BMI categories (i.e., underweight, normal weight, overweight, and obese). Analysis of variance (ANOVA) with Tukey post-hoc procedures was used to compare BMI categories to independent variables. Probability level was set at  $p \leq 0.05$ .

### **Research Question 3**

*3A: What intrapersonal, interpersonal, and home environment characteristics were associated with maternal obese vs. non-obese weight status? 3B: What is the obesity risk of non-obese mothers based on a score derived using the characteristics elucidated in Question 3A? 3C: How do non-obese mothers' intrapersonal, interpersonal, and home environmental characteristics differ based on their obesity risk score tertile?*

To answer Research Question 3 and determine which variables are predictive of obesity in mothers and their children, binomial logistic regression analysis was conducted. To prevent effects of multicollinearity, all independent variables were entered into a Pearson correlation matrix. Maternal and child BMI categories were dichotomized into obese and not obese dependent variables. Independent variables were removed if they were moderately or highly correlated (i.e.,  $>0.5$  Pearson correlation coefficient) with other variables in the model. Variables selected for inclusion if correlated with others were those highly associated with BMI category differences (as determined in Research Question #2), or those predicted to be associated with obesity risk based on the literature review. Beta estimates, beta standard errors, odds ratios (ORs), and 95% confidence intervals (CI) for each independent variable in the model predicting overweight/obese status were computed. Analysis of variance (ANOVA) with Tukey post-hoc procedures was used to compare obesity risk categories to independent variables. Probability level was set at  $p \leq 0.05$ . Analyses were performed with SPSS software version 21.0 (IBM corporation, Chicago, Illinois).

## CHAPTER 4

### RESULTS

The purposes of this study were to conduct a comprehensive assessment of the demographic, psychographic, behavioral, and physical environment characteristics that are associated with weight status in preschool aged children (ages 2 to 5 years) and their mothers. A second purpose was to examine the associations of obesity risk of preschool children and their mothers with their demographic, psychographic, behavioral, and physical environment characteristics. Data were collected from mothers of preschool aged children via an online self-report survey.

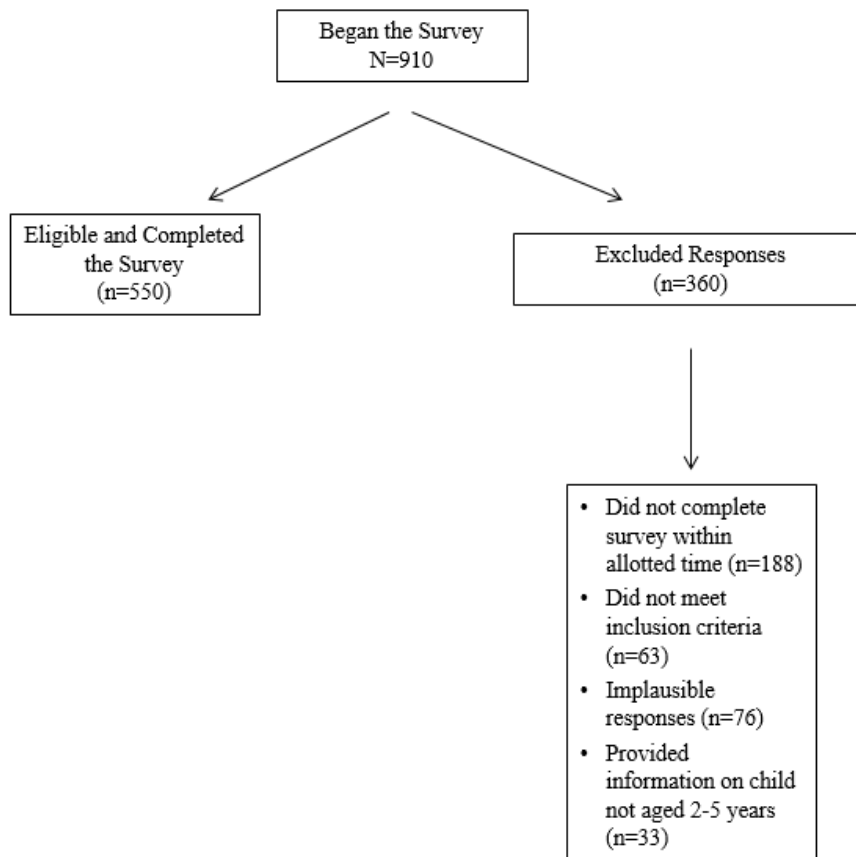
### SAMPLE

A total of 910 mothers participated in the online study survey (Figure 8). Participants who did not meet all inclusion criteria (i.e., aged 18 to 45 years, at least 1 child 2- to 5-years-old, primary food gatekeeper, female) (n=57), did not consent (n=6), started but did not return to complete the full survey before the quota was reached (n=188), or provided implausible responses (i.e., time to complete the survey was too short [ $<30$  minutes to complete the entire survey]), multiple pages had “straight line”<sup>619,620</sup> responses [n=72]), or reported data for a child other than the target audience (i.e., a child  $<2$  or  $>5$  years of age) (n=33) were eliminated from data analysis. The final analytic sample was 550 mothers.

### MATERNAL INTRAPERSONAL CHARACTERISTICS

#### Maternal Demographics

All participants were mothers who were the households’ primary food gatekeeper. Participants had  $2.20 \pm 1.01$ SD children under the age of 18 years living in their households with at least one of these children being between 2-and 5-years old. As shown in Table 1, the majority were white,

**Figure 8: Recruitment Study Sample**

**Table 1: Demographic Characteristics of Mothers of Young Children Study Participants (N=550)**

<b>Demographic Characteristic</b>	<b>N</b>	<b>%</b>
<b>Race/Ethnicity</b>		
Hispanic, Latino, or Spanish	25	4.55
White	397	72.18
Black or African American	52	9.45
American Indian or Alaskan Native	1	0.18
Asian (includes Indian, Chinese, Korean, Japanese)	30	5.45
Pacific Islander	3	0.55
Other/Mixed	42	7.64
<b>Education</b>		
Less than high school	10	1.82
High school graduate	89	16.18
Some college; technical or associate's degree	245	44.55
Bachelor's degree	143	26.00
Graduate Degree	63	11.45
<b>Number of Children Under Age 18 Living in the Home</b>		
1 child	138	25.09
2 children	241	43.86
3 children	114	20.73
4 children	43	7.82
5 children	9	1.64
6 or more children	5	0.91
<b>Birth Country</b>		
United States	509	92.55
Other	41	7.45
<b>Primary Language Spoken at Home</b>		
English	531	96.55
Spanish	12	2.18
Other	7	1.17
<b>Marital Status*</b>		
Single, never married	42	7.64
Single, living with partner	53	9.64
Married	430	78.18
Divorced	24	4.36
Widowed	1	0.18

<sup>a</sup> Family Affluence category is based on the Family Affluence Scale.<sup>569,570</sup>

<sup>b</sup> Risk for food insecurity increases as scores increase.



**Table 1: Demographic Characteristics of Mothers of Young Children Study Participants (N=550) Cont'd.**

<b>Demographic Characteristic</b>	<b>N</b>	<b>%</b>
<b>Region of Residence</b>		
New England	19	3.45
Mid-Atlantic	64	11.64
East North	100	18.18
West North	24	4.36
South Atlantic	123	22.36
East South	45	8.18
West South	55	10.00
Mountain	54	9.82
Pacific	66	12.00
<b>Maternal Hours of Paid Employment</b>		
0 hours	304	55.27
1 to 9 hours	23	4.18
10 to 19 hours	37	6.73
20 to 29 hours	43	7.82
30 to 39 hours	88	16.00
40 hours	29	5.27
More than 40 hours	26	4.73
<b>Spouse/Partner Hours of Paid Employment</b>		
0 hours	38	6.91
1 to 9 hours	6	1.09
10 to 19 hours	9	1.64
20 to 29 hours	12	2.18
30 to 39 hours	46	8.36
40 hours	187	34.00
more than 40 hours	185	33.64
<b>Family Affluence Ranking<sup>a</sup></b>		
Low	10	1.82
Middle	243	44.18
High	297	54.00
<b>Food Security Risk Score<sup>b</sup></b>		
0 (no risk for food insecurity)	175	31.82
1	79	14.36
2	93	16.91
3	63	11.45
4	66	12.00
5	41	7.45
6 (extremely high risk for food insecurity)	33	6.00

<sup>a</sup> Family Affluence category is based on the Family Affluence Scale.<sup>569,570</sup>

<sup>b</sup> Risk for food insecurity increases as scores increase.

married, and had at least some post-secondary education. Nearly all mothers were born in the United States and spoke English in their home

The proportion of mothers in the sample who had zero hours of paid employment per week was higher than that of the national labor force of mothers with children under 6 years old<sup>621</sup> (55.3% vs. 41.5%). However, most had a middle or high family affluence ranking,<sup>16,17</sup> likely because their partners/spouses tended to have full time jobs. Despite their affluence, less than one-third reported experiencing no indicators of food insecurity in the past year.

Participants lived in regions across the United States, with the proportion from various geographic regions similar to the national population distribution.<sup>622</sup> The proportion of white and non-white females in the study was comparable to national statistics for women aged 18 to 45 years (71.7% vs. 72.4% white). However, participants' highest level of educational achievement was higher than the national averages, with 18 percent having a high school diploma or less and 37 percent having at least a bachelor's degree, compared to the national averages<sup>623</sup> of 36 and 30 percent, respectively.

### **Maternal Health Status and History**

Table 2 indicates that nearly 9 out of 10 mothers rated their health as being good to excellent. Mothers tended to score well on self-reported indicators of physical and mental health (Health-Related Quality of Life Scale<sup>458,460</sup>); for example, 64 percent reported 0 to 2 days per week of "not good" health (mental or physical health). When asked about current and past chronic health conditions that had been diagnosed by a health professional, the majority (57%) reported no conditions. The most commonly reported chronic conditions diagnosed by a health professional were depression (24%) and high blood pressure (15%). The prevalence rate of other chronic health conditions was less than 7 percent. Among those who reported being diagnosed with depression (n=131), 8 mothers scored the highest possible score on a

**Table 2: Health Status of Mothers of Preschool Children (N=550)**

<b>Health Characteristic</b>	<b>N</b>	<b>%</b>
<b>General Health Rating</b>		
Poor	4	0.73
Fair	63	11.45
Good	191	34.73
Very Good	228	41.45
Excellent	64	11.64
<b>Number of Days in Past 30 Days of “Not Good” Mental or Physical Health (Health Related Quality of Life)</b>		
0-2 days	354	64.36
3-7 days	127	23.09
8-14 days	45	8.18
15-21 days	18	3.27
22-30 days	6	1.09
<b>Ever Diagnosed with a Chronic Disease by a Health Professional</b>		
None	318	57.8
Depression	131	23.8
High Blood Pressure	74	13.5
Thyroid Disease	35	6.6
High Blood Cholesterol	35	6.4
Diabetes	31	5.6
Polycystic Ovarian Disease (PCOS)	19	3.5
Heart Disease	2	0.4
Gout	0	0
<b>Depression Severity Score (if answered yes to having Depression diagnosis)<sup>a, b</sup></b>		
0	32	5.8
1	28	5.1
2	36	6.5
3	12	2.2
4	6	1.1
5	9	1.6
6	8	1.5
<b>Number Days in the Past 30 Days Smoked at Least 1 Cigarette<sup>c</sup></b>		
Do not currently smoke	431	78.36
1 to 5 days	17	3.09
6 to 10 days	4	0.73
11 to 15 days	6	1.09
16 to 20 days	1	0.18
21 to 25 days	5	0.91
26 to 29 days	1	0.18
Every day	83	15.09

<sup>a</sup> N=131<sup>b</sup> Depression severity increases as scores increase.<sup>c</sup> N=548

measure of depression severity. More than three-quarters of mothers did not smoke, yet 15 percent indicated that they smoke “every day”.

History of overweight in a primary relative is a risk factor for an individual becoming overweight, as is familial history of type 2 diabetes. As 80 percent of Americans are unable to discern the two types of diabetes<sup>624</sup> and the prevalence rate of type 2 diabetes far exceeds type 1<sup>625</sup>, the term “diabetes” as asked in the survey was assumed to be type 2 diabetes. When asked about family health history, many reported they had a blood-related primary relative (i.e., mother, father, sibling) who had diabetes (25%) or was overweight (38%). Very few mothers (6%) indicated that someone in their home was following a diet explicitly prescribed to them by a doctor or other health professional (Table 3).

#### **Maternal Pregnancy History and Health**

Few of the participants were pregnant at the time of the survey (5.5%), but more had been pregnant within the last year (11.8%) (Table 4). Mothers reported that they were  $24.5 \pm 5.39$  years old when they had their first child. This is slightly lower than the national average of 25.8 years old at first birth.<sup>626</sup> Of those who had given birth, about one-tenth had ever had a child who weighted more than 9 or less than 5.5 pounds, and two gave birth to both. When asked about pregnancy-related health issues, some reported that they had low blood iron levels (anemia) when pregnant (28%) or were depressed during the first year after giving birth (17%). The prevalence of anemia in pregnancy is much higher than the national rate of 2 percent reported in the 1995-2000 National Center for Health Statistics.<sup>627</sup> National prevalence data for perinatal depression are less precise, but are estimated to range from 3.1 to 4.9 percent during pregnancy and from 1 to 5.9 percent during the first year postpartum.<sup>628</sup> About 1 in 10 reported that they had diabetes when pregnant, which is slightly higher than the national gestational diabetes prevalence in 2010 of 9.2 percent (as reported on birth certificates or questionnaires).<sup>629</sup>

**Table 3: Health and Dietary Characteristics of Blood-related Primary Family Members Those Living in the Home (N=550)**

<b>Health Characteristic</b>	<b>N</b>	<b>%</b>
<b>Has Primary<sup>a</sup> Blood-related Family Member with These Conditions</b>		
Diabetes <sup>b</sup>	140	25.5
Overweight	207	37.6
No Diabetes/Overweight	290	52.7
<b>Has Household Member Following Diet Prescribed by Health Care Professional</b>		
No	518	94.2
Yes	32	5.8
<b>Person Who Was Following a Prescribed Diet<sup>b</sup></b>		
Self	16	2.9
Spouse/Partner	9	1.6
Other Adult in the Family	7	1.3
Child	6	1.1
<b>Type of Diet Prescribed<sup>b</sup></b>		
Low fat	7	1.3
Low salt	7	1.3
Diabetes	17	3.1
Gluten-free	3	0.6
Weight loss	8	1.5
Other	5	0.9

<sup>a</sup> Primary family members were defined as mother, father, brother, or sister.

<sup>b</sup> Diabetes assumed to be Type 2 as most Americans are unable to discern the two types of diabetes<sup>624</sup> and the prevalence of type 2 far exceeds type 1.<sup>625</sup>

<sup>c</sup> More than 1 family member may have been following one or more prescribed diets.

**Table 4: Pregnancy History and Health (N=550)**

<b>Health Characteristic</b>	<b>N</b>	<b>%</b>
<b>Last Time Pregnant</b>		
I have never been pregnant	12	2.18
Pregnant now	30	5.45
Within the last year	65	11.82
About 1 year ago	45	8.18
About 2 years ago	86	15.64
About 3 years ago	110	20.00
About 4 years ago	71	12.91
More than 4 years ago	131	23.82
<b>Age at birth of first child</b>		
Never given birth	12	2.20
16 or younger	15	2.73
17-20	127	23.09
21-25	194	35.27
26-30	123	22.36
31-35	61	11.09
36-40	15	2.73
41-45	3	0.55
46 and older	0	0.00
<b>Ever given birth to child more than 9 pounds</b>	69	12.55
<b>Ever given birth to a child less than 5.5 pounds</b>	60	10.91
<b>Health Issues When Pregnant</b>		
High blood pressure	91	16.55
Anemia	152	27.64
Diabetes	61	11.09
Depression	39	7.09
Depressed during first year after giving birth	95	17.27

### Maternal Anthropometric Measurements

Given the evidence from the literature<sup>630-634</sup> that parents often incorrectly estimate their children's heights and weights, multiple steps were taken to encourage and assess accuracy. A video with instructions was created and pilot tested with mothers of children (n=47) that described how to create a measuring tape if they did not have one and how to accurately measure waist, hip, and neck circumferences.

Mean BMIs indicate that, as a group, participants were overweight (mean  $27.69 \pm 7.90$ SD kg/m<sup>2</sup>) (Table 5). Slightly less than half of the participants had a BMI that was normal weight or underweight. However, an examination of the proportion who were obese indicated that the rate was slightly less than that of the general female adult population, with 30 percent of participants categorized as being obese compared to 40 percent of U.S. female's aged 20 years or older.<sup>635</sup>

Mothers who were not pregnant in the past 12 months or were currently pregnant (n=455) reported their waist, hip, and neck circumferences to be  $34.85 \pm 7.43$ SD,  $39.37 \pm 7.83$ SD, and  $12.36 \pm 2.62$  inches, respectively. Additionally, they reported their bra band and cup size as 36B, which is equivalent to over-bust circumference of about 36 inches. Most mothers indicated their waist was smaller than their hips (62%) and their hips were the same size or larger than their bra band size (88%) which is supported by the mean waist and hip circumference.

Mothers recalled that at about age 6, 12, 15, and 20 years their weights were about average whereas they rated their current weight as average to slightly heavy. When asked to choose the drawing most like their current figure, mothers tended to select the figures at or slightly above the midpoint which indicated an average to slightly overweight figure. Four out of five mothers reported that in the past 28 days, they were at least slightly dissatisfied with their body shape, with nearly a third reporting a lot of dissatisfaction (Table 6).

### Maternal Physical Activity

Two-thirds of mothers reported low or sedentary levels of physical activity (Table 7). Most mothers (85%) did not keep their screen time to the recommended 2 or fewer hours per

**Table 5: Body Mass Index and Anthropometric Measurements of Mothers (N=550)**

Measurement	N	%	Mean	SD	Range
<b>Body Mass Index (weight [kg]/height [in]<sup>2</sup>)</b>			27.69	7.90	16.44-60.46
Underweight (BMI<18.49)	18	3.27			
Low Normal weight (BMI 18.5 to <22)	125	22.73			
High Normal (BMI 22 to <25)	128	23.27			
Overweight (BMI 25 to <30)	115	20.91			
Obese Category 1 (BMI 30 to <35)	75	13.64			
Obese Category 2 (BMI 35 to <40)	39	7.09			
Morbidly Obese (BMI >40)	50	9.09			
<b>Circumferences (n=455)*</b>					
Waist Circumference (inches)			34.87	7.40	22.00-64.00
Hip Circumference (inches)			39.57	7.63	19.00-64.00
Neck Circumference (inches)			12.42	2.64	6.00-21.00

\*Mothers who were pregnant in the past year or currently pregnant were excluded from analysis

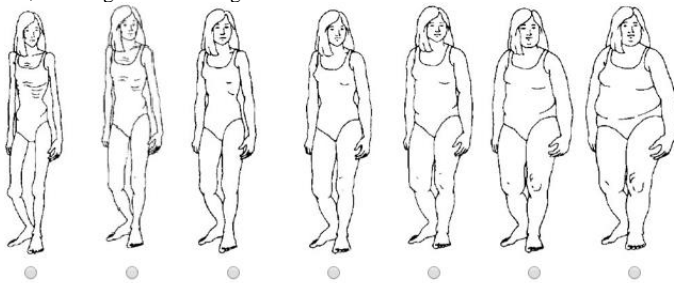


**Table 6: Maternal Weight History, Body Satisfaction, and Other Anthropometric Indicators (N=550)**

Measurement	N	%	Mean	SD	Range
Bra band size			36		Less than 28-46 or greater
Bra cup size			B		Less than AA-EE or greater
<b>Compared to your bra band, are your hips (at their fullest point)</b>					
much smaller	10	1.8			
a little smaller	59	10.7			
about the same	172	31.3			
a little larger	259	47.1			
much larger	50	9.1			
<b>Compared to your hips, how big is your waist?</b>					
much smaller	61	11.1			
a little smaller	280	50.9			
about the same	124	22.5			
a little larger	69	12.5			
much larger	16	2.9			

<sup>a</sup> Responses on a 5-point scale: 1= very thin, 2=thin, 3=average, 4=slightly heavy, 5=overweight.

<sup>b</sup> Body Image Perceptions based on Scores that correspond to the shapes below. The image on the far left is #1, the image on the far right is #7.



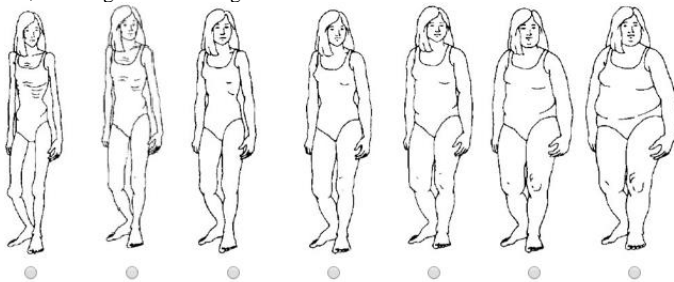
<sup>c</sup> Increasing scores mean more dissatisfaction with body shape.

**Table 6: Maternal Weight History, Body Satisfaction, and Other Anthropometric Indicators (N=550) Cont'd.**

Measurement	N	%	Mean	SD	Range
<b>Weight Perception History</b>					
How would you describe your weight when you were in 1 <sup>st</sup> grade (about age 6)? <sup>a</sup>			2.71	0.79	1-5
How would you describe your weight when you were in 6th grade (about age 12)? <sup>a</sup>			2.96	0.93	1-5
How would you describe your weight when you were in 10th grade (about age 15)? <sup>a</sup>			2.94	0.93	1-5
How would you describe your weight when you were around age 20? <sup>a</sup>			3.10	1.00	1-5
How would you describe your weight now? <sup>a</sup>			3.66	0.97	1-5
Which picture is most like your figure? <sup>b</sup>			4.62	1.26	2-4
<b>Dissatisfaction with body shape in past 28 days<sup>c</sup></b>			2.58	1.10	1-4
Not at all	104	18.9			
Slightly	189	34.4			
Moderately	93	16.9			
A lot	164	29.8			

<sup>a</sup> Responses on a 5-point scale: 1= very thin, 2=thin, 3=average, 4=slightly heavy, 5=overweight.

<sup>b</sup> Body Image Perceptions based on Scores that correspond to the shapes below. The image on the far left is #1, the image on the far right is #7.



<sup>c</sup> Increasing scores mean more dissatisfaction with body shape.

**Table 7: Maternal Physical Activity (n=550)**

Characteristic	N	%	Mean	SD	Range
<b>IPAQ Score<sup>a</sup></b>			15.44	9.98	0-42
Low/Sedentary	363	66.00			
Medium	127	23.09			
High	60	10.91			
<b>Screentime (hours per day)</b>			383.59	302.36	0-1425
≤2 hours per day <sup>b</sup>	81	14.73			
>2 hours per day <sup>b</sup>	469	85.27			
<b>Primary Mode of Transportation</b>					
Motorcycle/Car	537	97.64			
Subway/Train/Bus	10	1.82			
Walk/Bike	3	0.55			

<sup>a</sup> Scoring based on enhanced version of IPAQ (International Physical Activity Questionnaire) categorical scoring: physical activity = (# days of vigorous activities per week x 3) + (# days of moderate activities x 2) + (# days of walking 10 minutes at a time) . Scores could range from 0 to 49; low/sedentary score = 0 to <20, medium score = 20 to <30, and high score ≥30.<sup>605</sup>

<sup>b</sup> Categories based on screen time recommendation of ≤2 hours per day Guidelines.<sup>607</sup>

at least slightly dissatisfied with their body shape, with nearly a third reporting a lot of dissatisfaction (Table 6).

### **Maternal Physical Activity**

Two-thirds of mothers reported low or sedentary levels of physical activity (Table 7). Most mothers (85%) did not keep their screen time to the recommended 2 or fewer hours per day.<sup>607</sup> The vast majority used motorized personal transportation (i.e., cars or motorcycles) as their primary mode of transportation (98%). Only 3 mothers indicated that they usually walk or bike to get around.

### **Maternal Sleep Duration and Quality**

Mothers slept an average of  $7.11 \pm 1.84$  hours per night, with two-thirds of mothers getting less than the minimum recommended of 7 hours of sleep per night (Table 8). Most mothers reported that they had at least OK sleep quality (83%), with only 7 percent reporting very good sleep quality.

### **Maternal Dietary Intake**

The Block Fruit, Vegetable, and Fiber Screener results indicated that mothers' fiber intake was below the recommended for adult females ( $18.77 \pm 7.80$ SD gm per day vs 25 gm per day). However, they exceeded vitamin C, magnesium, and potassium RDAs for females ages 19-50 years,<sup>636</sup> and consumed an average of  $5.13 \pm 2.76$ SD servings of fruits and vegetables each day.

The Block Fat Screener results indicated that mothers' average percentage of calories from fat intakes were higher than that recommended for adults. However, the ratio of saturated to total fat they consumed was 0.27 and the cholesterol intake was slightly below daily recommendations.<sup>636</sup> If a respondent was consuming 2000 calories per day, about 7.8 percent of calories are from saturated fat, which near the 7 percent calorie from saturated fat intake recommended by the American Heart Association.<sup>637</sup>

Mothers drank about 111 kcal per day from sugar-sweetened beverages and 27 kcal from 100% fruit juices (Table 9). If a mother consumed 2000 kcal per day, sugar-sweetened beverages

**Table 8: Maternal Sleep Duration and Quality (N=550)**

Characteristic	Mean	SD	Range	N	%
<b>Hours of Sleep</b>	7.11	1.84	0-23		
<b>Maternal Sleep Duration Categories</b>					
Insufficient Sleep (<7 hours)				370	67.27
Adequate Sleep (8 hours)				102	18.55
Long Sleep (>8 hours)				78	14.18
<b>Maternal Sleep Quality</b>	3.24	0.89	1-5		
Very Good				37	6.90
Good				156	29.10
OK				255	47.57
Bad				73	13.62
Very Bad				15	2.80

**Table 9: Maternal Dietary Intake using Food Frequency Screeners (N=550)**

<b>Food Component</b>	<b>Mean</b>	<b>SD</b>	<b>Range</b>	<b>Daily Reference Intakes<sup>636</sup> for females 19-45<sup>b</sup> or Daily Values for 2000kcal per day<sup>c</sup></b>
<b>Fruit and Vegetable Servings</b>	5.13	2.76	0-14.39	
Dietary Fiber Intake (gm/day)	18.77	7.80	2.52-45.8	25gm/day <sup>b</sup>
Vitamin C Intake (mg/day)	156.25	66.13	15.85-385.9	60mg/day <sup>b</sup>
Magnesium Intake (mg/day)	372.64	116.83	127-778.3	310mg/day <sup>b</sup>
Potassium Intake (mg/day)	3595.93	1153.92	1161.2-7603.8	1500mg/day <sup>b</sup>
<b>Meat/Snacks</b>				
Total fat Intake (gm/day)	105.09	23.62	46.3-207.1	65gm/day <sup>c</sup>
Saturated fat Intake (gm/day)	28.34	8.66	6.78-65.74	20gm/day <sup>c</sup>
Percent of kcal from fat Intake /day	37.40	5.91	22.7-62.9	(20-35% recommended <sup>637</sup> )
Dietary cholesterol Intake (mg/day)	265.01	76.94	73.15-595.75	300mg <sup>c</sup>
<b>Beverages</b>				
Milk to Drink (servings/day)	0.56	0.44	0-more than <sup>a</sup>	--
Real 100% Fruit Juice (servings/day)	0.47	0.39	0-more than 1	--
Vegetable Juice (servings/day)	0.16	0.31	0-more than 1	--
Soft Drinks and Soda/Pop (servings/day)	0.38	0.41	0-more than 1	--
Fruit Drinks or Other Sugar-Sweetened Beverages (servings/day)	0.24	0.32	0-more than 1	--
Energy Drinks (servings/day)	0.09	0.23	0-more than 1	--
Sugar-Sweetened Specialty Coffee Drinks (servings/day)	0.19	0.30	0-more than 1	--
<b>Sugar-Sweetened Beverage Intake (soft drinks, fruit drinks, energy drinks, sweet coffee drinks)</b>				
Sugar (gm/day)	23.55	23.54	0-123.01	--
Kcal/day	111.91	114.84	0-607.80	--
Servings/day	0.89	0.88	0-32.00	--

<sup>a</sup> Highest possible response choice was more than 1 time each day; lowest response choice was less than 1 time per week.

<sup>b</sup> Daily Reference Intakes for females ages 19-45.<sup>636</sup>

<sup>c</sup> Daily Values for 2000 kilocalorie per day diet.

would provide six percent of calories per day. The World Health Organization is considering recommendations that added sugars make up less than ten percent of total energy intake per day, and reductions below five percent for additional health benefits.<sup>638</sup> The most frequently consumed sweet beverage was 100% fruit juice, followed by soft drinks, fruit drinks and other sweet beverages, sweetened specialty coffee drinks, and energy drinks. Mothers consumed about one-half serving each of milk and juice per day, and one serving of other sugary drinks.

### **Maternal Eating Behaviors**

As shown in Table 10, mothers tended to score at the mid-point on the Disinhibited Eating and Emotional Eating scales indicating that that they were able to keep eating under control and that their eating behaviors tended to not be driven by emotional state. Their Dietary Restraint score indicated that mothers felt they consciously regulated food intake to prevent weight gain. Their Adventurousness Eating scores were below the mid-point, indicating mothers had some wariness and fear of trying new foods.

### **Maternal Psychographic Characteristics**

Mothers' Self-Effectiveness scores indicated that they tended to somewhat agree that they planned ahead and were dependable (Table 11). Their Need for Cognition mean score indicated that they somewhat agreed that they liked dealing with situations that required considerable thinking. Mothers' scored high on the Parenting Self-efficacy indicator item, meaning that they felt confident in their parenting skills.

Mothers' Stress Management mean score indicated they felt they were in control and could manage stress. However, their Stress Management Self-efficacy scores indicated that they were only somewhat confident in their ability to handle stress.

### **Maternal Weight Teasing Experiences in Childhood**

Overall, mothers were rarely teased about their weights between the ages of 5 and 16 years (Table 12). Of those who indicated that they were teased at least sometimes (n=120), 62

**Table 10: Mean Maternal Eating Behaviors Scale Scores (N=550)**

<b>Scale</b>	<b>Cronbach alpha</b>	<b>Mean</b>	<b>SD</b>	<b>Actual Range</b>
Disinhibited Eating <sup>a</sup>	0.81	1.96	0.76	1-4
Maternal Emotional Eating <sup>b</sup>	0.75	2.07	0.88	1-4
Dietary Restraint <sup>c</sup>	0.74	2.42	0.74	1-4
Maternal Adventurousness Eating <sup>d</sup>	0.72	3.16	0.68	1-4

<sup>a</sup> Disinhibited eating scale had 3 4-point (mostly false to mostly true) Likert-type items with a Cronbach-alpha of 0.81.

<sup>b</sup> Maternal emotional eating scale had 3 4-point (mostly false to mostly true) Likert-type items with a Cronbach-alpha of 0.75.

<sup>c</sup> Dietary restraint scale had 4 4-point (mostly false to mostly true) Likert-type items with a Cronbach-alpha of 0.74.

<sup>d</sup> Eating adventurousness scale had 2 4-point (mostly false to mostly true) Likert-type items with a Cronbach-alpha of 0.72.



**Table 11: Maternal Psychographic Characteristics Scale Scores (N=550)**

<b>Scale</b>	<b>Cronbach alpha</b>	<b>Mean</b>	<b>SD</b>	<b>Possible Range</b>
Self-Effectiveness <sup>a</sup>	0.69	3.68	0.82	1-5
Need for Cognition <sup>b</sup>	N/A (1-item indicator)	3.49	0.98	1-5
Parenting Self-efficacy <sup>c</sup>	N/A (1-item indicator)	4.10	0.81	1-5
Stress Management <sup>d</sup>	0.84	3.94	0.76	1-4
Stress Management Self-Efficacy <sup>e</sup>	N/A (1-item indicator)	2.63	1.01	1-4

<sup>a</sup> Self-effectiveness scale had 4 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.69. Higher scores indicate more self-effectiveness in personal areas.

<sup>b</sup> Need for cognition had 1 5-point (SA to SD) Likert-type item. Higher score indicates a higher need for cognition.

<sup>c</sup> Parenting self-efficacy had 1 5-point (SA to SD) Likert-type item. Higher score indicates more parenting self-efficacy.

<sup>d</sup> Stress management scale had 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.84. Higher score indicates more control and better management of stress.

<sup>e</sup> Stress management self-efficacy had 1 5-point (SA to SD) Likert-type item. Higher score indicates more self-efficacy managing stress.

**Table 12: Maternal Perception of Weight Teasing in Childhood (N=550)**

<b>Scale</b>	<b>Cronbach alpha</b>	<b>Mean</b>	<b>SD</b>	<b>Possible Range</b>
Perception of Weight Teasing History <sup>a</sup>	0.95	1.84	1.15	1-5
Weight Teasing Effect <sup>b</sup>	0.88	3.50	0.75	1-4

<sup>a</sup> Perception of weight teasing history scale had 3 5-item (SA to SD) Likert-type items with a Cronbach alpha of 0.95. Higher scores indicate more teasing related to weight.

<sup>b</sup> Weight teasing effect scale had 3 5-item (SA to SD) Likert-type items with a Cronbach alpha of 0.88. N=120 mothers who reported they were teased at least sometimes; higher scores indicate higher degree of being upset if teased about weight.

percent indicated this teasing made them very upset another 22 percent reported it made them somewhat upset.

### **Maternal Perceptions about Child Overweight**

Mean scores on the Chubby Kids are Healthy scale indicated that mothers somewhat disagreed that it is healthy for children to be chubby. Mean Concern for Child's Overweight Risk scale scores revealed that mothers were not concerned about their children becoming overweight, although 11.5% were concerned. When asked to choose the first drawing in the sequence of 7 drawings (ranging from noticeably underweight to noticeably overweight with the mid-point being normal weight) that first represented an underweight child, mothers tended to select the second child in the sequence of drawings. When asked to choose the first drawing in the sequence that represented an overweight child, mothers tended to select the 6<sup>th</sup> figure in the sequence (see Table 13).

### **Maternal Modeling Frequency, and Mean Importance and Encouragement/Facilitation of Physical Activity and Media Use**

Mean scale scores indicated that mothers felt physical activity for their child and for themselves was important and they encouraged and facilitated ways for their children to be physically active (Table 14). Although mothers rated the importance of modeling physical activity for their child as high, they engaged in modeling of physical activity behaviors or participated in physical activity with their children less than half the days in a week during the past month. More mothers engaged in physical activity with their children at least 5 days per week than engaged in physical activity themselves that was observable (i.e., modeled) to their children at least 5 days per week (39% vs 12%). In the past month, children saw mothers playing video games, using computers, or watching TV or movies for more than 2 hours per day about 3 days each week.

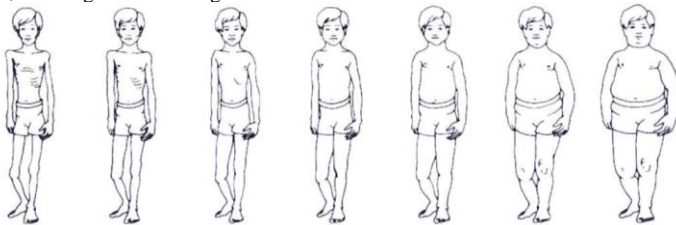
**Table 13: Maternal Perceptions about Child Overweight (N=550)**

Scale	Cronbach alpha	Mean	SD	Range	N	%
<b>Chubby Kids are Healthy<sup>a</sup></b>	0.65	2.70	0.74	1-5		
Strongly agree					5	0.9
Agree					60	10.9
Neither					274	49.8
Disagree					178	32.4
Strongly disagree					33	6.0
<b>I am Concerned for my Child's Overweight Risk<sup>b</sup></b>	0.91	1.91	1.03	1-5		
Strongly agree					17	3.1
Agree					46	8.4
Neither					80	19.8
Disagree					178	32.4
Strongly disagree					229	41.6
<b>Picture of Child first child who is Underweight<sup>c</sup></b>	N/A	1.99	0.81	1-6		
Picture #1					162	29.5
Picture #2					242	44.0
Picture #3					142	25.8
Picture #4, 6					4	0.7
<b>Picture of Child first child who is Overweight<sup>c</sup></b>	N/A	5.81	0.77	3-7		
Picture #7					106	19.3
Picture #6					247	44.9
Picture #5					185	33.6
Picture #3, 4					12	2.2

<sup>a</sup> A higher score indicates that a parent believes more strongly that an overweight child is healthier; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.65.

<sup>b</sup> A higher score indicates that parent is more concerned about her child's risk of becoming overweight; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.91.

<sup>c</sup> Body Image Perceptions based on Scores that correspond to the shapes below. The image on the far left is #1, the image on the far right is #7.



**Table 14: Maternal Modeling Frequency, and Mean Importance and Encouragement/Facilitation of Physical Activity and Media Use (N=550)**

Scale	Cronbach alpha	Mean	SD	Actual Range
Importance of Physical Activity for self <sup>a</sup>	0.82	3.49	0.97	1-5
Importance of Physical Activity for child <sup>b</sup>	0.68	3.83	0.87	1-5
Encouragement and Facilitation of Physical Activity <sup>c</sup>	0.88	4.23	0.66	1-5
Importance of Modeling Physical Activity <sup>d</sup>	0.79	4.13	0.82	1-5
Mother and Child Co- Physical Activity Behavior Frequency (days a week in the last month)	N/A	3.67	1.85	0-7
Maternal Modeling of Physical Activity Behavior Frequency (days a week in the last month)	N/A	3.08	1.22	0-6.5
Maternal Modeling of Media Use Behavior Frequency (days a week in the last month)	N/A	2.79	2.18	0-7

<sup>a</sup> Higher score indicates mother places greater importance on physical activity for self; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.82.

<sup>b</sup> Higher score indicates mother places greater importance of physical activity for her child; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.68.

<sup>c</sup> Higher score indicates greater encouragement/facilitation of physical activity by the mother for her child; scale includes 5 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.88.

<sup>d</sup> Higher score on all scales indicates greater importance mother places on modeling positive physical activity behaviors to her child; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.79.

### **Maternal Beliefs and Practices Regarding Screen Time**

Mothers agreed that children learn a lot from TV and that it helps them do better in school (Table 15). With regard to talking with kids about TV/media ads and content, mothers tended to have neutral scores. Approximately one-third of the mothers reported talking often with their preschool children about television shows and commercials.

### **Maternal Feeding Practices**

Mothers somewhat agreed that they modeled healthy eating behaviors to their children. Mothers tended to agree that they restricted sweets and salty snacks and disagreed that they pressured children to eat nutrient-dense foods (Table 16). With regard to food access and decisions about food, scale scores were slightly above the mid-point, indicating mothers somewhat agreed that they controlled access to and decisions about foods for their preschool children. Mothers had a neutral mean score on the Food Waste scale indicating they did not have a strong concern about the importance of not wasting food. Mean scores for the Use of Non-Food for Reward and Use of Food for Reward scores indicated that mothers somewhat disagreed they used (or withheld) food or non-food to reward (or punish) children.

## **CHILD INTRAPERSONAL CHARACTERISTICS**

### **Child Demographic Characteristics**

Mothers were instructed to answer questions about one of their children who was between the age of 2 and 5. Mothers with more than one child this age were instructed to give responses for the child born closest to 12 noon on June 7. The mean child age was  $3.47 \pm 1.09$ , and was almost evenly split between male and female children (48% and 52%, respectively). Most children were white (67%) or other/mixed race/ethnicity (15%) (Table 17). All but 19 of the children were participants' biological children, and 98 percent of the children were born in the United States.

**Table 15: Mean Maternal Beliefs and Practices Regarding Screen Time in Families with Preschool Children (N=550)**

<b>Scales</b>	<b>Cronbach alpha</b>	<b>Mean</b>	<b>SD</b>	<b>Actual Range</b>
Belief of Positive Effect of TV on Child Learning <sup>a</sup>	0.85	3.89	0.76	1-5
Talks Often with Kids Regarding TV/Media <sup>b</sup>	0.50	3.24	0.97	1-5

<sup>a</sup> Higher score indicates a mother more strongly agrees that TV has a positive effect on children's learning/helps them do better in school; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.50.

<sup>b</sup> Higher score indicates a mother more often speaks with her children about TV advertisements, shows, video games, or movies; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.85.

**Table 16: Mean Maternal Feeding Practices (N=550)**

<b>Scales</b>	<b>Cronbach alpha</b>	<b>Mean</b>	<b>SD</b>	<b>Actual Range</b>
Healthy Eating Modeling <sup>a</sup>	0.56	3.51	0.73	1.25-5
Restriction <sup>b</sup>	0.63	3.84	0.86	1-5
Pressure to Eat <sup>c</sup>	0.69	2.17	0.96	1-5
Food Access and Decisions <sup>d</sup>	0.65	3.33	0.52	1.43-5
Food Waste Non-Acceptance <sup>e</sup>	0.61	3.05	0.97	1-5
Instrumental Feeding <sup>f</sup> (Use of Food for Reward)	0.73	2.63	0.91	1-5
Use of Non-food for Reward <sup>g</sup>	0.65	2.90	0.95	1-5

<sup>a</sup> Higher scores indicate mother more strongly agrees that she models eating of healthy foods to her preschool children; scale includes 4 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.56.

<sup>b</sup> Higher scores indicate a mother uses more restriction of her preschool child's eating; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.63.

<sup>c</sup> Higher scores indicate a mother uses pressure on her preschool child to eat; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.69.

<sup>d</sup> Higher scores indicate a mother more strongly agrees that she controls her preschool children's access to and decisions about foods; scale includes 7 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.65.

<sup>e</sup> Higher scores indicate a mother does not like when food is waste; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.61.

<sup>f</sup> Higher scores indicate a mother more frequently uses food rewards for eating and behaving; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.73.

<sup>g</sup> Higher scores indicate a mother more frequently uses non-food rewards for eating and behaving; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.65.



**Table 17: Preschool Child Demographic Characteristics (N=550)**

<b>Demographic Characteristics</b>	<b>Mean</b>	<b>SD</b>	<b>Range</b>	<b>N</b>	<b>%</b>
<b>Child Age</b>	3.47	1.09	2-5		
<b>Child Sex</b>					
Male (age in years)	3.44	1.11	2-5	265	48.2
Female (age in years)	3.44	1.06	2-5	285	51.8
<b>Child Race/Ethnicity</b>					
Hispanic, Latino, or Spanish				21	3.8
White				371	67.5
Black or African American				50	9.0
American Indian or Alaskan Native				1	0.2
Asian (includes Indian, Chinese, Korean, Japanese)				13	2.4
Pacific Islander				8	1.5
Other/Mixed				83	15.1
<b>Mother gave birth to child</b>					
Yes				530	96.5
No				19	3.5
<b>Birth Country</b>					
United States				537	97.6
Other				13	2.4

### Child Health

The vast majority of mothers (92%) reported that their children had very good or excellent health (Table 18). They also had few days of “not good” mental or physical health, with 82 percent of children having had 0 to 2 days of “not good” health (mental or physical health) in the past month.

### Child Anthropometrics

Given the evidence from the literature<sup>630-634</sup> that parents often incorrectly estimate their children’s heights and weights, mothers were asked if they actually measured the heights and weights they reported for their children. The vast majority reported they did measure their children, but 119 did not measure child weight and 79 did not measure child height.

Given the difficulty in determining parental accuracy of children’s heights and weights using indicator questions (i.e., door knob height), mother’s report of children’s heights and weights were examined by two researchers to determine plausibility of the data. Body mass index and z-scores were not included for children if their mother did not report the month of their birth (n=7), nor if their height, weight, BMI-for-age, or z-score was biologically implausible (n=43). Biological implausibility was assessed for each child by comparing anthropometric measurements to the body figure selected and comparison of height to door knob item. Children’s birth weight and length are reported in Table 19. Most mothers were very sure or sure of their child’s weight and length at birth. Only 1 percent of mothers were unsure of the birth weight and 5 percent were unsure of their child’s birth length. Mothers believed that their children were of average weight before age 1 and between ages 1 and 2. When asked to choose the drawing most like their child’s current body shape, mothers tended to select the figures slightly below the midpoint, which indicated an average to slightly thin figure.

**Table 18: Preschool Child Health Status (N=550)**

<b>Characteristic</b>	<b>N</b>	<b>%</b>
<b>General Health Rating</b>		
Poor	1	0.2
Fair	6	1.1
Good	39	7.1
Very Good	173	31.5
Excellent	331	60.2
<b>Number of Days in Past 30 Days of “Not Good” Mental or Physical Health</b>		
0-2 days	453	82.36
3-7 days	76	11.09
8-14 days	16	2.91
15-21 days	3	0.55
22-30 days	2	0.36

**Table 19: Body Mass Index Percentile for Age and Anthropometric Measurements of Preschool Children (n=496<sup>a</sup>)**

Measurement	N	%	Mean	SD	Range
<b>Z-Score</b>			0.75	1.81	-5.09-7.44
<b>Body Mass Index Percentile for Age</b>			64.86	34.38	0-100
Underweight (BMI percentile <5 <sup>th</sup> percentile)	36	7.3			
Normal weight (BMI percentile 5 <sup>th</sup> to <85 <sup>th</sup> )	235	47.4			
Overweight (BMI percentile 85 <sup>th</sup> to <95 <sup>th</sup> )	67	13.5			
Obese (BMI percentile equal to or >95 <sup>th</sup> )	158	31.9			
<b>Birth Weight for Length Z-Score<sup>b</sup></b>			-2.17	8.36	-115.8-8.4
<b>Birth Weight for Length Percentile<sup>b</sup></b>			34.93	35.75	0.01-99.90
<b>Birth Length (inches)</b>			19.96	4.36	0-51
<b>Certainty of remembering birth length correctly<sup>c</sup></b>			3.35	0.89	1-4
<b>Birth weight (pounds)</b>			7.04	4.31	0-15
<b>Certainty of remembering birth weight correctly<sup>c</sup></b>			3.72	0.60	1-4
<b>Child's Weight Before Age 1<sup>d</sup></b>			2.9	0.70	1-5
<b>Child's Weight Between Age 1 and 2<sup>d</sup></b>			2.86	0.58	1-5
<b>Which looks most like your child now<sup>e</sup></b>			3.76	0.70	2-6

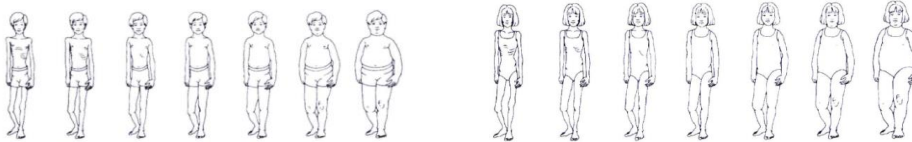
<sup>a</sup> N=496; data excluded for 50 children. Data from 7 children missing, and 43 children had biologically implausible data.

<sup>b</sup> N=493; data excluded for 53 children as the birth length and weight given by mothers exceeded the 1<sup>st</sup> and 99<sup>th</sup> percentiles of weight for length; or was biologically implausible (over 24 inches or less than 17 inches long at birth)

<sup>c</sup> Higher score indicates higher agreement of correctly remembering weight and length (1= Not at all sure, 4=very sure).

<sup>d</sup> Answer response possibilities were 1-5; 1 = very thin, 5= overweight

<sup>e</sup> Body Image Perceptions based on Scores that correspond to the shapes below. The image on the far left is #1, the image on the far right is #7.



<sup>d</sup> Memory of child's birth weight and length were assessed on a 4-point scale; 4=very sure, 1= not sure at all.

The mean birth BMI-for-age percentile was  $34.95 \pm 4.36SD$ . Not surprisingly, this is significantly less than the children's BMI percentiles now ( $p < 0.001$ ). The mean Z-score for children was  $0.75 \pm 1.82$  (range  $-5.09$ - $7.44$ ).

Mothers believed that their children were of average weight before age 1 and between ages 1 and 2. When asked to choose the drawing most like their child's current body shape, mothers tended to select the figures slightly below the midpoint, which indicated an average to slightly thin figure.

As anticipated, mean child weight was greatest 5 year olds and lowest for 2 year olds (see Table 20), and most mothers indicated that they actually measured their child's weight when answering this question. One-way ANOVA showed that weights were significantly higher if mothers of 5 year olds did not weight their child them compared to those who did ( $46.12 \pm 7.49lb$  and  $44.33 \pm 9.90lb$ ,  $p = 0.016$ ), yet did not differ for mothers of 2 to 4 year olds.

Mean child height also increased with each year of age, and over 80 percent indicated that they actually measured their child's height when answering this question. Heights differed significantly among 2-, 3-, and 4-year-old children whose mothers did not actually measure their height ( $p = 0.032$ ,  $p < 0.001$ , and  $p = 0.030$ ), but not among 5 year olds.

### **Child Physical Activity**

IPAQ for children scores indicate that the preschool children in the study had high levels of physical activity; however, one in three had low/sedentary levels of activity (see Table 21).<sup>70,139,196,544</sup> Mothers agreed that their children tended to be more active instead of tending to choose more sedentary activities, like watching TV or reading or drawing. Yet, children spent an average of 130 minutes watching TV daily. Mothers limited TV time to an average of  $4.53 \pm 4.09$  hours per day, which exceeds the 2 hour/day APA guidelines<sup>607</sup> for screen time limits for children. Mothers reported that their preschool children engaged in significantly more physical activity significantly more often inside the home ( $4.92 \pm 1.83$  days/week) than in the yard ( $4.52 \pm 2.21$  days/week) or neighborhood ( $2.55 \pm 1.80$  days/week), and engaged in significantly

**Table 20: Body Mass Index Percentile for Age and Anthropometric Measurements of Preschool Children (n=496\*)**

Measurement	N	%	Mean	SD	Range	p-value <sup>#</sup>
<b>Weight (pounds)</b>			37.13	8.53	21.5-85.0	
Weight was measured			37.28	8.47	21.5-85	
Weight not measured			36.56	8.78	22-68	0.244
2 year olds	127		30.39	4.92	21.5-60	
Weight was measured	92		30.12	4.30	22-60	
Weight not measured	35		31.09	6.31	22-60	
3 year olds	122		34.62	5.63	24-65	
Weight was measured	96		34.63	4.79	26-45.6	
Weight not measured	26		34.58	8.13	24-65	
4 year olds	139		39.31	6.28	25-60	
Weight was measured	110		39.30	6.14	25-57	
Weight not measured	29		39.33	6.91	28-60	
5 year olds	108		44.32	8.88	30-80	
Weight was measured	92		43.97	9.07	30-80	
Weight not measured	16		46.32	7.69	36-68	

\* N=496; data excluded for 54 children. Data from 7 children missing, and 47 children had biologically implausible data.

# p-value using independent sample t-tests.

**Table 20: Body Mass Index Percentile for Age and Anthropometric Measurements of Preschool Children (n=496\*) Cont'd.**

Measurement	N	%	Mean	SD	Range	p-value <sup>#</sup>
<b>Height</b>	496		38.62	4.80	20-48.75	
Height was measured	403		38.89	4.61	20-48.75	
Height was estimated	68		36.71	5.10	27-48.75	0.001
Other way of ascertaining height	25		39.40	5.91	25.75-48.50	0.675
2 year olds	127		34.85	3.46	20.25-44.25	
Height was measured	103		34.85	3.46	20.25-44.25	
Height was estimated	19		32.96	3.30	27.00-40.00	
Other way of ascertaining height	5		31.55	3.94	25.75-36.00	
3 year olds	122		37.58	3.24	27.25-44.00	
Height was measured	98		38.03	2.99	30.00-44.00	
Height was estimated	18		34.96	3.75	27.25-41.25	
Other way of ascertaining height	6		37.96	2.21	36.00-41.75	
4 year olds	139		40.22	4.06	20-48	
Height was measured	117		40.35	4.11	20-48	
Height was estimated	17		39.28	4.31	30.25-47.00	
Other way of ascertaining height	5		40.60	1.44	38.50-42.00	
5 year olds	108		42.63	4.13	30.75-48.75	
Height was measured	85		42.76	3.80	30.75-48.75	
Height was estimated	14		40.93	5.02	33.25-48.75	
Other way of ascertaining height	9		44.06	5.24	34.25-48.50	
<b>Height Estimation Indicators</b>						
Higher than the Doorknob	79	15.8	34.67	4.37	26-48.75	
Same as the Doorknob	148	29.6	36.36	3.90	20.25-48.25	
Shorter than the Doorknob	269	54.2	41.01	3.94	20-48.75	

\* N=496; data excluded for 54 children. Data from 7 children missing, and 47 children had biologically implausible data.

# p-value using independent sample t-tests.

**Table 21: Child Physical Activity Level and Screen time (N=550)**

Scales	N	%	Mean	SD	Actual Range
<b>IPAQ Score<sup>a</sup></b>			26.19	11.42	0-42
Low/Sedentary	170	30.91			
Medium	142	25.82			
High	238	43.27			
<b>Physical Activity Tendencies<sup>b</sup></b>			4.01	0.68	2-5
<b>Screen time (minutes per day)<sup>c</sup></b>			273.52	256.99	0-1395
>2 hours per day	296	53.82			
<=2 hours per day	254	46.18			
<b>Frequency of Engaging in Physical Activity</b>					
Inside the Home (days/week)			4.92 <sup>ABd</sup>	1.83	0-7
In the Yard (days/week)			4.52 <sup>AC</sup>	2.21	0-7
In the Neighborhood (days/week)			2.55 <sup>BC</sup>	1.80	0-7

<sup>a</sup> Scoring based on enhanced version of IPAQ (International Physical Activity Questionnaire) categorical scoring: physical activity = (# days of vigorous activities per week x 3) + (# days of moderate activities x 2) + (# days of walking 10 minutes at a time). Scores could range from 0 to 49; low/sedentary score = 0 to <20, medium score = 20 to <30, and high score  $\geq 30$ .<sup>605</sup>

<sup>b</sup> This scale score indicates how likely a child is to be physically active and is comprised of 4 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.68; a higher score indicates a child is more likely to be physically active.

<sup>c</sup> Screen time guidelines<sup>607</sup>

<sup>d</sup> One-sample t-test analysis show significant differences ( $p < 0.05$ ) between pairs followed by the same capital superscript letters.



more physical activity in their yard than in the neighborhood (Table 21). Over half of the mothers (55%) reported their child was active five or more days inside the home or yard (54%), while significantly fewer (13%) were active five or more days in their neighborhood (e.g., parks, pools, playgrounds, recreation centers).

### **Child Sleep**

Children slept for a mean of 10.5 hours per night, however total age-related sleep (nap and night-time) duration recommendations<sup>614</sup> were not met by 70 percent of the children. This appears to be due to children getting less nap time than is recommended for their age (Table 22), as about three-quarters meet or exceed recommendations for night sleep for their age. Mothers reported very good or good sleep quality for almost all (90.5%) of the preschool children, and none had very bad sleep quality.

### **Child Beverage Intake**

With regard to beverage consumption, children drank milk the most, followed by real 100% fruit juice, then fruit drinks or other sugar-sweetened beverages, respectively (Table 23). Children consumed less than 1 serving of milk and 100% fruit juice per day. About one-fourth of mothers indicated that their children had less than 1 serving of milk a day, and only 14 percent had more than 1 serving a day. Sugar-sweetened beverages in the form of soft drinks and fruit drinks supplied minimal sugar and calories to children's diets.

### **Child Eating Styles**

Mean child eating fussiness (i.e., neophobia) scores were neutral, with only 29 percent of mothers agreeing or strongly agreeing their children exhibited eating fussiness behaviors (Table 24). Children tended to not be emotional eaters, with a mean score below the mid-point on a 5-point scale. Only 11 percent of mothers strongly disagreed or disagreed that their children could not self-regulate their eating, indicating most mothers perceived their preschool-aged children as being able to follow internal signals of satiety and self-regulate food intake.

### **Child Teasing Experiences**

**Table 22: Child Sleep Hours and Quality (N=550)**

Scale	Mean	SD	Range	N	%
<b>Minutes of Nap</b>	65.05	78.70	0-660		
<b>Hours of Night-time Sleep</b>	10.46	2.08	2-22.25		
<b>Child Night Sleep Duration Recommendations by Age<sup>a 614</sup></b>					
Less than Age Recommendations				134	24.4
Meets Age Recommendations				296	53.8
Exceeds Age Recommendations				120	21.8
<b>Child Nap Sleep Duration Recommendations by Age<sup>b 614</sup></b>					
Less than Age Recommendations				289	52.5
Meets Age Recommendations				240	43.6
Exceeds Age Recommendations				21	3.8
<b>Child Total (nap and night-time) Sleep Duration Recommendations by Age<sup>c 614</sup></b>					
Less than Age Recommendations				386	70.2
Meets Age Recommendations				149	27.1
Exceeds Age Recommendations				15	2.7
<b>Child Night-time Sleep Quality<sup>d</sup></b>	4.41	0.70	1-5		
Very Good				286	52.0
Good				212	38.5
OK				44	8.0
Bad				8	1.5
Very Bad				0	0.0

<sup>a</sup> Child nap recommendations vary by age; 2 years 1 to 4 hours, 3 years 1 hour, 4 -5 years not needed. <sup>614</sup>

<sup>b</sup> Child night sleep recommendations vary by age; 2-3 years 10 to 12 hours, 4-5 years 10 to 11 hours. <sup>614</sup>

<sup>c</sup> Child total (night-time and nap) sleep recommendations vary by age; 2-3 years 12 to 14 hours, 4-5 years 11 to 13 hours. <sup>614</sup>

<sup>d</sup> A higher score of sleep quality indicates better sleep quality.

**Table 23: Child Beverage Intake (N=550)**

<b>Food Component</b>	<b>Mean</b>	<b>SD</b>	<b>Actual Range</b>	<b>N</b>	<b>%</b>
<b>Beverages</b>					
Milk to Drink (servings/day)	0.91	0.33	0-more than 7 <sup>a</sup>		
Less than 1 day a week				145	26.4
1 day a week				28	5.1
2 days a week				36	6.5
3 days a week				43	7.8
4 days a week				35	6.4
5 days a week				42	7.6
6 days a week				25	4.5
7 days a week				115	20.9
More than 1 time a day				78	14.2
Real 100% Fruit Juice (servings/day)	0.69	0.38	0-more than 7 <sup>a</sup>		
Vegetable Juice (servings/day)	0.17	0.32	0-more than 7 <sup>a</sup>		
Soft Drinks and Soda/Pop (servings/day)	0.11	0.22	0-more than 7 <sup>a</sup>		
Fruit Drinks or Other Sugar-Sweetened Beverages (servings/day)	0.23	0.32	0-more than 7 <sup>a</sup>		
<b>Sugar-Sweetened Beverage (SSB) Intake per day(soft drinks and fruit drinks)</b>					
Sugar (gm/day)	7.54	10.54	0-54.38		
Kcal/day	35.69	48.62	0-243.43		
Servings/day	0.35	0.47	0-2.29		

**Table 24: Mean Child Eating Styles (N=550)**

<b>Scale</b>	<b>Cronbach alpha</b>	<b>Mean</b>	<b>SD</b>	<b>Range</b>
Child Eating Neophobia <sup>a</sup>	0.88	3.11	1.09	1-5
Child Emotional Eating <sup>b</sup>	0.81	1.72	0.78	1-5
Child Eating Self Regulation <sup>c</sup>	0.63	3.52	0.98	1-5

<sup>a</sup> Higher score indicates a mother more strongly agrees that her child has wariness of trying and eating new foods; scale includes 4 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.88.

<sup>b</sup> Higher scores indicate a mother more strongly agrees that her child's eating is regulated by his or her emotional state; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.81.

<sup>c</sup> Higher scores indicate that a mother more strongly agrees that her child is better able to follow inner signals of satiety and self-regulate his or her intake of food; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.63.

Most (93%) mothers indicated that their child was not teased. Among those who indicated their child was teased (n=18), the most common reasons were because of the child's body shape or weight (e.g., "she has chunky monkey thighs", "she is overweight"; n=4) or the mother was not sure why. Other reasons children were teased included sibling rivalry and normal preschool-child interactions with each other (e.g., "just to get a reaction out of him"), for fun (e.g., "for fun, to make him laugh"), due to choice of activities like sports or reading (e.g., "she plays hockey and likes things not typical for her age"), and other non-weight related yet still negative reasons (e.g., "bathroom problems") (Table 25).

#### **Child's Father's Characteristics**

Most of the children's fathers were born in the United States (Table 26). Mothers reported that the fathers' weights were "about right" and only 3.8 percent described them as being "very heavy."

### **INTERPERSONAL FAMILY CHARACTERISTICS**

#### **Family Meals**

Most families had frequent family meals, with 93 percent reporting that they shared 7 or more meals per week with their family (Table 27). Mean scores indicate that mothers place a great deal of importance on having family meals. The locations of family meals was reported to be those recommended (i.e., at a table, not in front of a TV). Half of families consumed their dinners in the kitchen 6 or 7 nights a week. Mothers tended to agree that they planned meals for their family, and they strongly agreed that they had time and energy for family meals.

#### **Family and Household Interactions and Organization**

Mothers tended to agree that their families provided them with good support for engaging in healthy behaviors (e.g., healthy eating and physical activity). Mothers reported that their families tended to "get along" well, as they scored below the mid-point on the Family Conflict

**Table 25: Child Teasing (N=550)**

Scale	N	%
<b>Others Tease, Joke, or Make Fun of Child</b>		
Yes	18	3.3
No	511	92.7
Not Sure	21	3.8
<b>If yes, why (n=18)<sup>a</sup>:</b>		
Not Sure Why	5	27.8
Weight/Body Shape	4	22.2
Sibling rivalry, normal child-like interactions	2	11.1
Fun	3	16.7
Choice of activities like sports, reading	2	11.1
Other non-weight related negative reasons	2	11.1

<sup>a</sup> 18 mothers reported their children were teased; qualitative data analysis was conducted to assess the major categories that emerged when mothers gave an open ended response to why they believed the child was teased.

**Table 26: Paternal Demographics (N=550)**

Characteristic	N	%
<b>Paternal Country of Birth</b>		
United States	494	89.8
Other	56	10.2
<b>Paternal Weight as Described by the Mother</b>		
Very Thin	13	2.4
Thin	59	10.7
About Right	349	63.5
Heavy	104	18.9
Very Heavy	21	3.8
Not Sure	4	0.7

**Table 27: Family Meals Behaviors, Importance, Atmosphere, Locations, and Maternal Time and Energy for Family Meals (N=550)**

<b>Scales</b>	<b>Cronbach alpha</b>	<b>Mean</b>	<b>SD</b>	<b>Actual Range</b>
<b>Frequency of Family Meals (days/week)</b>	N/A	13.64	5.05	0-21
<b>Importance of Family Meals<sup>a</sup></b>	0.70	4.52	0.64	2-5
<b>Family Meal Atmosphere<sup>b</sup></b>	0.70	4.12	0.86	1-5
<b>Location Where Family Meals Eaten</b>				
Fast Food Restaurants (days/week)	N/A	0.93	1.18	0-7
In Front of TV (days/week)	N/A	2.24	2.48	0-7
At Kitchen or Dining Room Table (days/week)	N/A	4.69	2.5	0-7
In the Car (days/week)	N/A	0.43	1.16	0-7
<b>Family Meal Planning<sup>c</sup></b>	0.70	3.40	0.88	1-5
<b>Time and Energy for Family Meals<sup>d</sup></b>	0.78	4.34	0.85	1-5

<sup>a</sup> Higher score indicates more importance placed on family meals; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.70.

<sup>b</sup> Higher score indicates more positive family meal atmosphere; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.70.

<sup>c</sup> Higher score indicates more meal planning ; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.70.

<sup>d</sup> Higher score indicates more time and energy for family meals; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.78.



and Cohesion scale. Mothers scored around the mid-point on a scale of Household Disorganization, indicating some household chaos and disorganization existed.

Mothers strongly agreed that they engaged physically and verbally with their children. Most agreed that they spent a lot of time talking with their children while they did chores around the house, and that they give their children lots of hugs and kisses (Table 28).

## **ENVIRONMENTAL CHARACTERISTICS**

### **Home and Neighborhood Physical Activity Environment: Availability and Accessibility**

Mothers reported fair to good availability of physical activity equipment and space for their preschool children (e.g., balls, tricycles, scooters, jump ropes, other toys that help children be active) in their homes, yards (e.g., areas right outside the home), and neighborhoods (Table 29). Some parents selected that they were unsure about the accessibility of physical activity. The mean scores for physical activity accessibility indicate that preschool children could easily access play equipment and space in home and neighborhood areas that was safe and clean.

### **Home Media Environment: Availability, Accessibility, and Policies about Screen Time**

Participants reported having a wide array of media equipment (e.g., DVD players, iPads) in their homes, averaging  $11.57 \pm 4.21$ SD devices (Table 30). Most mothers (61%) reported their preschool child had only 0 or 1 pieces of media equipment in their bedrooms, usually televisions (42%), smart phones/tablets/laptops (29%), and DVD players (24%).

Overall, preschool children's access to media equipment (i.e., children could easily turn on and play with various screen time devices without help) was rated as somewhat low. However, mothers rated child access to tablets, smart phones, and electronic educational devices (like LeapPads) significantly higher than other devices.

Half of the participants allowed their preschool children to have 150 minutes or more of TV/movie time and 60 minutes or more of computer time each day. Video games were seldom

**Table 28: Family and Household Interactions and Organization (N=550)**

<b>Scale</b>	<b>Cronbach alpha</b>	<b>Mean</b>	<b>SD</b>	<b>Actual Range</b>
<b>Family Support for Healthy Behaviors<sup>a</sup></b>	0.81	4.40	0.73	1-5
<b>Family Conflict and Cohesion<sup>b</sup></b>	0.84	1.83	0.70	1-5
<b>Household Disorganization<sup>c</sup></b>	0.76	2.47	0.92	1-5
<b>Verbal Engagement with Children<sup>d</sup></b>	N/A	4.17	0.93	1-5
<b>Physical Engagement with Children<sup>e</sup></b>	N/A	4.74	0.51	1-5

<sup>a</sup> Higher score indicates more support; scale includes 4 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.81.

<sup>b</sup> Higher score indicates more conflict and less cohesion; scale includes 5 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.84.

<sup>c</sup> Higher score indicates more chaos, disorganization, and hurriedness in the home; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.76.

<sup>d</sup> Higher score indicates more verbal engagement with children while doing chores around the house; scale includes 2 5-point (SA to SD) Likert-type item.

<sup>e</sup> Higher score indicates more physical interaction with children; scale includes 1 5-point (SA to SD) Likert-type item.

**Table 29: Mean Home and Neighborhood Physical Activity Environment<sup>a</sup> Scores for Households with Young Children (N=550)**

<b>Characteristic</b>	<b>Cronbach alpha</b>	<b>Mean</b>	<b>SD</b>	<b>Actual Range</b>
<b>Physical Activity Availability<sup>b</sup></b>	0.72	3.78	0.67	1.17-4.92
<b>Physical Activity Accessibility<sup>c</sup></b>	0.90	4.20	1.09	1-5

<sup>a</sup> Home environment included inside the home, yard (area right outside the home), and neighborhood (area nearby the home).

<sup>b</sup> Physical activity availability scale includes 12 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.72.

<sup>c</sup> Physical activity accessibility scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.90; n=524; respondents who answered “not sure” were removed from analysis.

**Table 30: Mean Home Media Equipment Environment in Households with Preschool Children (N=550)**

Scales	Cronbach alpha	Mean	SD	Actual Range
<b>Media Equipment<sup>a</sup> Availability</b>	N/A			
Number of Media Devices in the Home		11.57	4.21	3-32
Number of Media Devices in Child's Bedroom		1.39	1.62	0-7
<b>Media Equipment Accessibility<sup>b</sup></b>	0.84	2.78	1.18	1-5
TV, DVD, Watch Shows or Movies		3.24	1.45	1-5
Computers and Laptops		2.50	1.42	1-5
Video games that are played standing up and require lots of moving		2.36	1.39	1-5
Video games played sitting down		2.38	1.42	1-5
Tablets, Smart phones, or Electronic educational devices (like LeapPad)		3.41	1.47	1-5
<b>Minutes of Screen Time Child Allowed Per Day</b>	N/A	495.14	714.22	0-4320 <sup>c</sup>
TV/Movie Time		256.36	354.23	0-1440 <sup>c</sup>
Computer Time		143.32	304.21	0-1440 <sup>c</sup>
Video Game Time		95.45	274.49	0-1440 <sup>c</sup>
<b>Limiting TV Commercials and Shows Not Appropriate<sup>d</sup></b>	0.50	3.67	0.93	1-5
<b>Is this Children Permitted to Watch Ed TV Only<sup>e</sup></b>	N/A	3.52	1.09	1-5

<sup>a</sup> Equipment included TV, DVD player, computer/laptop, smart phone/tablet/LeapPad, video game devices placed sitting down, video game devices played standing up and require lots of moving (like Wii Fit, Xbox Kinect), and Internet access.

<sup>b</sup> Higher score indicates parent more strongly agrees that item is easy for her preschool kids to turn on and play with with little or no help; media equipment accessibility scale includes 5 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.84

<sup>c</sup> Note that parents did not limit on screen time were coded as 1440 (24 hours).

<sup>d</sup> Higher score indicates a mother tries to limit TV commercials and movies/shows to those made for children; activity accessibility scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.50.

<sup>e</sup> Higher score indicates a mother more strongly agrees that she only lets her preschool children watch educational TV programs; includes 1 5-point (SA to SD) Likert-type item.

allowed, with 51 percent allowing no time for video games. Mothers tended to somewhat agree that preschool children's TV viewing should be limited to commercial-free programming and programming for children. Additionally, mothers somewhat agreed that they limited their preschool children to educational TV programs.

#### **Household Food Availability, Accessibility, and Policies**

Mothers reported that there were about 1.4 servings of fruits and vegetables available in the home for each household member per day. This translates into an average of 43 mg of vitamin C and 5g fiber available daily per capita in the household (Table 31).

The fatty, salty, and sweet snacks like chips, doughnuts, ice cream, and candy in household food supplies could provide over 300 kcal daily to each household member. This equates to over 20gm of sugar, 14gm of total fat, and 7 grams of saturated fat.

An examination of breakfast foods indicates that the household food supply contained about 2 servings per person each day of breakfast foods. There were significantly more fiber or plain cereals available than sweet cereal, and granola/breakfast cereal per person.

The most abundant beverages available in the home were milk, 100% fruit juice, and sugar-sweetened drinks. Each household member had about 1 serving of milk available each day, followed by about 0.75 servings of 100% fruit juice, and 0.41 servings of sugar sweetened soft drinks and other sugary beverages. Overall, beverages could supply an average of 269kcal per day per person, the vast majority of which were from sugar. Availability of sugar-sweetened specialty coffee drinks and energy drinks increased total sweetened beverage availability to more than 1 drink available for each household member daily.

#### **Household Food Availability, Accessibility, and Policies**

Mothers reported that there were about 1.4 servings of fruits and vegetables available in the home for each household member per day. This translates into an average of 43 mg of vitamin C and 5g fiber available daily per capita in the household (Table 31).

**Table 31: Household Availability of Foods and Food Components (N=550)**

<b>Food Component</b>	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>
<b>Fruit and Vegetables Servings (per day)</b>	1.42	0.64	0	2.85
Dietary Fiber (grams/day)	5.05	1.91	0.25	9.37
Vitamin C (mg/day)	42.60	16.33	1.94	78.27
Magnesium (mg/day)	88.87	28.73	16.93	152.90
Potassium (mg/day)	866.42	284.21	156.03	1495.63
<b>Fat, Salty, and Sweet Snack Servings (Chips, Doughnuts, Ice Cream, Candy) per day</b>	1.20	1.03	0	4.57
Energy (kcal/day)	319.29	285.92	0	1268.27
Sugar (gm/day)	21.57	22.11	0	94.67
Saturated fat gm/day)	7.26	7.07	0	31.06
Total fat (gm/day)	14.96	13.67	0	60.87
<b>Breakfast Food Servings per day</b>	2.01	0.89	0	3.43
Plain or fiber cereal	0.76	0.39	0	0-more than 1 <sup>a</sup>
Sweet cereal	0.65	0.40	0	0-more than 1
Breakfast, granola, or protein bar	0.60	0.39	0	0-more than 1

<sup>a</sup> Highest possible response choice was more than 1 time each day; lowest response choice was less than 1 time per week.

<sup>b</sup> Scores indicate the number of nutrient dense or nutrient poor foods that a mother allows her child to get for a snack without her help.

<sup>c</sup> Score indicates the number of nutrient dense or nutrient-poor foods that a mother keeps in places that are easy for her child to see and reach.

The fatty, salty, and sweet snacks like chips, doughnuts, ice cream, and candy in household food supplies could provide over 300 kcal daily to each household member. This equates to over 20gm of sugar, 14gm of total fat, and 7 grams of saturated fat. An examination of breakfast foods indicates that the household food supply contained about 2 servings per person each day of breakfast foods. There were significantly more fiber or plain cereals available than sweet cereal, and granola/breakfast cereal per person.

The most abundant beverages available in the home were milk, 100% fruit juice, and sugar-sweetened drinks. Each household member had about 1 serving of milk available each day, followed by about 0.75 servings of 100% fruit juice, and 0.41 servings of sugar sweetened soft drinks and other sugary beverages. Overall, beverages could supply an average of 269kcal per day per person, the vast majority of which were from sugar. Availability of sugar-sweetened specialty coffee drinks and energy drinks increased total sweetened beverage availability to more than 1 drink available for each household member daily.

Mothers allowed children to independently access  $1.86 \pm 1.77$  nutrient-dense snacks (possible range=0-5) and  $0.61 \pm 1.25$  nutrient-poor/calorie-rich snacks (possible range=0-6). More nutrient dense snacks were kept in places that were easy for children to see and reach than low nutrient dense snack foods (Table 31).

## **HOMES SURVEY INSTRUMENT RESULTS**

As reviewed in Chapters 2, 3, and Appendix 2, the constructs measured in the survey came from items created de-novo as well as existing scales that were modified. Cronbach's internal consistency scores were computed using all participants who met eligibility requirements (n=550). Cronbach's for all were fair to excellent (mean 0.74, range 0.50-0.95). See table footnotes for details.

## **MATERNAL WEIGHT STATUS AND WEIGHT-RELATED CHARACTERISTICS**

To address Research Question 2: *How do weight-related characteristics of home environments differ with the weight status of mothers?*, mothers and children were assigned to a weight status category based on their BMIs. As described in Chapter 2, BMI is a calculation of weight in kilograms by height in meters square. For adults, obesity is defined as BMI greater than or equal to 30, overweight as between 25.0 and 29.9, normal weight as 24.9 and 18.5, and underweight as 18.4 and less. For this analysis, mothers were assigned to weight status groups as follows: underweight and low normal weight (i.e., BMI < 22), high normal (i.e., BMI= 22 to 24.9), overweight, and obese. The number of underweight mothers was too low for meaningful analyses, thus they were combined with low normal weight mothers.

Dependent variables (BMI category) were compared using analysis of variance and Tukey post hoc procedures to examine how mother and child interpersonal, family intrapersonal, and environmental characteristics varied by weight status. Categorical independent variables and BMI categories were assessed with chi-square. The sample size for these analyses were computed with 550 mothers.

### **Maternal Intrapersonal Characteristics and Weight Status**

**Maternal Demographics.** Demographic characteristics of the respondents split by BMI category are shown in Tables 32 and 33. Chi-square tests revealed significant differences in BMI category between race/ethnicities. Compared to other race/ethnicity groups, the Asian race/ethnicity group had the largest proportion of underweight/low normal weight and the smallest proportion of in the obese group. The converse was true for Black or African Americans; they had the greatest proportion that was obese and, along with Hispanics, had the lowest proportion that was underweight/low normal weight

Chi-square results indicate BMI categories significantly differed by education level. The greatest proportion of obese mothers had an education level of high school graduate or less whereas the largest proportion of mothers with a bachelor's degree or higher were



**Table 32: Demographic Characteristics of Mothers of Young Children Study Participants, Split by Maternal BMI Category (N=550)**

Maternal Demographic Characteristic	Underweight/Low Normal Weight N=143		High Normal Weight N=128		Overweight N=115		Obese N=164		p-value*
	%	N	%	N	%	N	%	N	
<b>Race/Ethnicity#</b>									0.002
White (n=397)	25.2	100	24.4	97	20.7	82	29.7	118	
Hispanic, Latino, or Spanish (n=25)	20.0	5	48.0	12	8.0	2	24.0	6	
Black or African American (n=52)	21.2	11	9.6	5	25.0	13	44.2	23	
Asian (e.g., Indian, Japanese, Chinese, Korean), Pacific Islander, or American Indian (n=34)	44.1	15	26.5	9	20.6	7	8.8	3	
Other or Mixed Race (n=42)	28.6	12	11.9	5	26.2	11	33.3	14	
<b>Education</b>									0.018
High School or Less (n=99)	20.2	20	18.2	18	23.2	23	38.4	38	
Some college; technical or associate's degree (n=245)	23.7	58	25.3	62	18.0	44	33.1	81	
Bachelor's degree or higher (n=206)	31.6	65	23.3	48	23.3	48	21.8	45	
<b>Maternal Hours of Paid Employment</b>									0.513
No hours of paid employment (n=304)	23.0	70	23.7	72	21.4	65	31.9	97	
1 to 39 hours (n=103)	25.2	26	24.3	25	21.4	22	29.1	30	
40 or more hours (n=143)	32.9	47	21.7	31	19.6	28	25.9	37	

\*Overall chi-square.

Comment [BE1]: No foot note for this symbol

**Table 33: Home Demographic Characteristics of Mothers of Young Children Study Participants, Split by Maternal BMI Category (N=550)**

	Underweight/Low Normal Weight N=143			High Normal Weight N=128			Overweight N=115			Obese N=164			P- value*
Maternal Demographic Characteristic	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
Number of Children Under Age 18 Living in the Home	2.09	0.94	1-5	2.26	1.01	1-6	2.17	0.95	1-6	2.21	1.06	1-6	0.384
Family Affluence Ranking <sup>a</sup>	2.57	0.55	1-3	2.49	0.53	1-3	2.63 <sup>A</sup>	0.50	1-3	2.43 <sup>A</sup>	0.53	1-3	0.006
Food Security Risk Score <sup>b</sup>	1.65 <sup>A</sup>	1.79	0-6	1.74 <sup>B</sup>	1.88	0-6	2.11	1.79	0-6	2.55 <sup>AB</sup>	2.01	0-6	<0.001

<sup>a</sup> Higher scores indicate greater Family Affluence; possible range = 1 to 3.

<sup>b</sup> Higher scores indicate greater risk for food insecurity; possible range = 0 to 6.

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

underweight/low normal weight (Table 32). No significant differences were found between mothers with no hours of paid employment and those with paid employment. The number of children under age 18 in a home did not differ significantly with maternal BMI category (see Table 33). Overweight mothers had significantly higher family affluence scores than obese mothers. Food security risk scores were highest among obese mothers, differing significantly from those in both normal BMI categories. A higher food security risk score indicates greater risk of becoming or being food insecure.

**Maternal Health Status and History.** Obese mothers rated their general health significantly lower than mothers in every other BMI category (Table 34). More than one-quarter of obese mothers rated their general health as poor or fair whereas only 5% of mothers in both normal weight categories rated their general health similarly. Obese mothers had significantly more days of poor health than both underweight/low normal and high normal weight mothers, and overweight mothers had significantly more days of poor health than underweight/low normal weight mothers. Obese mothers also had significantly higher depression severity scores compared to mothers in the underweight/low normal and high normal weight categories. Maternal age at birth of the first child (Table 35) and smoking status (Table 36) did not differ with BMI category. Significantly more obese mothers reported diagnosis of chronic diseases including depression, diabetes, and high blood pressure and cholesterol. For example, more than 32% of obese mothers reported a depression diagnosis compared to 27% of overweight and 17% of underweight/low normal and high normal weight mothers. More than 35% of obese women reported diabetes or high blood pressure. Among the 19 mothers who reported having a diagnosis of Polycystic Ovarian Disease, 13 were overweight or obese. Obese mothers were significantly more likely to have a primary blood-related family member who had diabetes or

Maternal age at birth of the first child (Table 35) and smoking status (Table 36) did not differ with BMI category. Significantly more obese mothers reported diagnosis of chronic

**Table 34: Health Status of Mothers of Preschool Children, Split by Maternal BMI Category (N=550)**

Health Characteristic	Underweight/Low Normal Weight N=143			High Normal Weight N=128			Overweight N=115			Obese N=164			p-value <sup>#</sup>
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>General Health Rating*</b>	4.05 <sup>A</sup> <sub>B</sub>	0.74	2-5	3.69 <sup>C</sup>	0.77	2-5	3.50 <sup>AD</sup>	0.72	2-5	2.97 <sup>BCD</sup>	0.80	1-5	<0.001
<b>Number of Days in Past 30 Days of “Not Good” Mental or Physical Health (Health Related Quality of Life)</b>	2.08 <sup>A</sup> <sub>B</sub>	3.90	0-25	2.11 <sup>C</sup>	3.00	0-17	3.67 <sup>A</sup>	5.22	0-28	5.02 <sup>BC</sup>	6.34	0-30	<0.001
<b>Depression Severity Score†</b>	0.86 <sup>A</sup>	1.36	0-6	0.88 <sup>B</sup>	1.42	0-6	1.05	1.28	0-6	1.34 <sup>AB</sup>	1.559	0-6	0.005

\* Higher scores indicate better general health; possible score range 1 to 5.

† Higher scores indicate greater depression severity; possible score range 0 to 6.

<sup>#</sup> ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

**Table 35: Age at Birth of First Child of Mothers of Preschool Children, Split by Maternal BMI Category (N=550)**

Health Characteristic	Underweight/Low Normal Weight N=143			High Normal Weight N=128			Overweight N=115			Obese N=164			p- value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
Age in years at birth of first child	24.61	4.53	15-38	24.74	5.51	15-42	24.66	5.72	15-39	23.96	5.75	15-42	0.243

\*ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

**Table 36: Health History of Mothers of Preschool Children, Split by Maternal BMI Category (N=550)**

Health Characteristic	Underweight/Low Normal Weight N=143		High Normal Weight N=128		Overweight N=115		Obese N=164		p-value*
	N	%	N	%	N	%	N	%	
<b>Currently Smokes</b> (n=119)	32	26.9	21	17.6	23	19.3	43	36.1	0.2229
<b>Ever Diagnosed with a Chronic Disease by a Health Professional<sup>a</sup></b> (n=233)	35 <sup>AB</sup>	15.0	45 <sup>C</sup>	19.3	51 <sup>AD</sup>	21.9	102 <sup>BCD</sup>	43.8	<0.001
<b>Has Primary<sup>b</sup> Blood-related Family Member with Diabetes<sup>c</sup> or Overweight (n=260)</b>	41 <sup>AB</sup>	15.8	51 <sup>C</sup>	19.6	58 <sup>AD</sup>	22.3	110 <sup>BCD</sup>	42.3	<0.001

<sup>a</sup> Chronic diseases include depression, high blood cholesterol, high blood pressure, heart disease, polycystic ovarian syndrome, diabetes, thyroid disease, or gout.

<sup>b</sup> Primary family members were defined as blood-relatives including mother, father, brother, or sister.

<sup>c</sup> No attempt made to distinguish between types of diabetes because most Americans assume Type 2 and Type 1 the same.<sup>625</sup>

\*ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

diseases including depression, diabetes, and high blood pressure and cholesterol. For example, more than 32% of obese mothers reported a depression diagnosis compared to 27% of overweight and 17% of underweight/low normal and high normal weight mothers. More than 35% of obese women reported diabetes or high blood pressure. Among the 19 mothers who reported having a diagnosis of Polycystic Ovarian Disease, 13 were overweight or obese. Obese mothers were significantly more likely to have a primary blood-related family member who had diabetes or were overweight than all other groups. Overweight mothers were significantly more likely to have a primary blood-related family member who had diabetes or were overweight than underweight/low normal weight mothers.

**Maternal Body Satisfaction.** Body shape dissatisfaction increased with BMI category. Post hoc Tukey pairwise comparisons indicate all BMI categories differed significantly from each other with regard to body shape dissatisfaction (Table 37).

**Maternal Physical Activity.** Table 38 shows that physical activity levels decreased across weight categories. There was a significant post hoc difference between underweight/low normal weight and obese mothers, with obese mothers having lower IPAQ scores. Obese mothers spent significantly more hours on screen time activities per day than overweight mothers.

**Maternal Sleep Duration and Quality.** Hours of sleep differed between BMI categories (Table 39). High normal weight mothers reported significantly more sleep than obese mothers. Maternal sleep quality was significantly higher in underweight/low normal and high normal weight mothers compared to obese mothers.

**Maternal Eating Behaviors.** Intake of fiber, vitamin C, magnesium, and potassium was highest among underweight/low normal weight mothers, and decreased as BMI category rose (Table 40). Underweight/low normal weight mothers consumed significantly more of these nutrients compared to obese mothers.

**Table 37: Maternal Body Satisfaction, Split by Maternal BMI Category (N=550)**

Character- istic	Underweight/Low Normal Weight N=143			High Normal Weight N=128			Overweight N=115			Obese N=164			p- value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Dissatisfac- tion with body shape in past 28 days<sup>a</sup></b>	1.73 <sup>ABC</sup>	0.77	1-4	2.30 <sup>ADE</sup>	0.97	1-4	2.70 <sup>BDF</sup>	0.97	1-4	3.45 <sup>CEF</sup>	0.86	1-4	<0.001

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Higher scores indicate greater dissatisfaction with body shape; possible score range=1 to 4.



**Table 38: Maternal Physical Activity, Split by Maternal BMI Category (n=550)**

Characteristic	Underweight/Low Normal Weight N=143			High Normal Weight N=128			Overweight N=115			Obese N=164			p-value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>IPAQ Score<sup>a</sup></b>	17.17 <sup>A</sup>	10.47	0-42	16.33	9.46	0-42	14.06	9.69	0-42	14.20 <sup>A</sup>	9.91	0-42	0.018
<b>Hours of Screentime per day</b>	6.45	5.08	0.5- 23.5	6.32	5.35	0-23.8	5.26 <sup>A</sup>	4.00	1-21	6.39 <sup>A</sup>	5.04	0-23.8	0.018

<sup>a</sup> Enhanced version of IPAQ (International Physical Activity Questionnaire) categorical scoring: physical activity = (# days of vigorous activities per week x 3) + (# days of moderate activities x 2) + (# days of walking 10 minutes at a time) . Scores could range from 0 to 49; low/sedentary score = 0 to <20, medium score = 20 to <30, and high score  $\geq 30$ .<sup>605</sup> Possible score range= 0 to 42.

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

**Table 39: Maternal Sleep Duration and Quality, Split by Maternal BMI Category (N=550)**

Characteristic	Underweight/Low Normal Weight N=143			High Normal Weight N=128			Overweight N=115			Obese N=164			p-value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Hours of Sleep</b>	7.13	1.89	2.25- 2.3	7.49 <sup>A</sup>	2.29	1-20.5	6.91	1.37	4-15	6.93 <sup>A</sup>	1.66	0-23	0.039
<b>Maternal Sleep Quality<sup>a</sup></b>	3.41 <sup>A</sup>	0.92	1-5	3.41 <sup>B</sup>	0.87	1-5	3.20	0.79	2-5	2.99 <sup>AB</sup>	0.09	1-5	<0.001

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Higher score indicates better sleep quality; possible range=1 to 5 (very good to very bad).

**Table 40: Maternal Dietary Intake, Split by Maternal BMI Category (N=550)**

Characteristic	Underweight/Low Normal Weight N=143			High Normal Weight N=128			Overweight N=115			Obese N=164			p- value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Fruit and Vegetable Servings</b>	5.48	2.97	0.33-14.39	5.30	3.02	0-14.39	4.95	2.66	0-14.39	4.8	2.39	0-13.28	0.138
Dietary Fiber Intake (grams/day)	20.10 <sup>A</sup>	8.47	4.16-45.64	19.27	8.36	5.31-45.80	18.32	7.37	2.52-45.32	17.53 <sup>A</sup>	6.81	3.36-43.23	0.026
Vitamin C Intake (mg/day)	167.0 <sup>A</sup>	72.14	37-385.45	160.3	71.08	37-385.9	153.30	63.02	15.9-384.6	145.74 <sup>A</sup>	56.99	36.0-356.5	0.034
Magnesium Intake (mg/day)	392.2 <sup>A</sup>	127.2	158.1-776.6	380.0	125.4	166.9-778.3	366.6	110.8	127-773.2	354.0 <sup>A</sup>	101.5	149.6-733.9	0.029
Potassium Intake (mg/day)	3787.7 <sup>A</sup>	1257	1496.2-7590	3668	1239.1	1547-7603.8	3539.1	1096.3	1161.2-7562.4	3412.3 <sup>A</sup>	999.4	1427.2-7140.2	0.030
<b>Meat/Snacks</b>													
Total fat Intake (gm/day)	107.8	25.6	46.3-190.3	101.7	23.6	53.5-207.10	102.1	21.4	48.7-156.7	107.4	23.0	55.9-153.1	0.05
Saturated fat Intake (gm/day)	29.3	9.4	6.8-59.6	27.1	8.7	9.4-65.7	27.33	7.8	7.7-47.3	29.2	8.4	10.3-56.9	0.05
Percent of kcal from fat Intake /day	38.1	6.4	22.7-58.7	36.6	5.9	24.5-62.9	36.7	5.5	23.3-50.0	38.0	5.7	25.1-56.9	0.05
Dietary cholesterol Intake (mg/day)	273.9	83.2	73.15-544.8	254.1	76.8	96.6-595.8	255.4	69.9	80.95-432.0	272.49	74.9	104.35-517.8	0.05

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Highest possible response choice was more than 1 time each day; lowest response choice was less than 1 time per week.

**Table 40: Maternal Dietary Intake, Split by Maternal BMI Category (N=550) Cont'd.**

	Underweight/Low Normal Weight N=143			High Normal Weight N=128			Overweight N=115			Obese N=164			p- value*
Characteristic	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
Beverages													
Milk to Drink (servings/day)	0.57	0.45	0- more than 1 <sup>a</sup>	0.56	0.46	0- more than 1	0.54	0.43	0- more than 1	0.57	0.43	0- more than 1	0.951
Real 100% Fruit Juice (servings/day)	0.51	0.39	0-more than 1	0.47	0.41	0- more than 1	0.43	0.38	0-more than 1	0.47	0.40	0-more than 1	0.448
Vegetable Juice (servings/day)	0.23 <sup>AB</sup>	0.35	0-more than 1	0.20 <sup>C</sup>	0.34	0-more than 1	0.11 <sup>A</sup>	0.25	0-more than 1	0.11 <sup>BC</sup>	0.27	0-more than 1	0.001
Soft Drinks and Soda/Pop (servings/day)	0.35	0.42	0-more than 1	0.38	0.41	0-more than 1	0.33	0.40	0-more than 1	0.43	0.42	0-more than 1	0.049
Fruit Drinks or Other Sugar- Sweetened Beverages (servings/day)	0.27	0.27	0-more than 1	0.10	0.26	0-more than 1	0.17 <sup>A</sup>	0.28	0-more than 1	0.27 <sup>A</sup>	0.32	0-more than 1	0.008
Energy Drinks (servings/day)	0.13 <sup>A</sup>	0.27	0-more than 1	0.10	0.26	0-more than 1	0.06 <sup>A</sup>	0.19	0-more than 1	0.07	0.21	0-more than 1	0.032
Sugar-Sweetened Specialty Coffee Drinks (servings/day)	0.21	0.31	0-more than 1	0.20	0.33	0-more than 1	0.15	0.26	0-more than 1	0.18	0.30	0-more than 1	0.640

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Highest possible response choice was more than 1 time each day; lowest response choice was less than 1 time per week.

**Table 40: Maternal Dietary Intake, Split by Maternal BMI Category (N=550) Cont'd.**

	Underweight/Low Normal Weight N=143			High Normal Weight N=128			Overweight N=115			Obese N=164			p- value*
Characteristic	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
Sugar-Sweetened Beverage Intake (soft drinks, fruit drinks, energy drinks, sweet coffee drinks)													
Sugar (gm/day)	25.32	26.07	0-103.29	24.03	26.93	0-123.01	18.85	18.87	0-75.54	24.93	20.98	0-107.6	0.072
Kcal/day	122.19	127.29	0-511.25	114.2	132.57	0-607.8	88.79	90.58	0-363.82	117.36	101.85	0-531.83	0.064
Servings/day	0.96	0.98	0-3.86	0.90	1.00	0-4.57	0.71 <sup>A</sup>	0.71	0-2.71	0.96 <sup>A</sup>	0.78	0-4	0.041

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

Data indicated a significant main effect of intake of total fat grams per day, saturated fat grams, percent of kilocalories from fat, and dietary cholesterol intake. Although follow-up procedures were not significant among BMI categories, both obese and underweight/low normal weight mothers tended to consume more total fat, saturated fat, and cholesterol, and had higher percent of kilocalories from fat per day than other BMI groups.

No significant differences were found between BMI category and intake of milk, real 100% fruit juice, and sugar-sweetened specialty coffee drinks. Both underweight/low and high normal weight groups tended to consume significantly more vegetable juice than overweight and obese mothers. Underweight/low normal weight mothers consumed significantly more servings of energy drinks per day compared to overweight mothers. Obese mothers consumed significantly more servings per day of sugar-sweetened beverages than overweight mothers.

No significant differences were found between BMI categories and mothers' disinhibited or adventurous eating styles (Table 41). However, mothers differed significantly with regard to emotional eating and dietary restraint across BMI categories. Post-hoc analyses indicated that underweight/low normal and normal weight mothers were significantly less likely to be emotional eaters than heavier mothers. Dietary restraint was significantly lower among underweight/low normal weight mothers than overweight mothers.

**Maternal Psychographic Characteristics.** No significant differences were found among BMI categories and psychographic characteristics, including measures of maternal self-effectiveness, need for cognition, parenting self-efficacy, or stress management self-efficacy. See Table 42.

**Maternal Weight Teasing in Childhood.** There was a significant main effect of BMI category and mother's report of weight teasing when younger. Obese mothers reported experiencing significantly more weight teasing in the past than mothers in all other BMI categories (Table 43). Among those teased at least sometimes (N=109), obese mothers reported significantly higher degree of being upset for weight teasing compared to all other weight categories.

**Table 41: Mean Maternal Eating Behaviors Scale Scores, Split by Maternal BMI Categories (N=550)**

Characteristic	Underweight/Low Normal Weight N=143			High Normal Weight N=128			Overweight N=115			Obese N=164			p- value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
Disinhibited Eating <sup>a</sup>	1.87	0.73	1-4	1.88	0.78	1-4	2.00	0.75	1-4	2.08	0.75	1-4	0.051
Maternal Emotional Eating <sup>b</sup>	1.77 <sup>AB</sup>	0.77	1-4	1.90 <sup>C</sup>	0.82	1-4	2.45 <sup>A</sup>	0.73	1-4	2.38 <sup>BC</sup>	0.91	1-4	<0.001
Dietary Restraint <sup>c</sup>	2.27 <sup>A</sup>	0.79	1-4	2.45	0.73	1-4	2.60 <sup>A</sup>	0.72	1-4	2.40	0.70	1-4	0.004
Maternal Adventurousness Eating <sup>d</sup>	3.11	0.73	1-4	3.23	0.66	1.50-4	3.15	0.63	1-4	3.16	0.72	1-4	0.581

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Disinhibited eating scale had 3 4-point (mostly false to mostly true) Likert-type items with a Cronbach-alpha of 0.81.

<sup>b</sup> Maternal emotional eating scale had 3 4-point (mostly false to mostly true) Likert-type items with a Cronbach-alpha of 0.75.

<sup>c</sup> Dietary restraint scale had 4 4-point (mostly false to mostly true) Likert-type items with a Cronbach-alpha of 0.74.

<sup>d</sup> Eating adventurousness scale had 2 4-point (mostly false to mostly true) Likert-type items with a Cronbach-alpha of 0.72.

**Table 42: Maternal Psychographic Characteristics Scale Scores, Split by Maternal BMI Categories (N=550)**

Characteristic	Underweight/Low Normal Weight N=143			High Normal Weight N=128			Overweight N=115			Obese N=164			p-value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
Self-Effectiveness <sup>a</sup>	3.76	0.72	1.75-5	3.77	0.84	1.5-5	3.63	0.87	1-5	3.57	0.83	1-5	0.081
Need for Cognition <sup>b</sup>	3.60	1.01	1-5	3.51	0.97	1-5	3.35	0.93	1-5	3.46	0.98	1-5	0.218
Parenting Self-Efficacy <sup>c</sup>	4.19	0.70	2-5	4.13	0.80	2-5	4.08	0.83	1-5	4.00	0.88	1-5	0.210
Stress Management <sup>d</sup>	3.98	0.75	1.5-4.5	4.02	0.72	1.5-4.5	3.99	0.70	1.5-4.5	3.80	0.83	1.5-4.5	0.053
Stress Management Self-Efficacy <sup>e</sup>	2.71	1.02	1-4	2.66	1.08	1-4	2.66	0.99	1-4	2.5	0.98	1-4	0.280

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Self-effectiveness scale had 4 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.69. Higher scores indicate more self-effectiveness in personal areas.

<sup>b</sup> Need for cognition had 1 5-point (SA to SD) Likert-type item. Higher score indicates a higher need for cognition.

<sup>c</sup> Parenting self-efficacy had 1 5-point (SA to SD) Likert-type item. Higher score indicates more parenting self-efficacy.

<sup>d</sup> Stress management scale had 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.84. Higher score indicates more control and better management of stress.

<sup>e</sup> Stress management self-efficacy had 1 5-point (SA to SD) Likert-type item. Higher score indicates more self-efficacy managing stress.



**Table 43: Maternal Weight Teasing in Childhood, Split by Maternal BMI Category (N=550)**

Scale	Underweight/Low Normal Weight N=143			High Normal Weight N=128			Overweight N=115			Obese N=164			p-value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
Perception of Weight Teasing History (1-5) <sup>a</sup>	1.46 <sup>A</sup>	0.80	1-4.33	1.59 <sup>B</sup>	0.99	1-5	1.70 <sup>C</sup>	1.01	1-5	2.47 <sup>ABC</sup>	1.35	1-5	<0.001
Weight Teasing Effect(1-5) <sup>b</sup>	0.79 <sup>A</sup>	1.24	0-4	1.15 <sup>B</sup>	1.50	0-4	1.22 <sup>C</sup>	1.59	0-4	2.20 <sup>ABC</sup>	1.70	0-4	<0.001

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Higher scores indicate more teasing related to weight.

<sup>b</sup> N=109 mothers who reported they were teased at least sometimes; higher scores indicate higher degree of being upset if teased about weight.

**Maternal Perceptions about Child Overweight.** No significant difference was found among maternal BMI and mother's belief that overweight children are healthier. Obese mothers are, however, significantly more likely to be concerned about their children's risk of becoming overweight compared to mothers in all other weight categories (Table 44). There were no differences between maternal weight categories and her perception of visual representations of children as underweight or overweight.

**Maternal Modeling Frequency, and Mean Importance and Encouragement/Facilitation of Physical Activity and Media Use.** Obese mothers placed significantly less importance on physical activity for themselves than mothers in all other weight categories (Table 45). Obese mothers also placed significantly less importance on modeling physical activity behaviors to their children and spent significantly fewer days a week in the last month modeling physical activity behaviors than both categories of normal weight mothers. Obese mothers did, however, report significantly fewer days modeling media use behaviors to their children compared to both categories of normal weight mothers. No significant difference was seen between maternal weight and the importance they place on physical activity for their children, their use of encouragement and facilitating physical activity for their children, and how often they engage in physical activity behaviors with the child.

**Maternal Beliefs and Practices Regarding Screen Time.** No significant associations were found between mother weights and scales assessing mothers' belief in positive effects of TV on child learning (Table 46). Similarly, no significant differences occurred across weight categories with regard to the frequency with which mothers talked with their children regarding TV and media.

**Maternal Feeding Practices.** Obese mothers reported significantly less modeling of healthy eating behaviors to their children and were less likely to tolerate food waste in the home compared to both categories of normal weight mothers (Table 47). Obese mothers exerted significantly less control over their preschool children's access to and decisions about foods than

**Table 44: Maternal Perceptions about Child Overweight, Split by Maternal BMI Category (N=550)**

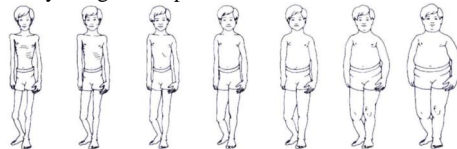
Characteristic	Underweight/Low Normal Weight N=143			High Normal Weight N=128			Overweight N=115			Obese N=164			p- value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Chubby Kids are Healthy<sup>a</sup></b>	2.70	0.67	1-4.33	2.72	0.79	1-5	2.71	0.70	1-4.67	2.69	0.77	1-4.33	0.982
<b>I am Concerned for my Child's Overweight risk<sup>b</sup></b>	1.65 <sup>A</sup>	0.87	1-5	1.86 <sup>B</sup>	1.00	1-5	1.72 <sup>C</sup>	0.86	1-4.5	2.30 <sup>ABC</sup>	1.19	1-5	<0.001
<b>Picture of Child first child who is ... Underweight<sup>c</sup></b>	1.97	0.76	1-3	1.97	0.75	1-3	2.02	0.78	1-6	2.01	0.90	1-6	0.935
<b>Overweight<sup>c</sup></b>	5.91	0.72	4-7	5.83	0.79	4-7	5.77	0.78	4-7	5.74	0.80	3-7	0.239

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> A higher score indicates that a parent believes more strongly that an overweight child is healthier; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.65.

<sup>b</sup> A higher score indicates that parent is more concerned about her child's risk of becoming overweight; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.91.

<sup>c</sup> Body Image Perceptions based on Scores that correspond to the shapes below. The image on the far left is #1, the image on the far right is #7.



**Table 45: Maternal Modeling Frequency, and Mean Importance and Encouragement/Facilitation of Physical Activity and Media, Split by Maternal BMI Category (N=550)**

Character-istic	Underweight/Low Normal Weight N=143			High Normal Weight N=128			Overweight N=115			Obese N=164			p- value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
Importance of Physical Activity for self <sup>a</sup>	3.76 <sup>A</sup>	0.90	1-5	3.68 <sup>B</sup>	0.98	1-5	3.51 <sup>C</sup>	0.85	1-5	3.09 <sup>ABC</sup>	0.98	1-5	<0.001
Importance of Physical Activity for child <sup>b</sup>	3.90	0.88	1-5	3.88	0.85	1-5	3.7	0.80	1-5	3.77	0.91	1-5	0.497
Encouragement and Facilitation of Physical Activity <sup>c</sup>	4.29	0.69	1-5	4.29	0.65	1.8-5	4.24	0.58	2.6-5	4.12	0.69	1.8-5	0.094
Importance of Modeling Physical Activity <sup>d</sup>	4.24 <sup>A</sup>	0.84	1-5	4.32 <sup>B</sup>	0.69	2-5	4.10	0.75	2-5	3.91 <sup>AB</sup>	0.89	1-5	<0.001

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Higher score indicates mother places greater importance on physical activity for self; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.82.

<sup>b</sup> Higher score indicates mother places greater importance of physical activity for her child; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.68.

<sup>c</sup> Higher score indicates greater encouragement/facilitation of physical activity by the mother for her child; scale includes 5 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.88.

<sup>d</sup> Higher score on all scales indicates greater importance mother places on modeling positive physical activity behaviors to her child; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.79.

**Table 45: Maternal Modeling Frequency, and Mean Importance and Encouragement/Facilitation of Physical Activity and Media, Split by Maternal BMI Category (N=550) Cont'd.**

Characteristic	Underweight/Low Normal Weight N=143			High Normal Weight N=128			Overweight N=115			Obese N=164			p- value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
Mother and Child Co- Physical Activity Behavior Frequency (days a week in the last month)	3.80	1.92	0-7	3.64	1.83	0-7	3.46	1.88	0-7	3.72	1.80	0-7	0.503
Maternal Modeling of Physical Activity Behavior Frequency (days a week in the last month)	3.35 <sup>A</sup>	1.14	0.33-6	3.21 <sup>B</sup>	1.25	0-6.33	2.97	1.17	0.5-6	2.80 <sup>AB</sup>	1.23	0-6.5	<0.001
Maternal Modeling of Media Use Behavior Frequency (days a week in the last month)	3.13 <sup>A</sup>	2.20	0-7	3.13 <sup>B</sup>	2.07	0-7	2.79	2.27	0-7	2.21 <sup>AB</sup>	2.07	0-7	<0.001

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

**Table 46: Mean Maternal Beliefs and Practices Regarding Screentime in Families with Preschool Children, Split by Maternal BMI Category (N=550)**

Characteristic	Underweight/Low Normal Weight N=143			High Normal Weight N=128			Overweight N=115			Obese N=164			p- value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
Belief of Positive Effect of TV on Child Learning <sup>a</sup>	3.87	0.77	1-5	3.91	0.70	1-5	3.81	0.80	1-5	3.93	0.78	1-5	0.632
Talks Often with Kids Regarding TV/Media <sup>b</sup>	3.33	0.92	1-5	3.35	0.98	1-5	3.21	1.00	1-5	3.10	0.99	1-5	0.107

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Higher score indicates a mother more strongly agrees that TV has a positive effect on children's learning/helps them do better in school; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.50.

<sup>b</sup> Higher score indicates a mother more often speaks with her children about TV advertisements, shows, video games, or movies; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.85.

underweight/low normal weight mothers. Although no significant differences were seen, overweight and obese mothers reported less restriction and pressuring feeding practices than normal weight mothers. No significant differences were noted between weight category and use with regard to the frequency with which mothers talked with their children regarding TV and media.

**Maternal Feeding Practices.** Obese mothers reported significantly less modeling of healthy eating behaviors to their children and were less likely to tolerate food waste in the home compared to both categories of normal weight mothers (Table 47). Obese mothers exerted significantly less control over their preschool children's access to and decisions about foods than underweight/low normal weight mothers. Although no significant differences were seen, overweight and obese mothers reported less restriction and pressuring feeding practices than normal weight mothers. No significant differences were noted between weight category and use of both food and non-food rewards, however, the use of rewards tended to decline as weight increased.

#### **Child Intrapersonal Factors and Maternal Weight Status**

**Child Eating Style.** Obese mothers were significantly more likely feel that their children displayed eating neophobia characteristics than underweight/low normal weight mothers (Table 48). Children's emotional eating and eating self-regulation characteristics were not associated with maternal weight category.

#### **Maternal Interpersonal Factors and Maternal Weight Status**

**Family Meals.** Obese mothers reported family meals were eaten in front of a TV significantly more days per week than both underweight/low normal and overweight mothers. Obese mothers also indicated they spent significantly fewer days sharing family meals at a kitchen or dining room table compared to underweight/low normal weight mothers (Table 49). There was no significant association between maternal weight category and frequency of family meals, importance placed on family meals, atmosphere at family meals, and frequency of eating meals at

**Table 47: Mean Maternal Feeding Practices, Split by Maternal BMI Category (N=550)**

Characteristic	Underweight/Low Normal Weight N=143			High Normal Weight N=128			Overweight N=115			Obese N=164			p-value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
Healthy Eating Modeling <sup>a</sup>	3.59 <sup>A</sup>	0.69	1.25-5	3.64 <sup>B</sup>	0.74	1.25-5	3.52	0.66	2-5	3.33 <sup>AB</sup>	0.77	1.25-4.75	0.001
Restriction <sup>b</sup>	3.94	0.79	1-5	3.89	0.89	1-5	3.76	0.87	2-5	3.79	0.90	1.5-5	0.285
Pressure to Eat <sup>c</sup>	2.23	0.95	1-5	2.22	1.00	1-5	2.15	0.99	1-5	2.15	0.99	1-5	0.522
Food Access and Decisions <sup>d</sup>	3.41 <sup>A</sup>	0.48	1.86-4.43	3.38	0.51	2-4.43	3.32	0.54	2-5	3.23 <sup>A</sup>	0.52	1.43-4.43	0.016
Food Waste Non-Acceptance <sup>e</sup>	3.24 <sup>A</sup>	0.99	1-5	3.14 <sup>B</sup>	0.88	1-5	3.01	0.91	1-5	2.8 <sup>AB</sup>	1.01	1-5	0.002
Instrumental Feeding <sup>f</sup> (Use of Food for Reward)	2.75	0.91	1-5	2.71	0.95	1-5	2.57	0.92	1-5	2.50	0.85	1-5	0.059
Use of Non-food for Reward <sup>g</sup>	2.96	1.05	1-5	2.91	0.89	1-5	2.89	0.87	1-4.5	2.85	0.95	1-5	0.780

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Higher scores indicate mother more strongly agrees that she models eating of healthy foods to her preschool children; scale includes 4 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.56.

<sup>b</sup> Higher scores indicate a mother uses more restriction of her preschool child's eating; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.63.

<sup>c</sup> Higher scores indicate a mother uses pressure on her preschool child to eat; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.69.

<sup>d</sup> Higher scores indicate a mother more strongly agrees that she controls her preschool children's access to and decisions about foods; scale includes 7 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.65.

<sup>e</sup> Higher scores indicate a mother does not like when food is waste; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.61.

<sup>f</sup> Higher scores indicate a mother more frequently uses food rewards for eating and behaving; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.73.

<sup>g</sup> Higher scores indicate a mother more frequently uses non-food rewards for eating and behaving; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.65.



**Table 48: Mean Child Eating Styles, Split by Maternal BMI Category (N=550)**

Characteristic	Underweight/Low Normal Weight N=143			High Normal Weight N=128			Overweight N=115			Obese N=164			p- value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
Child Eating Neophobia <sup>a</sup>	2.99 <sup>A</sup>	1.01	1-5	3.07	1.09	1-5	3.01	1.09	1-5	3.31 <sup>A</sup>	1.13	1-5	0.032
Child Emotional Eating <sup>b</sup>	1.79	0.75	1-4	1.77	0.86	1-5	1.68	0.78	1-5	1.66	0.75	1-5	0.449
Child Eating Self-Regulation <sup>c</sup>	3.44	0.93	1-5	3.53	0.93	1.5-5	3.41	1.02	1-5	3.66	1.03	1-5	0.132

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Higher score indicates a mother more strongly agrees that her child has wariness of trying and eating new foods; scale includes 4 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.88.

<sup>b</sup> Higher scores indicate a mother more strongly agrees that her child's eating is regulated by his or her emotional state; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.81.

<sup>c</sup> Higher scores indicate that a mother more strongly agrees that her child is better able to follow inner signals of satiety and self-regulate his or her intake of food; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.63.

**Table 49: Family Meals Behaviors, Importance, Atmosphere, Locations, and Maternal Time and Energy for Family Meals, Split by Maternal BMI Category (N=550)**

Characteristic	Underweight/Low Normal Weight N=143			High Normal Weight N=128			Overweight N=115			Obese N=164			p- value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Frequency of Family Meals (days/week)</b>	14.05	1.87	0-21	13.88	4.83	0-21	13.07	4.892	2-21	13.49	5.46	0-21	0.420
<b>Importance of Family Meals<sup>a</sup></b>	4.58	0.55	2.33-5	4.51	0.69	2-5	4.49	0.64	2.33-5	4.50	0.66	2-5	0.617
<b>Family Meal Atmosphere<sup>b</sup></b>	4.10	0.86	1-5	4.14	0.86	1-5	4.10	0.81	2-5	4.12	0.88	1-5	0.988
<b>Location Where Family Meals Eaten</b>													
Fast Food Restaurants (days/week)	1.04	1.36	0-7	0.97	1.22	0-7	0.74	0.83	0-3	0.94	1.20	0-7	0.220
In Front of TV (days/week)	1.91 <sup>A</sup>	2.42	0-7	2.16	2.43	0-7	1.99 <sup>B</sup>	2.37	0-7	2.77 <sup>AB</sup>	2.58	0-7	0.009
At Kitchen or Dining Room Table (days/week)	5.19 <sup>A</sup>	2.41	0-7	4.77	2.34	0-7	4.55	2.46	0-7	4.29 <sup>A</sup>	2.69	0-7	0.015
In the Car (days/week)	0.60	1.56	0-7	0.46	1.14	0-7	0.30	0.66	0-4	0.35	1.01	0-7	0.143
<b>Family Meal Planning<sup>c</sup></b>	3.47	0.87	1-5	3.49	0.92	1-5	3.42	0.84	1-5	3.25	0.89	1-5	0.071
<b>Time and Energy for Family Meals<sup>d</sup></b>	4.33	0.88	1-5	4.37	0.89	1-5	4.30	0.80	1.5-5	4.36	0.83	2-5	0.919

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Higher score indicates more importance placed on family meals; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.70.

<sup>b</sup> Higher score indicates more positive family meal atmosphere; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.70.

<sup>c</sup> Higher score indicates more meal planning ; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.70.

<sup>d</sup> Higher score indicates more time and energy for family meals; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.78.

fast food restaurants or in the car. No significant associations were found between family meal planning or time and energy for family meals and maternal weight category.

**Family and Household Interactions and Organization.** Obese mothers reported significantly more family conflict and less cohesion in their homes compared to high normal weight mothers (Table 50). No significant associations were found between maternal weight and other household and family interaction and organization scales.

#### **Maternal Environmental Factors and Weight Status**

##### **Home and Neighborhood Physical Activity Environment: Availability and Accessibility.**

While only approaching statistical significance, obese mothers reported lower scores of physical activity availability in their homes, yards, and neighborhoods compared to all other maternal weight categories (Table 51). Physical activity accessibility, however, scored significantly higher among high normal weight mothers than obese mothers.

**Home Media Environment: Availability, Accessibility, and Policies about Screentime.** No significant differences were noted between maternal weight category and the number of media devices available in the home or in the preschool child's bedroom. There also were no significant differences between maternal weight category and accessibility of media equipment (i.e., TV, DVDs, computers, laptops, etc.).

Obese mothers allowed children to have significantly more hours of total screentime per day than both categories of normal weight mothers (Table 52). Upon examination of types of screentime hours allowed, obese mothers allowed significantly more TV or movie time for their preschool children compared to all other weight categories. No significant association was found between maternal weight category and limits placed on TV programming children were permitted to watch.

**Household Food Availability, Accessibility, and Policies.** Obese mothers reported fewer fruit and vegetable servings daily and associated nutrients (i.e., fiber, vitamin C, magnesium, and

**Table 50: Family and Household Interactions and Organization, Split by Maternal BMI Category (N=550)**

Characteristic	Underweight/Low Normal Weight N=143			High Normal Weight N=128			Overweight N=115			Obese N=164			p- value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Family Support for Healthy Behaviors<sup>a</sup></b>	4.42	0.75	1.5-5	4.40	0.80	1-5	4.41	0.73	1.25-5	4.37	0.67	1.75-5	0.948
<b>Family Conflict and Cohesion<sup>b</sup></b>	1.80	0.70	1-4	1.75 <sup>A</sup>	0.60	1-3.60	1.77	0.63	1-3.6	1.97 <sup>A</sup>	0.80	1-5	0.026
<b>Household Disorganization<sup>c</sup></b>	2.56	0.92	1-5	2.35	0.94	1-5	2.45	0.88	1-4.33	2.49	0.92	1-5	0.302
<b>Verbal Engagement with Children<sup>d</sup></b>	4.18	0.85	1-5	4.22	0.95	1-5	4.10	1.00	1-5	4.16	0.94	1.5	0.773
<b>Physical Engagement with Children<sup>e</sup></b>	4.71	0.50	3-5	4.73	0.60	1-5	4.77	0.47	3-5	4.75	0.47	3-5	0.860

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Higher score indicates more support; scale includes 4 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.81.

<sup>b</sup> Higher score indicates more conflict and less cohesion; scale includes 5 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.84.

<sup>c</sup> Higher score indicates more chaos, disorganization, and hurriedness in the home; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.76.

<sup>d</sup> Higher score indicates more verbal engagement with children while doing chores around the house; scale includes 2 5-point (SA to SD) Likert-type item.

<sup>e</sup> Higher score indicates more physical interaction with children; scale includes 1 5-point (SA to SD) Likert-type item.

**Table 51: Mean Home and Neighborhood Physical Activity Environment Scores for Households with Young Children, Split by Maternal BMI Category (N=550)**

Characteristic	Underweight/Low Normal Weight N=143			High Normal Weight N=128			Overweight N=115			Obese N=164			p- value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Physical Activity Availability</b>	3.83	0.69	1.17-4.92	3.85	0.66	1.33-4.92	3.80	0.58	1.5-4.67	3.66	0.72	1.17-4.75	0.053
<b>Physical Activity Accessibility<sup>#</sup></b>	4.22	1.01	1-5.50	4.27 <sup>A</sup>	0.90	1-5.5	4.14	1.07	1-5	3.93 <sup>A</sup>	1.15	1-5	0.031

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>#</sup>N=529, removed 21 answers of “not sure”

**Table 52: Mean Home Media Equipment Environment in Households with Preschool Children, Split by Maternal BMI Category (N=550)**

Characteristic	Underweight/Low Normal Weight N=143			High Normal Weight N=128			Overweight N=115			Obese N=164			p-value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Media Equipment<sup>a</sup> Availability</b>													
Number of Media Devices in the Home	11.40	3.90	4-24	11.29	4.46	3-32	11.42	3.82	5-28	12.03	4.52	3-31	0.405
Number of Media Devices in Child's Bedroom	1.29	1.67	0-7	1.33	1.73	0-6	1.48	1.66	0-7	1.46	1.45	0-6	0.695

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Equipment included TV, DVD player, computer/laptop, smart phone/tablet/LeapPad, video game devices placed sitting down, video game devices played standing up and require lots of moving (like Wii Fit, Xbox Kinect), and Internet access.

<sup>b</sup> Higher score indicates mother more strongly agrees that item is easy for her preschool kids to turn on and play with with little or no help; media equipment accessibility scale includes 5 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.84

<sup>c</sup> Note that mothers did not limit on screen time were coded as 1440 (24 hours).

<sup>d</sup> Higher score indicates a mother tries to limit TV commercials and movies/shows to those made for children; activity accessibility scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.50.

**Table 52: Mean Home Media Equipment Environment in Households with Preschool Children, Split by Maternal BMI Category (N=550) Cont'd.**

	Underweight/Low Normal Weight N=143			High Normal Weight N=128			Overweight N=115			Obese N=164			p-value*
Characteristic	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Media Equipment Accessibility<sup>b</sup></b>													
TV, DVD, Watch Shows or Movies	3.24	1.40	1-5	3.23	1.45	1-5	3.19	1.46	1-5	3.27	1.50	1-5	0.978
Computers and Laptops	2.63	1.35	1-5	2.53	1.42	1-5	2.46	1.43	1-5	2.39	1.48	1-5	0.512
Video games that are played standing up and require lots of moving	2.40	1.30	1-5	4.43	1.41	1-5	2.32	1.41	1-5	2.30	1.44	1-5	0.841
Video games played sitting down	2.34	1.34	1-5	2.45	1.41	1-5	4.43	1.48	1-5	2.34	1.46	1-5	0.870
Tablets, Smart phones, or Electronic educational devices (like LeapPad)	3.40	1.42	1-5	3.50	1.42	1-5	3.28	1.51	1-5	3.45	1.52	1-5	0.673

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Equipment included TV, DVD player, computer/laptop, smart phone/tablet/LeapPad, video game devices placed sitting down, video game devices played standing up and require lots of moving (like Wii Fit, Xbox Kinect), and Internet access.

<sup>b</sup> Higher score indicates mother more strongly agrees that item is easy for her preschool kids to turn on an play with with little or no help; media equipment accessibility scale includes 5 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.84

<sup>c</sup> Note that mothers did not limit on screen time were coded as 1440 (24 hours).

<sup>d</sup> Higher score indicates a mother tries to limit TV commercials and movies/shows to those made for children; activity accessibility scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.50.

<sup>e</sup> Higher score indicates a mother more strongly agrees that she only lets her preschool children watch educational TV programs; includes 1 5-point (SA to SD) Likert-type item.

**Table 52: Mean Home Media Equipment Environment in Households with Preschool Children, Split by Maternal BMI Category (N=550) Cont'd.**

Characteristic	Underweight/Low Normal Weight N=143			High Normal Weight N=128			Overweight N=115			Obese N=164			p- value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Hours of Screen Time Child Allowed Per Day</b>	6.88 <sup>A</sup>	8.84	0.5-72 <sup>c</sup>	6.70 <sup>B</sup>	8.77	0.5-49	8.1	12.82	0-72	10.77 <sup>AB</sup>	14.98	0.75-72	0.009
TV/Movie Time	3.71 <sup>A</sup>	4.84	0.5-24	3.43 <sup>B</sup>	4.95	0-24	3.80 <sup>C</sup>	5.27	0-24	5.75 <sup>ABC</sup>	7.44	0.5-24	0.002
Computer Time	1.70	3.49	0-24	1.98	3.77	0-24	2.75	5.90	0-24	3.06	6.27	0-24	0.074
Video Game Time	1.46	3.99	0-24	1.29	3.62	0-24	1.56	4.87	0-24	1.96	5.44	0-24	0.637
<b>Limiting TV Commercials and Shows Not Appropriate<sup>d</sup> Is this Children Permitted to Watch Ed TV Only<sup>e</sup></b>	3.69	0.79	1.5-5	3.71	0.95	1-5	3.73	0.94	1-5	3.56	1.01	1-5	0.405
	3.55	1.02	1-5	3.44	1.09	1-5	3.63	1.06	1-5	3.46	1.16	1-5	0.462

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Equipment included TV, DVD player, computer/laptop, smart phone/tablet/LeapPad, video game devices placed sitting down, video game devices played standing up and require lots of moving (like Wii Fit, Xbox Kinect), and Internet access.

<sup>b</sup> Higher score indicates mother more strongly agrees that item is easy for her preschool kids to turn on an play with with little or no help; media equipment accessibility scale includes 5 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.84

<sup>c</sup> Note that mothers did not limit on screen time were coded as 1440 (24 hours).

<sup>d</sup> Higher score indicates a mother tries to limit TV commercials and movies/shows to those made for children; activity accessibility scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.50.



potassium) than mothers in all other weight categories. These differences are significant between obese and high normal weight mothers. No significant differences were noted between maternal weight category and availability of fat, salty, and sweet snack servings (chips, doughnuts, ice cream, and candy) or for the energy, sugar, saturated fat and fat available from those foods in the home. Obese mothers reported less availability of breakfast foods in the home than all other maternal weight categories, with underweight/low normal weight mothers reporting significantly more servings of breakfast granola or protein bars available in their homes per day than obese mothers.

An examination of beverages available in the home revealed few significant differences (Table 53). Underweight/low normal and high normal weight mothers reported significantly more vegetable juice servings availability in the home per day than obese mothers. Obese mothers also reported significantly fewer energy drink servings per day available in the home compared to high normal weight mothers.

Maternal weight category was not associated with mothers' policies toward allowing their preschool children to serve themselves either high nutrient density or low nutrient density snacks. Additionally, no differences occurred across maternal weight category and mothers' storage of snack foods in places easy for children to see and reach.

## **CHILD WEIGHT STATUS AND WEIGHT-RELATED CHARACTERISTICS**

To address Research Question 2: *How do weight-related characteristics of home environments differ with the weight status of mothers and children?*, children were assigned to a weight status category based on their BMI percentile for age. Children below the 5<sup>th</sup> percentile are classified underweight; those in the 5<sup>th</sup> to < 25<sup>th</sup> percentile are low normal weight status; 25<sup>th</sup> to 74<sup>th</sup> percentile are middle normal weight status; 75<sup>th</sup> to 84<sup>th</sup> percentile are high normal; those 85<sup>th</sup> to < 95<sup>th</sup> are overweight, and those in the 95<sup>th</sup> percentile for age and above are obese.

**Table 53: Household Availability of Foods and Food Components, Split by Maternal BMI Category (N=550)**

Characteristic	Underweight/Low Normal Weight N=143			High Normal Weight N=128			Overweight N=115			Obese N=164			p-value *
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Fruit and Vegetables Servings (per day)</b>	10.23	4.29	2.55-19.94	10.60 <sup>A</sup>	4.94	1.44-19.94	9.94	4.35	0-19.94	9.08 <sup>A</sup>	4.35	0-19.94	0.025
Dietary Fiber (grams/day)	36.33	13.35	10.51-64.76	37.44 <sup>A</sup>	13.56	11.47-65.56	35.69	12.92	9.45-63.83	32.55 <sup>A</sup>	13.19	1.72-65.56	0.011
Vitamin C (mg/day)	306.16	114.68	83.65-545.65	316.08 <sup>A</sup>	115.9	89.80-547.90	302.2	110.83	75.25-542.95	274.52 <sup>A</sup>	112.4	13.60-547.90	0.011
Magnesium (mg/day)	636.70	201.24	249.50-1061.8	653.79 <sup>A</sup>	203.9	259.7-1070.3	628.3	194.65	231.4-1051.6	580.38 <sup>A</sup>	198.2	118.5-1070	0.011
Potassium (mg/day)	6207.3	1992.5	2364.4-10400.4	6377.51 <sup>A</sup>	2017	2465.4-10469.4	6128.6	1927.7	2194.4-10317.6	5652.28 <sup>A</sup>	1959	1092.2-10469.4	0.011

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Highest possible response choice was more than 1 time each day; lowest response choice was less than 1 time per week.

**Table 53: Household Availability of Foods and Food Components, Split by Maternal BMI Category (N=550) Cont'd.**

Charac- teristic	Underweight/Low Normal Weight N=143			High Normal Weight N=128			Overweight N=115			Obese N=164			p- value *
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Fat, Salty, and Sweet Snack Servings (Chips, Doughnuts, Ice Cream, Candy) per day</b>	9.29	7.76	0-32	8.28	7.38	0-32	8.20	7.13	0-32	7.75	6.64	0-32	0.305
Energy (kcal/day)	2489.7	2142.6	0- 8877.9	2200.59	2049	0- 8877.9	2180.9	1962.5	0- 8877.9	2077.7	1855.5	0- 8877.92	0.328
Sugar (gm/day)	170.22	167.98	0- 662.72	153.29	158	0- 662.7	143.4	149.14	0- 662.72	137.82	143.28	0- 662.72	0.433
Saturated fat (gm/day)	57.17	53.98	0- 217.39	51.58	50.58	0- 217.39	48.60	47.91	0- 217.39	46.31	45.37	0- 217.39	0.264
Total fat (gm/day)	117.00	103.25	0- 426.12	103.78	97.51	0- 426.1	101.90	98.72	0- 426.12	96.61	88.23	0- 426.12	0.303

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Highest possible response choice was more than 1 time each day; lowest response choice was less than 1 time per week.

**Table 53: Household Availability of Foods and Food Components, Split by Maternal BMI Category (N=550) Cont'd.**

	Underweight/Low Normal Weight N=143			High Normal Weight N=128			Overweight N=115			Obese N=164			p- value *
Characteristic	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
Breakfast Food Servings per day													
Plain or fiber cereal	0.79	0.40	0-More than 1 <sup>a</sup>	0.78	0.37	0- More than 1	0.79	0.37	0- More than 1	0.71	0.40	0- More than 1	0.239
Sweet cereal	0.68	0.40	0-More than 1	0.69	0.39	0- More than 1	0.64	0.41	0- More than 1	0.59	0.41	0- More than 1	0.141
Breakfast, granola, or protein bar	0.68 <sup>A</sup>	0.38	0-More than 1	0.61	0.39	0- More than 1	0.56	0.40	0- More than 1	0.54 <sup>A</sup>	2.0.39	0- More than 1	0.011

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Highest possible response choice was more than 1 time each day; lowest response choice was less than 1 time per week.

<sup>b</sup> Scores indicate the number of nutrient dense or nutrient poor foods that a mother allows her child to get for a snack without her help.

<sup>c</sup> Score indicates the number of nutrient dense or nutrient-poor foods that a mother keeps in places that are easy for her child to see and reach.

**Table 53: Household Availability of Foods and Food Components, Split by Maternal BMI Category (N=550) Cont'd.**

	Underweight/Low Normal Weight N=143			High Normal Weight N=128			Overweight N=115			Obese N=164			p-value*
Characteristic	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
Beverage Servings per day													
Milk	0.93	0.30	0-More than 1 <sup>a</sup>	0.94	0.28	0-More than 1	0.88	0.31	0-More than 1	0.92	0.29	0-More than 1	0.512
100% fruit juice	0.78	0.36	0-More than 1	0.73	0.37	0-More than 1	0.74	0.38	0-More than 1	0.75	0.36	0-More than 1	0.698
Vegetable juice	0.31 <sup>A</sup>	0.38	0-More than 1	0.36 <sup>B</sup>	0.41	0-More than 1	0.27	0.37	0-More than 1	0.20 <sup>AB</sup>	0.31	0-More than 1	0.002
Soft drink (not diet)	0.36	0.40	0-More than 1	0.45	0.42	0-More than 1	0.36	0.40	0-More than 1	0.46	0.43	0-More than 1	0.088
Other sugar-sweetened drink (e.g., fruit drinks)	0.35	0.38	0-More than 1	0.45	0.42	0-More than 1	0.30	0.37	0-More than 1	0.46	0.43	0-More than 1	0.450
Energy drink	0.12	0.26	0-More than 1	0.15 <sup>A</sup>	0.30	0-More than 1	0.08	0.07	0-More than 1	0.06 <sup>A</sup>	0.0.17	0-More than 1	0.010
Sugar-sweetened specialty coffee drink	0.22	0.35	0-More than 1	0.15	0.30	0-More than 1	0.20	0.32	0-More than 1	0.06	0.17	0-More than 1	0.1229
Sugar (gm/day)	43.66	28.61	8.7-145.2	47.37	33.67	0-145.21	40.07	26.51	0-139.96 139.96	42.50	24.95	0-116.83	0.239
Energy (gm/day)	236.01	141.73	37.5-745.91	252.97	168.87	0-745.90	216.44	132.17	0-706.81	226.01	123.60	0-634.11	0.207

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Highest possible response choice was more than 1 time each day; lowest response choice was less than 1 time per week.

**Table 53: Household Availability of Foods and Food Components, Split by Maternal BMI Category (N=550) Cont'd.**

	Underweight/Low Normal Weight N=143			High Normal Weight N=128			Overweight N=115			Obese N=164			p-value *
Characteristic	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Child Food Access Policy<sup>b</sup></b>													
Mean Number of Nutrient Dense Foods Available	1.57	1.48	0-4	1.64	1.44	0-4	1.45	1.48	0-4	1.55	1.45	0-4	0.793
Mean Number of Low Nutrient Density Foods Available	0.86	1.46	0-6	1.07	1.67	0-7	0.81	1.32	0-6	0.99	1.56	0-7	0.491
<b>Child Food Accessibility<sup>c</sup></b>													
Nutrient Dense Foods	2.04	1.48	0-4	2.05	1.39	0-4	2.04	1.43	0-4	2.02	1.33	0-4	0.997
Low Nutrient Density Foods	0.06	1.29	0-7	1.20	1.57	0-7	1.30	1.67	0-7	1.33	1.9	0-7	0.400

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Highest possible response choice was more than 1 time each day; lowest response choice was less than 1 time per week.

<sup>b</sup> Scores indicate the number of nutrient dense or nutrient poor foods that a mother allows her child to get for a snack without her help.

<sup>c</sup> Score indicates the number of nutrient dense or nutrient-poor foods that a mother keeps in places that are easy for her child to see and reach.

Dependent variables (BMI category) were compared using analysis of variance and Tukey post hoc procedures to examine how mother and child interpersonal, family intrapersonal, and environmental characteristics varied by weight status. Categorical independent variables and BMI categories were assessed with chi-square. The sample size for these analyses were computed with 550 mothers.

#### **Child Intrapersonal Characteristics and Weight Status**

**Child Demographic Characteristics.** Mothers of preschool aged children provided information on their child's height and weight. They were instructed to measure them with a measuring tape and scale if possible. Children's demographic characteristics, split by BMI category, are shown in Tables 54 and 55. There was a significant difference between child sex and BMI category. Chi-square tests revealed child BMI category differed significantly among child race/ethnicities. Black or African American children had the largest proportion of obese children. The smallest proportion of obese children was among Asian children.

Chi-square results indicate that child BMI category significantly differed across maternal education attainment level. The largest proportion of normal weight children had mothers with at least a bachelor's degree (Table 54). No significant differences were found between child BMI category and mother's weight status, marital status, or hours of paid employment. Chi-square results indicate child BMI category significantly differed by length of time a child was breastfed. With regard to breastfeeding length, 48% of children who were not breast fed were obese, whereas only about 26% and 22% of those who were breastfed for 6 month or less or more than 7 months were obese.

No differences were found between child BMI category and family affluence ranking. Food security risk score, however, significantly differed by BMI category. Obese children had families with a significantly higher mean food security risk score than middle normal weight children (see Table 55).

**Table 54: Preschool Child Demographic Characteristics, Split by Child BMI Percentile Categories (N=496)**

Child Demographic Characteristic	Underweight BMI (<5 <sup>th</sup> percentile) (N=41)		Low Normal BMI (5 <sup>th</sup> to 25 <sup>th</sup> percentile) (N=50)		Middle Normal BMI (25 <sup>th</sup> to 74 <sup>th</sup> percentile) (N=148)		High Normal BMI (75 <sup>th</sup> to 84 <sup>th</sup> percentile) (N=50)		Overweight BMI (85 <sup>th</sup> to 94 <sup>th</sup> percentile) (N=60)		Obese BMI (>=95 <sup>th</sup> percentile) (N=147)		p-value *
	N	%	N	%	N	%	N	%	N	%	N	%	
<b>Child Sex</b>													0.376
Male (n=239)	22	9.2	22	9.2	69	28.9	25	10.5	36	15.1	65	27.2	
Female (n=257)	19	7.4	28	10.9	79	30.7	25	9.7	24	9.3	82	31.9	
<b>Race/Ethnicity</b>													0.004
White (n=340)	28	8.2	40	11.8	109	32.1	39	11.5	40	11.8	87	24.7	
Hispanic, Latino, or Spanish (n=19)	4	21.1	1	5.3	3	15.8	1	5.3	4	21.1	6	31.6	
Black or African American (n=43)	2	4.7	2	4.7	7	16.3	2	4.7	3	7.0	27	62.8	
Asian (e.g., Indian, Japanese, Chinese, Korean), Pacific Islander, or American Indian (n=20)	2	10.0	3	15.0	7	35.0	2	10.0	3	15.0	3	15.0	
Other or Mixed Race (n=74)	5	6.8	4	5.4	22	29.7	6	8.1	10	13.5	27	36.5	
<b>Maternal Education Attainment</b>													0.023
High School or Less (n=90)	7	7.8	4	4.4	26	28.9	13	14.4	5	5.6	35	38.9	
Some college; technical or associate's degree (n=223)	19	8.5	22	9.9	60	26.9	17	7.6	33	14.8	72	32.3	
Bachelor's degree or higher (n=183)	15	8.2	24	13.1	62	33.9	20	10.9	22	12.0	40	21.9	
<b>Mother's Weight Status</b>													0.402
Average (n=190)	16	8.4	15	7.9	58	30.5	19	10.0	20	10.5	62	32.6	
Very thin or thin (n=52)	5	9.6	9	17.3	9	17.3	5	9.6	10	19.2	14	26.9	
Heavy or very heavy (n=254)	20	7.9	26	10.2	81	31.9	26	10.2	30	11.8	71	28.0	

\*Overall chi-square.



**Table 54: Preschool Child Demographic Characteristics, Split by Child BMI Percentile Categories (N=496) Cont'd.**

Child Demographic Characteristic	Underweight BMI (<5 <sup>th</sup> percentile) (N=41)		Low Normal BMI (5 <sup>th</sup> to 25 <sup>th</sup> percentile) (N=50)		Middle Normal BMI (25 <sup>th</sup> to 74 <sup>th</sup> percentile) (N=148)		High Normal BMI (75 <sup>th</sup> to 84 <sup>th</sup> percentile) (N=50)		Overweight BMI (85 <sup>th</sup> to 94 <sup>th</sup> percentile) (N=60)		Obese BMI (>=95 <sup>th</sup> percentile) (N=147)		p-value*
	N	%	N	%	N	%	N	%	N	%	N	%	
<b>Marital Status</b>													0.085
Single, never married; Divorced; Widowed (n=59)	2	3.4	6	10.2	15	25.4	4	6.8	5	8.5	27	45.8	
Single, living with partner; or Married (n=437)	39	8.9	44	10.1	133	30.4	46	10.5	55	12.6	120	27.5	
<b>Maternal Hours of Paid Employment</b>													0.165
No hours of paid employment (n=278)	26	9.4	34	12.2	89	32.0	31	11.2	30	10.8	68	24.5	
1 to 39 hours (n=169)	11	6.5	12	7.1	44	26.0	15	8.9	22	13.0	65	38.5	
40 or more hours (n=49)	4	8.2	4	8.2	15	30.6	4	8.2	8	16.3	14	28.6	
<b>How long child was breastfed (months)</b>													<0.001
Breastfed for more than 7 months (n=195)	18	9.2	27	13.8	62	31.8	20	13.0	25	12.8	43	22.1	
Did not breastfeed (n=122)	11	9.0	8	6.6	21	17.2	10	8.2	15	12.3	57	46.7	
Breastfed for 6 months or less (n=179)	12	6.7	15	8.4	65	36.3	20	11.2	20	11.2	47	26.3	

\*Overall chi-square.

**Table 55: Home Demographic Characteristics of Mothers of Young Children Study Participants, Split by Child BMI Percentile Category (N=496)**

Child Demo- graphic Charac- teristic	Underweight BMI (<5 <sup>th</sup> percentile) (N=41)			Low Normal BMI (5 <sup>th</sup> to 25 <sup>th</sup> percentile) (N=50)			Middle Normal BMI (25 <sup>th</sup> to 74 <sup>th</sup> percentile) (N=148)			High Normal BMI (75 <sup>th</sup> to 84 <sup>th</sup> percentile) (N=50)			Overweight BMI (85 <sup>th</sup> to 94 <sup>th</sup> percentile) (N=60)			Obese BMI (≥95 <sup>th</sup> percentile) (N=147)			P- value *
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Family Affluence Ranking<sup>a</sup></b>	2.51	0.51	2-3	2.52	0.58	1-3	2.54	0.51	1-3	2.58	0.54	1-3	2.60	0.56	1-3	2.43	0.54	1-3	0.268
<b>Food Security Risk Score<sup>b</sup></b>	2.17	1.93	0-6	2.00	2.02	0-6	1.70 <sub>A</sub>	1.68	0-6	1.78	1.87	0-6	1.73	1.86	0-6	2.48 <sub>A</sub>	2.00	0-6	0.009

<sup>a</sup> Higher scores indicate greater Family Affluence; possible range = 1 to 3.

<sup>b</sup> Higher scores indicate greater risk for food insecurity; possible range = 0 to 6.

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

**Table 56: Maternal and Child Health Status, Split by Child BMI Percentile Categories (N=496)**

	<b>Underweight BMI (&lt;5<sup>th</sup> percentile) (N=41)</b>			<b>Low Normal BMI (5<sup>th</sup> to 25<sup>th</sup> percentile) (N=50)</b>			<b>Middle Normal BMI (25<sup>th</sup> to 74<sup>th</sup> percentile) (N=148)</b>			<b>High Normal BMI (75<sup>th</sup> to 84<sup>th</sup> percentile) (N=50)</b>			<b>Overweight BMI (85<sup>th</sup> to 94<sup>th</sup> percentile) (N=60)</b>			<b>Obese BMI (&gt;=95<sup>th</sup> percentile) (N=147)</b>			<b>P-value #</b>
<b>Health Characteristic</b>	<b>Mean</b>	<b>SD</b>	<b>Range</b>	<b>Mean</b>	<b>SD</b>	<b>Range</b>	<b>Mean</b>	<b>SD</b>	<b>Range</b>	<b>Mean</b>	<b>SD</b>	<b>Range</b>	<b>Mean</b>	<b>SD</b>	<b>Range</b>	<b>Mean</b>	<b>SD</b>	<b>Range</b>	
<b>Maternal General Health Rating*</b>	3.54	0.87	1-5	3.48	0.89	5-5	3.49	0.88	1-5	3.50	0.71	2-5	3.62	0.85	1-5	3.48	0.88	1-5	0.930
<b>Maternal Number of Days in Past 30 Days of “Not Good” Mental or Physical Health (Health Related Quality of Life)</b>	5.27	11.73	0-60	7.06	10.18	0-45	7.39	10.23	0-59	8.34	11.79	0-45	4.82	8.32	0-34	6.73	9.30	0-49	0.417
<b>Mother’s Depression Severity Score†</b>	1.07	1.69	0-6	1.08	1.63	0-6	1.02	1.36	0-6	0.94	1.27	0-4	0.82	1.20	0-5	1.10	1.44	0-6	0.854

\*Higher scores indicate better general health; possible score range 1 to 5.

†Higher scores indicate greater depression severity; possible score range 0 to 6.

# ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

**Table 56: Maternal and Child Health Status, Split by Child BMI Percentile Categories (N=496) Cont'd.**

Health Characteristic	Underweight BMI (<5 <sup>th</sup> percentile) (N=41)			Low Normal BMI (5 <sup>th</sup> to 25 <sup>th</sup> percentile) (N=50)			Middle Normal BMI (25 <sup>th</sup> to 74 <sup>th</sup> percentile) (N=148)			High Normal BMI (75 <sup>th</sup> to 84 <sup>th</sup> percentile) (N=50)			Overweight BMI (85 <sup>th</sup> to 94 <sup>th</sup> percentile) (N=60)			Obese BMI (>=95 <sup>th</sup> percentile) (N=147)			P-value #
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Mother's age at birth of first child</b>	25.12	5.72	16-41	25.77	5.68	16-38	25.36 <sub>A</sub>	5.45	15-40	25.18	5.41	16-36	23.95	4.76	15-42	23.36 <sub>A</sub>	5.15	15-42	0.011
<b>Child General Health Rating*</b>	4.46	0.67	3-5	4.48	0.81	1-5	4.50	0.65	3-5	4.60	0.64	3-5	4.65	0.58	3-5	4.53	0.67	2-5	0.627
<b>Child Number of Days in Past 30 Days of "Not Good" Mental or Physical Health (Health Related Quality of Life)</b>	2.00	2.95	1-19	3.72	4.37	1-27	3.48	6.13	1-58	3.10	4.18	1-23	2.23	2.33	1-15	3.47	5.19	1-34	0.287

\*Higher scores indicate better general health; possible score range 1 to 5.

†Higher scores indicate greater depression severity; possible score range 0 to 6.

# ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

**Table 57: Anthropometric Measurements of Preschool Children, Split by Child BMI Percentile Categories (n=496)**

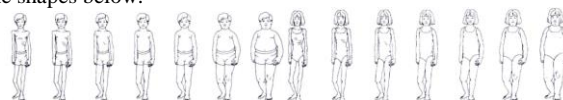
Characteristic	Underweight BMI (<5 <sup>th</sup> percentile) (N=41)			Low Normal BMI (5 <sup>th</sup> to 25 <sup>th</sup> percentile) (N=50)			Middle Normal BMI (25 <sup>th</sup> to 74 <sup>th</sup> percentile) (N=148)			High Normal BMI (75 <sup>th</sup> to 84 <sup>th</sup> percentile) (N=50)			Overweight BMI (85 <sup>th</sup> to 94 <sup>th</sup> percentile) (N=60)			Obese BMI (>=95 <sup>th</sup> percentile) (N=147)			p-value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Birth Weight for Length Z-Score</b>	0.75	1.48	2.93 -	0.36	1.47	3.03 -	0.29	2.34	3.03 -	0.53	1.28	2.72 -	0.66	1.38	2.54 -	0.56	1.56	2.83 -	0.76 9
<b>Birth Weight for Length Percentile</b>	33.1 0	35.2 6	- 98.7 5	43.4 7	35.8 8	- 99.8 4	38.6 4	32.5 4	0.3- 99.1	36.9 4	34.1 8	0.33 - 98.5	34.6 1	34.4 1	0.55 - 98.6 8	35.3 1	36.1 6	0.23 - 99.8 6	0.81 3
<b>Birth Length (inches)</b>	20.0 6	1.04	18- 22	19.8 2	1.09	18- 21.7 5	20.1 6	1.13	16- 23.5	20.1 2	1.18	18- 22	20.2 4	1.17	18- 23	20.0 0	1.07	17- 22	0.57 5
<b>Birth weight (pounds)</b>	7.40	1.26	4.63 - 9.88	7.37	0.99	4.94 -9.6	7.77	1.12	5.8- 11.8	7.65	1.06	5.94 - 10.6 3	7.68	0.98	6.13 - 10.3 1	7.54	0.92	5.44 - 9.38	0.30 1
<b>Which looks most like your child now<sup>b</sup></b>	3.34 ABCD	0.69	2-5	3.50 E	0.65	2-5	3.73 A	0.61	2-6	3.78 B	0.65	3-5	3.77 C	0.56	2-5	3.93 DE	0.79	2-6	<0.0 01

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

# N=328, pre-term and biologically implausible birth weight and length data removed.

<sup>a</sup> Memory of child's birth weight and length were assessed on a 4-point scale; 4=very sure, 1= not sure at all.

<sup>b</sup> Body Image Perceptions based on Scores that correspond to the shapes below.



The image on the far left is #1, the image on the far right is #7.

**Child Health.** No difference was noted between child BMI category and maternal general health rating, number of days of poor health in the past month, or depression severity score (Table 56). There was a significant difference between child BMI category and mother's age at birth of her first child. The mean age at which mothers gave birth to their first child was significantly lower

Mothers of obese children were significantly more likely to identify a drawing of a heavier child as representing their child's body shape. The body image size chosen by mothers to represent their children increased as child BMI category increased. Body images ranged from thin to heavy, so higher scores represented heavier children.

**Child Physical Activity.** No significant differences were seen between child BMI category and child physical activity levels, tendency to engage in physical activity, and daily screentime. While not significant, overweight children had fewer hours of screentime than other BMI categories. No differences were found between child BMI category and days per week children engaged in physical activity inside the home or in the yard. There was a significant difference, however, between child BMI category and days weekly that children engaged in physical activity in the neighborhood, with obese children playing more days per week in the neighborhood (Table 58).

**Child Sleep.** Child sleep duration was split by age as children two to three years old have different night time and nap sleep requirements than children four to five years old. Overall, obese children slept fewer hours than their lighter weight counterparts, with obese children sleeping significantly less than middle normal weight children. Younger children tended to have higher total, night-time, and nap sleep times, which aligns with recommendations that younger children require more sleep (See Table 60).<sup>614</sup> No significant differences were noted between BMI category and total hours of night sleep or nap time. There also was no significant difference between BMI category and children's sleep quality. Whether children met sleep recommendations for age did not differ by weight category (Table 59).

**Table 58: Child Physical Activity Level and Screen time, Split by Child BMI Percentile Categories (N=496)**

	Underweight BMI (<5 <sup>th</sup> percentile) (N=41)			Low Normal BMI (5 <sup>th</sup> to 25 <sup>th</sup> percentile) (N=50)			Middle Normal BMI (25 <sup>th</sup> to 74 <sup>th</sup> percentile) (N=148)			High Normal BMI (75 <sup>th</sup> to 84 <sup>th</sup> percentile) (N=50)			Overweight BMI (85 <sup>th</sup> to 94 <sup>th</sup> percentile) (N=60)			Obese BMI (>=95 <sup>th</sup> percentile) (N=147)			p-value*
Child Physical Activity	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
Child Frequency of Engaging in Physical Activity																			
Inside the Home (days/week)	5.41	1.62	0.67-7	4.88	1.92	0-7	4.84	1.93	0-7	4.67	2.03	0-7	4.81	1.83	0.67-7	4.94	1.74	0-7	0.516
In the Yard <sup>#</sup> (days/week)	4.61	1.97	0.50-7	4.67	2.03	0-7	4.59	2.00	0-7	5.09	1.92	0-7	4.83	1.92	0-7	4.86	1.90	0-7	0.677
In the Neighborhood (days/week)	2.56	1.90	0-7	2.09	1.53	0-7	2.22 <sub>A</sub>	1.52	0-7	2.52	1.47	0-7	2.46	1.62	0-7	2.83 <sub>A</sub>	2.06	0-7	0.037

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>#</sup>N= 465; data excluded if mother reported that there was no yard.

<sup>a</sup> Scoring based on enhanced version of IPAQ (International Physical Activity Questionnaire) categorical scoring: physical activity = (# days of vigorous activities per week x 3) + (# days of moderate activities x 2) + (# days of walking 10 minutes at a time) . Scores could range from 0 to 49; low/sedentary score = 0 to <20, medium score = 20 to <30, and high score ≥30.<sup>605</sup>

<sup>b</sup> This scale score indicates how likely a child is to be physically active and is comprised of 4 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.68; a higher score indicates a child is more likely to be physically active.

**Comment [BE2]:** No lower case a or b in this table or continuation of table

**Table 58: Child Physical Activity Level and Screen time, Split by Child BMI Percentile Categories (N=496) Cont'd.**

	Underweight BMI (<5 <sup>th</sup> percentile) (N=41)			Low Normal BMI (5 <sup>th</sup> to 25 <sup>th</sup> percentile) (N=50)			Middle Normal BMI (25 <sup>th</sup> to 74 <sup>th</sup> percentile) (N=148)			High Normal BMI (75 <sup>th</sup> to 84 <sup>th</sup> percentile) (N=50)			Overweight BMI (85 <sup>th</sup> to 94 <sup>th</sup> percentile) (N=60)			Obese BMI (>=95 <sup>th</sup> percentile) (N=147)			p-value*
Child Physical Activity	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Child Frequency of Engaging in Physical Activity</b>																			
Inside the Home (days/week)	5.41	1.62	0.67-7	4.88	1.92	0-7	4.84	1.93	0-7	4.67	2.03	0-7	4.81	1.83	0.67-7	4.94	1.74	0-7	0.516
In the Yard <sup>#</sup> (days/week)	4.61	1.97	0.50-7	4.67	2.03	0-7	4.59	2.00	0-7	5.09	1.92	0-7	4.83	1.92	0-7	4.86	1.90	0-7	0.677
In the Neighborhood (days/week)	2.56	1.90	0-7	2.09	1.53	0-7	2.22 <sub>A</sub>	1.52	0-7	2.52	1.47	0-7	2.46	1.62	0-7	2.83 <sub>A</sub>	2.06	0-7	0.037

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

#N= 465; data excluded if mother reported that there was no yard.

<sup>a</sup> Scoring based on enhanced version of IPAQ (International Physical Activity Questionnaire) categorical scoring: physical activity = (# days of vigorous activities per week x 3) + (# days of moderate activities x 2) + (# days of walking 10 minutes at a time) . Scores could range from 0 to 49; low/sedentary score = 0 to <20, medium score = 20 to <30, and high score ≥30.<sup>605</sup>

<sup>b</sup> This scale score indicates how likely a child is to be physically active and is comprised of 4 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.68; a higher score indicates a child is more likely to be physically active.



Table 59: Child Sleep Hours, Split by Child BMI Percentile Category (N=496)

Child Sleep Characteristic	Underweight BMI (<5 <sup>th</sup> percentile) (N=41)			Low Normal BMI (5 <sup>th</sup> to 25 <sup>th</sup> percentile) (N=50)			Middle Normal BMI (25 <sup>th</sup> to 74 <sup>th</sup> percentile) (N=148)			High Normal BMI (75 <sup>th</sup> to 84 <sup>th</sup> percentile) (N=50)			Overweight BMI (85 <sup>th</sup> to 94 <sup>th</sup> percentile) (N=60)			Obese BMI (>=95 <sup>th</sup> percentile) (N=147)			P-value *
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
Total Child Sleep (hours)	11.2	2.28	7-20.5	10.9	2.23	7.5-22	10.8 <sub>A</sub>	1.93	3-22.3	10.3	1.96	3.5-14.3	10.4	2.06	2-15	10.2 <sub>A</sub>	1.94	2-19	0.027
2-3 years	11.9	2.23	9.5-17.6	12	2.70	8.25-17.8	11.0	1.72	6-16.5	10.9	1.62	8.5-13.5	11	1.31	9-13.6	10.5	1.59	5-13.3	
4-5 years	9.74	1.12	7.88-11	10.3	1.36	8.5-12	10.4	1.90	5.75-17.6	9.88	2.02	4.25-13.1	9.69	2.27	2.5-12	9.91	2.15	2.5-17.3	

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> A higher score of sleep quality indicates better sleep quality

Comment [BE3]: No lower case a present in this table

**Table 60: Child Sleep Hours, Split by Child BMI Percentile Category (N=496) Cont'd.****Comment [BE4]:** Should this be Table 59 cont'd?

Child Sleep Characteristic	Underweight BMI (<5 <sup>th</sup> percentile) (N=41)			Low Normal BMI (5 <sup>th</sup> to 25 <sup>th</sup> percentile) (N=50)			Middle Normal BMI (25 <sup>th</sup> to 74 <sup>th</sup> percentile) (N=148)			High Normal BMI (75 <sup>th</sup> to 84 <sup>th</sup> percentile) (N=50)			Overweight BMI (85 <sup>th</sup> to 94 <sup>th</sup> percentile) (N=60)			Obese BMI (>=95 <sup>th</sup> percentile) (N=147)			P-value *
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Total Night time sleep (hours)</b>																			
2-3 years	9.62	1.52	3.5-12	9.76	1.26	7-13	9.81	1.68	1-21	9.41	1.99	1.25-12	9.45	1.95	1-12	9.12	1.71	1-12.5	0.140
4-5 years	9.94	1.13	8.25-11.75	10.1	1.52	7.25-12.5	9.67	1.39	4.5-12.3	9.50	1.41	8-12	9.69	1.26	8-11.6	9.22	1.54	3.88-12.3	
	9.09	1.64	6.13-11	9.68	1.05	8.25-11.3	9.90	1.81	5-16.5	9.26	2.33	2.13-12	9.16	2.38	1.5-11	9.17	1.81	1-12.3	
<b>Total Nap Time (Hours)</b>																			
2-3 years	1.57	2.01	0-10	1.14	1.64	0-11	0.97	1.13	0-8	0.93	1.14	0-4	0.94	0.91	0-3	1.07	1.25	0-10	0.521
4-5 years	2.00	2.04	0.5-8.25	1.92	2.07	0.5-6.5	1.37	1.20	0-5.63	1.39	1.15	0.5-3.5	1.32	0.88	0-3	1.25	0.82	0-2.75	
	0.65	1.21	0-3.38	0.61	0.77	0-2	0.53	0.77	0-2.75	0.61	0.91	0-2.5	0.53	0.7	0-2	0.88	1.26	0-7.63	
<b>Child Sleep Quality<sup>a</sup></b>	4.44	0.71	2-5	4.32	0.77	2-5	4.39	0.71	2-5	4.38	0.75	2-5	4.47	0.65	3-5	4.44	0.67	2-5	0.878

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> A higher score of sleep quality indicates better sleep quality.

**Table 60: Child Sleep Hours, Split by Child BMI Percentile Category (N=496) Cont'd**

Child Sleep Characteristic	Underweight BMI (<5 <sup>th</sup> percentile) (N=41)		Low Normal BMI (5 <sup>th</sup> to 25 <sup>th</sup> percentile) (N=50)		Middle Normal BMI (25 <sup>th</sup> to 74 <sup>th</sup> percentile) (N=148)		High Normal BMI (75 <sup>th</sup> to 84 <sup>th</sup> percentile) (N=50)		Overweight BMI (85 <sup>th</sup> to 94 <sup>th</sup> percentile) (N=60)		Obese BMI (>=95 <sup>th</sup> percentile) (N=147)		p-value*
	N	%	N	%	N	%	N	%	N	%	N	%	
<b>Child Total (nap and night-time) Sleep Duration Recommendations by Age<sup>a 614</sup></b>													0.207
Less than Age Recommendations (n=341)	26	7.6	32	9.4	92	27.0	35	10.3	42	12.3	114	33.4	
Meets Age Recommendations (n=142)	13	9.2	16	11.3	54	38.0	13	9.2	17	12.0	29	2.4	
Exceeds Age Recommendations (n=13)	2	15.4	2	15.4	2.	15.4	2	15.4	1	7.7	4	30.8	

\*Overall chi-square

<sup>a</sup> Child sleep recommendations vary by age; 2-3 years 10 to 12 hours, 4-5 years 10 to 11 hours.<sup>614</sup>

**Table 61: Child Beverage Intake, Split by Child BMI Percentile Category (N=496)**

	Underweight BMI (<5 <sup>th</sup> percentile) (N=41)			Low Normal BMI ( 5 <sup>th</sup> to 25 <sup>th</sup> percentile) (N=50)			Middle Normal BMI (25 <sup>th</sup> to 74 <sup>th</sup> percentile) (N=148)			High Normal BMI (75 <sup>th</sup> to 84 <sup>th</sup> percentile) (N=50)			Overweight BMI (85 <sup>th</sup> to 94 <sup>th</sup> percentile) (N=60)			Obese BMI (>=95 <sup>th</sup> percentile) (N=147)			p- value*
Child Beverage Intake	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Beverages</b>																			
Milk to Drink (servings/day)	0.99	0.27	0- >1 <sup>a</sup>	0.87	0.33	0- >1	0.91	0.35	0- >1	0.88	0.35	0- >1	0.88	0.38	0- >1	0.89	0.35	0- >1	0.053
Real 100% Fruit Juice (servings/day)	0.61	0.41	0- >1	0.64	0.41	0- >1	0.66	0.39	0- >1	0.65	0.37	0- >1	0.75	0.39	0- >1	0.76	0.37	0- >1	0.011
Vegetable Juice (servings/day)	0.13 <sub>A</sub>	0.29	0- >1	0.12 <sub>B</sub>	0.29	0- >1	0.11 <sub>C</sub>	0.27	0- >1	0.08	0.24	0-1	0.24	0.37	0- >1	0.21 <sub>ABC</sub>	0.34	0- >1	0.002

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Highest possible response choice was more than 1 time each day; lowest response choice was less than 1 time per week.

**Table 61: Child Beverage Intake, Split by Child BMI Percentile Category (N=496) Cont'd**

	Underweight BMI (<5 <sup>th</sup> percentile) (N=41)			Low Normal BMI ( 5 <sup>th</sup> to 25 <sup>th</sup> percentile) (N=50)			Middle Normal BMI (25 <sup>th</sup> to 74 <sup>th</sup> percentile) (N=148)			High Normal BMI (75 <sup>th</sup> to 84 <sup>th</sup> percentile) (N=50)			Overweight BMI (85 <sup>th</sup> to 94 <sup>th</sup> percentile) (N=60)			Obese BMI (>=95 <sup>th</sup> percentile) (N=147)			p-value*
Child Beverage Intake	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Beverages</b>																			
Soft Drinks and Soda/Pop (servings/ day)	0.06	0.18	0- 0.86	0.05	0.11	0- 0.43	0.08 A	0.17	0-1	0.10	0.19	0- 0.71	0.10	0.20	0- 0.86	0.17 A	0.27	0- >1 <sup>a</sup>	0.034
Fruit Drinks or Other Sugar- Sweetened Beverages (servings/ day)	0.15 A	0.29	0- >1	0.21 B	0.34	0- >1	0.19 C	0.27	0- >1	0.26	0.38	0- >1	0.20	0.26	0- >1	0.29 ABC	0.35	0- >1	0.001
<b>Sugar-Sweetened Beverage (SSB) Intake per day (soft drinks and fruit drinks)</b>																			
Sugar (gm/day)	4.60 A	8.87	0- 35.7	5.29	7.62	0- 28.9	5.85 B	7.89	0- 37.4	7.48	10.3 8	0- 37.4	6.48	9.02	0- 38.2	10.2 AB	13.1 1	0- 54.4	0.002
Kcal/day	22.0 A	41.3 7	0- 155	26.1 0	38.0 2	0- 143	27.8 B	36.6 5	0- 158	36.0 5	49.5 1	0- 177	30.6 2	41.2 2	0- 169	47.6 AB	59.6	0- 243	0.002

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Highest possible response choice was more than 1 time each day; lowest response choice was less than 1 time per week.

**Child Beverage Intake.** There was no significant difference between child BMI category and daily servings of milk (Table 61). There was a significant difference between child BMI category and real 100% fruit juice servings per day, although no significant differences were noted with post-hoc analysis. Obese children tended to consume significantly more servings daily of both vegetable juice and fruit drinks or other sugar-sweetened beverages than lower weight children. They also consumed significantly more servings per day of soft drinks and soda/pop than middle normal weight children. Sugar grams and kilocalories consumed per day from soft drinks and fruit drinks were significantly higher among obese children than underweight and middle normal weight children.

**Child Eating Styles.** No significant associations were found between child BMI category and child food neophobia or emotional eating. Child BMI category and child eating self-regulation differed significantly, with obese children having the lowest mean self-regulation of food intake score (Table 62).

#### **Child Interpersonal Factors and Weight Status**

**Child's Father's Characteristics.** There was no association between child BMI category and weight of their biological fathers (Table 63).

**Maternal Perceptions about Child Overweight.** Child BMI status was not related to mothers' belief that chubby children are healthier or to their concern about their children's risk for becoming overweight later in life. When asked to identify the first picture in a series of drawings (ranging from thin to heavy child drawings) that represented an underweight child, mothers of obese children chose significantly thinner images of children as being underweight than mothers who had overweight and middle normal BMI children. In comparison to mothers of overweight children, mothers of obese children chose images of heavier children as a visual representation of a child that is overweight (Table 64).

**Maternal Modeling Frequency, and Mean Importance and Encouragement/Facilitation of Physical Activity and Media Use.** A significant difference between child BMI category and

**Table 62: Mean Child Eating Styles, Split by Child BMI Percentile Category (N=496)**

Child Eating Styles	Underweight BMI (<5 <sup>th</sup> percentile) (N=41)			Low Normal BMI (5 <sup>th</sup> to 25 <sup>th</sup> percentile) (N=50)			Middle Normal BMI (25 <sup>th</sup> to 74 <sup>th</sup> percentile) (N=148)			High Normal BMI (75 <sup>th</sup> to 84 <sup>th</sup> percentile) (N=50)			Overweight BMI (85 <sup>th</sup> to 94 <sup>th</sup> percentile) (N=60)			Obese BMI (>=95 <sup>th</sup> percentile) (N=147)			p-value *
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
Child Eating Neophobia <sup>a</sup>	3.16	0.92	1.25-5	3.12	1.13	1-5	3.17	1.08	1-5	3.10	1.19	1-5	3.03	1.09	1-5	3.12	1.07	1-5	0.981
Child Emotional Eating <sup>b</sup>	1.94	0.69	1-4	1.52	0.77	1-5	1.74	0.71	1-5	1.73	0.85	1-5	1.53	0.74	1-4.5	1.71	0.77	1-3.5	0.063
Child Eating Self-Regulation <sup>c</sup>	3.49	0.92	1-5	3.78	0.90	1-5	3.57	0.82	1.5-5	3.65	0.97	1.5-5	3.78	0.91	2-5	3.37	1.12	1-5	0.035

\*ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Higher score indicates a mother more strongly agrees that her child has wariness of trying and eating new foods; scale includes 4 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.88.

<sup>b</sup> Higher scores indicate a mother more strongly agrees that her child's eating is regulated by his or her emotional state; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.81.

<sup>c</sup> Higher scores indicate that a mother more strongly agrees that her child is better able to follow inner signals of satiety and self-regulate his or her intake of food; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.63.

**Table 63: Paternal Demographics, Split by Child BMI Percentile Categories (N=496)**

Paternal Characteristic	Underweight BMI (<5 <sup>th</sup> percentile) (N=41)		Low Normal BMI (5 <sup>th</sup> to 25 <sup>th</sup> percentile) (N=50)		Middle Normal BMI (25 <sup>th</sup> to 74 <sup>th</sup> percentile) (N=148)		High Normal BMI (75 <sup>th</sup> to 84 <sup>th</sup> percentile) (N=50)		Overweight BMI (85 <sup>th</sup> to 94 <sup>th</sup> percentile) (N=60)		Obese BMI (≥95 <sup>th</sup> percentile) (N=147)		p- value*
	N	%	N	%	N	%	N	%	N	%	N	%	
<b>Paternal Weight as Described by the Mother (#N=492)</b>													0.536
Very thin or thin (n=67)	7	10.4	11	16.4	16	23.9	5	7.5	10	14.9	18	26.9	
Average (n=313)	25	8.0	24	7.7	96	30.7	32	10.2	38	12.1	98	31.3	
Very heavy or heavy (n=112)	9	8.0	14	12.5	35	31.3	13	11.6	11	9.8	30	26.8	

\*Overall Chi-square

#N=492; removed responses of 'not sure' from analysis



**Table 64: Maternal Perceptions about Child Overweight, Split by Child BMI Percentile Category (N=496)**

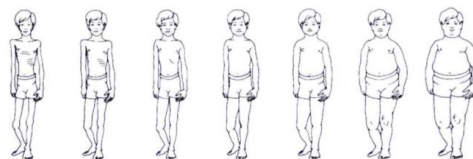
Characteristic	Underweight BMI (<5 <sup>th</sup> percentile) (N=41)			Low Normal BMI (5 <sup>th</sup> to 25 <sup>th</sup> percentile) (N=50)			Middle Normal BMI (25 <sup>th</sup> to 74 <sup>th</sup> percentile) (N=148)			High Normal BMI (75 <sup>th</sup> to 84 <sup>th</sup> percentile) (N=50)			Overweight BMI (85 <sup>th</sup> to 94 <sup>th</sup> percentile) (N=60)			Obese BMI (>=95 <sup>th</sup> percentile) (N=147)			p-value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Chubby Kids are Healthy<sup>a</sup></b>	2.54	0.90	1-5	2.77	0.63	1-4.3	2.66	0.71	1-4.3	2.74	0.72	1.33-5	2.64	0.74	1-4.7	2.75	0.77	1-4.7	0.554
<b>I am Concerned for my Child's Overweight risk<sup>b</sup></b>	1.78	1.16	1-5	1.72	0.86	1-4	1.93	1.01	1-5	1.97	1.12	1-5	1.85	0.92	1-5	1.94	1.08	1-5	0.727
<b>Picture of Child first child who is Underweight<sup>c</sup></b>	1.83	0.97	1-6	2.12	0.72	1-3	2.11 <sub>A</sub>	0.80	1-6	1.88	0.75	1-3	2.27 <sub>B</sub>	0.71	1-3	1.85 <sub>AB</sub>	0.76	1-3	0.001
<b>Overweight<sup>c</sup></b>	5.73	0.92	3-7	5.72	0.70	4-7	5.66	0.70	3-7	5.78	0.68	5-7	5.6 <sup>A</sup>	0.76	4-7	6.01 <sub>A</sub>	0.77	4-7	<0.001

\*ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> A higher score indicates that a mother believes more strongly that an overweight child is healthier; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.65.

<sup>b</sup> A higher score indicates that mother is more concerned about her child's risk of becoming overweight; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.91.

<sup>c</sup> Body Image Perceptions based on Scores that correspond to the shapes below.  
The image on the far left is #1, the image on the far right is #7.



importance mothers placed on their own physical activity was noted. Importance placed on physical activity for herself was lowest among mothers of underweight children and tended to increase as child BMI increased. No significant differences between child BMI category and importance mothers placed on child physical activity or the encouragement and facilitation of child activity were found. Child BMI category also was not associated with importance mothers placed on modeling physical activity behaviors or the days a week in the past month that mothers participated in physical activity with her preschool children. Mothers of overweight children reported modeling physical activity behaviors to their children significantly more days a week than mothers with middle normal weight children. Mothers of overweight children also reported modeling use of media devices significantly more days per week than mothers of high normal or obese children (Table 65).

**Maternal Beliefs and Practices Regarding Screentime.** Child BMI category was not related to mothers' belief that television had a positive effect on child learning. There also was no relationship between child BMI category and whether mothers talked often with their kids about television and media (Table 66).

**Maternal Feeding Practices.** A significant main effect was found between child BMI category and mothers' control of Food Access and Decisions and Acceptance of Food Waste scales, but post-hoc analyses revealed no significant differences among groups. Mothers of middle normal weight children had significantly lower food access and decision making scores than mothers of obese children (Table 67). Mothers of overweight and obese children had lower acceptance of food waste. No significant differences were found between child BMI category and all other maternal feeding practices.

**Family Meals.** No differences were found between the Frequency of Family Meals, Importance of Family Meals, or Family Meal Atmosphere scales and child BMI categories (Table 68). Child BMI differed significantly with days per week family meals were consumed in fast food restaurants, with obese and underweight children having more fast food meals per week. Obese

**Table 65: Maternal Modeling Frequency, and Mean Importance and Encouragement/Facilitation of Physical Activity and Media, Split by Child BMI Percentile Category (N=496) Cont'd.**

Child Demo- graphic Charac- teristic	Underweight BMI (<5 <sup>th</sup> percentile) (N=41)			Low Normal BMI ( 5 <sup>th</sup> to 25 <sup>th</sup> percentile) (N=50)			Middle Normal BMI (25 <sup>th</sup> to 74 <sup>th</sup> percentile) (N=148)			High Normal BMI (75 <sup>th</sup> to 84 <sup>th</sup> percentile) (N=50)			Overweight BMI (85 <sup>th</sup> to 94 <sup>th</sup> percentile) (N=60)			Obese BMI (>=95 <sup>th</sup> percentile) (N=147)			P- value *
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
Importance of Physical Activity for self <sup>a</sup>	3.21	1.05	1-5	3.35	0.97	1.33- 5	3.34	0.91	1-5	3.57	0.90	1.67- 5	3.66	0.99	1.67- 5	3.61	0.99	1-5	0.030
Importance of Physical Activity for child <sup>b</sup>	4.01	0.76	2-5	3.67	0.90	1.5- 5	3.75	0.82	1-5	3.85	0.77	2-5	3.93	0.89	2-5	3.85	0.91	1-5	0.333
Encourage- ment and Facilitation of Physical Activity <sup>c</sup>	4.39	0.63	2-5	4.23	0.59	2.8- 5	4.18	0.65	1.8- 5	4.30	0.47	3.4- 5	4.31	0.63	2.8- 5	4.22	0.71	1.6- 5	0.447

\*ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Higher score indicates mother places greater importance on physical activity for self; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.82.

<sup>b</sup> Higher score indicates mother places greater importance of physical activity for her child; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.68.

<sup>c</sup> Higher score indicates greater encouragement/facilitation of physical activity by the mother for her child; scale includes 5 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.88.

<sup>d</sup> Higher score on all scales indicates greater importance mother places on modeling positive physical activity behaviors to her child; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.79.

**Table 65: Maternal Modeling Frequency, and Mean Importance and Encouragement/Facilitation of Physical Activity and Media, Split by Child BMI Percentile Category (N=496) Cont'd.**

Child Demo- graphic Charac- teristic	Underweight BMI (<5 <sup>th</sup> percentile) (N=41)			Low Normal BMI (5 <sup>th</sup> to 25 <sup>th</sup> percentile) (N=50)			Middle Normal BMI (25 <sup>th</sup> to 74 <sup>th</sup> percentile) (N=148)			High Normal BMI (75 <sup>th</sup> to 84 <sup>th</sup> percentile) (N=50)			Overweight BMI (85 <sup>th</sup> to 94 <sup>th</sup> percentile) (N=60)			Obese BMI (≥95 <sup>th</sup> percentile) (N=147)			p- value *
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
Importance of Modeling Physical Activity <sup>d</sup>	3.93	1.05	1-5	4.11	0.82	1-5	4.10	0.83	2-5	4.11	0.75	2.5- 5	4.17	0.73	2.5- 5	4.23	0.8	2-5	0.377
Mother and Child Co- Physical Activity Behavior Frequency (days a week in the last month)	3.73	1.88	0-7	3.90	1.84	0.5 -7	3.47	1.81	0.7	3.99	1.64	0-7	3.82	1.78	0-7	3.72	1.9	0-7	0.473

\*ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Higher score indicates mother places greater importance on physical activity for self; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.82.

<sup>b</sup> Higher score indicates mother places greater importance of physical activity for her child; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.68.

<sup>c</sup> Higher score indicates greater encouragement/facilitation of physical activity by the mother for her child; scale includes 5 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.88.

<sup>d</sup> Higher score on all scales indicates greater importance mother places on modeling positive physical activity behaviors to her child; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.79.

**Table 65: Maternal Modeling Frequency, and Mean Importance and Encouragement/Facilitation of Physical Activity and Media, Split by Child BMI Percentile Category (N=496) Cont'd.**

Child Demo- graphic Charac- teristic	Underweight BMI (<5 <sup>th</sup> percentile) (N=41)			Low Normal BMI ( 5 <sup>th</sup> to 25 <sup>th</sup> percentile) (N=50)			Middle Normal BMI (25 <sup>th</sup> to 74 <sup>th</sup> percentile) (N=148)			High Normal BMI (75 <sup>th</sup> to 84 <sup>th</sup> percentile) (N=50)			Overweight BMI (85 <sup>th</sup> to 94 <sup>th</sup> percentile) (N=60)			Obese BMI (>=95 <sup>th</sup> percentile) (N=147)			P- value *
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
Maternal Modeling of Physical Activity Behavior Frequency (days a week in the last month)	3.36	1.37	0.5- 6.5	3.24	1.33	0.17 - 6.33	2.85 <sub>A</sub>	1.17	0- 5.83	2.98	0.91	1.33 - 5.17	3.41 <sub>A</sub>	1.27	0.83 -6	3.08	1.22	0-6	0.024
Maternal Modeling of Media Use Behavior Frequency (days a week in the last month)	3.30	2.12	0.7	2.75	2.40	0-7	2.68	2.17	0-7	2.33 <sub>A</sub>	2.09	0-7	3.58 <sub>AC</sub>	2.14	0-7	2.62 <sub>C</sub>	2.20	0-7	0.019

\*ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Higher score indicates mother places greater importance on physical activity for self; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.82.

<sup>b</sup> Higher score indicates mother places greater importance of physical activity for her child; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.68.

<sup>c</sup> Higher score indicates greater encouragement/facilitation of physical activity by the mother for her child; scale includes 5 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.88.

<sup>d</sup> Higher score on all scales indicates greater importance mother places on modeling positive physical activity behaviors to her child; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.79.

**Table 66: Mean Maternal Beliefs and Practices Regarding Screentime in Families with Preschool Children, Split by Child BMI Percentile Category (N=496)**

Characteristic	Underweight BMI (<5 <sup>th</sup> percentile) (N=41)			Low Normal BMI (5 <sup>th</sup> to 25 <sup>th</sup> percentile) (N=50)			Middle Normal BMI (25 <sup>th</sup> to 74 <sup>th</sup> percentile) (N=148)			High Normal BMI (75 <sup>th</sup> to 84 <sup>th</sup> percentile) (N=50)			Overweight BMI (85 <sup>th</sup> to 94 <sup>th</sup> percentile) (N=60)			Obese BMI (>=95 <sup>th</sup> percentile) (N=147)			p-value *
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
Belief of Positive Effect of TV on Child Learning <sup>a</sup>	3.76	0.90	1-5	3.86	0.66	2.5-5	3.89	0.66	2-5	3.97	0.79	2-5	3.78	0.89	1-5	3.95	0.82	1-5	0.574
Talks Often with Kids Regarding TV/Media <sup>b</sup>	3.18	0.92	1-5	3.12	1.11	1-5	3.18	0.87	1-5	3.19	0.97	1-5	3.28	1.04	1-5	3.28	1.00	1-5	0.901

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Higher score indicates a mother more strongly agrees that TV has a positive effect on children's learning/helps them do better in school; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.50.

<sup>b</sup> Higher score indicates a mother more often speaks with her children about TV advertisements, shows, video games, or movies; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.85.

**Table 67: Mean Maternal Feeding Practices, Split by Child BMI Percentile Category (N=496)**

Charac- teristic	Underweight BMI (<5 <sup>th</sup> percentile) (N=41)			Low Normal BMI (5 <sup>th</sup> to 25 <sup>th</sup> percentile) (N=50)			Middle Normal BMI (25 <sup>th</sup> to 74 <sup>th</sup> percentile) (N=148)			High Normal BMI (75 <sup>th</sup> to 84 <sup>th</sup> percentile) (N=50)			Overweight BMI (85 <sup>th</sup> to 94 <sup>th</sup> percentile) (N=60)			Obese BMI (≥95 <sup>th</sup> percentile) (N=147)			p- value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
Healthy Eating Modeling <sup>a</sup>	3.5	0.67	1.5 - 4.8	3.5	0.7	1.8- 4.8	3.5	0.7	1.2 5-5	3.4	0.8	1.3-5	3.7	0.7	1.75- 5	3.5	0.8	1.25 -5	0.299
Restriction <sup>b</sup>	3.6	0.9	2-5	3.8	0.9	1-5	3.8	0.9	1.5- 5	3.9	0.9	1-5	4.1	0.8	2-5	3.9	0.9	1-5	0.089
Pressure to Eat <sup>c</sup>	2.5	1.0	1-5	2.1	0.8	1-4.7	2.1	0.9	1-5	2.3	1.0	1-5	2.3	1.0	1-5	2.2	1.0	1-5	0.872
Food Access and Decisions <sup>d</sup>	3.2	0.6	2- 4.4	3.4	0.5	1.9- 4.4	3.2 <sub>A</sub>	0.5	2- 4.4	3.3	0.5	2-4.4	3.4	0.5	2.3- 4.4	3.4 <sup>A</sup>	0.5	1.9- 4.4	0.047

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Higher scores indicate mother more strongly agrees that she models eating of healthy foods to her preschool children; scale includes 4 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.56.

<sup>b</sup> Higher scores indicate a mother uses more restriction of her preschool child's eating; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.63.

<sup>c</sup> Higher scores indicate a mother uses pressure on her preschool child to eat; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.69.

<sup>d</sup> Higher scores indicate a mother more strongly agrees that she controls her preschool children's access to and decisions about foods; scale includes 7 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.65.

<sup>e</sup> Higher scores indicate a mother does not like when food is waste; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.61.

<sup>f</sup> Higher scores indicate a mother more frequently uses food rewards for eating and behaving; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.73.

<sup>g</sup> Higher scores indicate a mother more frequently uses non-food rewards for eating and behaving; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.65.

**Table 67: Mean Maternal Feeding Practices, Split by Child BMI Percentile Category (N=496) Cont'd.**

Characteristic	Underweight BMI (<5 <sup>th</sup> percentile) (N=41)			Low Normal BMI (5 <sup>th</sup> to 25 <sup>th</sup> percentile) (N=50)			Middle Normal BMI (25 <sup>th</sup> to 74 <sup>th</sup> percentile) (N=148)			High Normal BMI (75 <sup>th</sup> to 84 <sup>th</sup> percentile) (N=50)			Overweight BMI (85 <sup>th</sup> to 94 <sup>th</sup> percentile) (N=60)			Obese BMI (>=95 <sup>th</sup> percentile) (N=147)			p-value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
Food Waste	2.5	1.1	1-5	3.0	0.9	1-5	2.9	0.9	1-5	3.1	0.9	1-4.5	3.2	0.7	1.5-4.5	3.2	1.0	1-5	0.044
Non-Acceptance <sup>e</sup>																			
Instrumental Feeding <sup>f</sup> (Use of Food for Reward)	2.6	0.9	1-4.3	2.5	0.9	1-4.7	2.6	0.8	1-5	2.6	0.9	1-5	2.5	1.0	1-4.7	2.7	1.0	1-5	0.882
Use of Non-food for Reward <sup>g</sup>	2.9	0.9	1-5	2.9	0.8	1-5	2.8	0.9	1-5	2.9	0.9	1-5	2.9	1.0	1-5	2.9	1.0	1-5	0.942

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Higher scores indicate mother more strongly agrees that she models eating of healthy foods to her preschool children; scale includes 4 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.56.

<sup>b</sup> Higher scores indicate a mother uses more restriction of her preschool child's eating; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.63.

<sup>c</sup> Higher scores indicate a mother uses pressure on her preschool child to eat; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.69.

<sup>d</sup> Higher scores indicate a mother more strongly agrees that she controls her preschool children's access to and decisions about foods; scale includes 7 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.65.

<sup>e</sup> Higher scores indicate a mother does not like when food is waste; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.61.

<sup>f</sup> Higher scores indicate a mother more frequently uses food rewards for eating and behaving; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.73.

<sup>g</sup> Higher scores indicate a mother more frequently uses non-food rewards for eating and behaving; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.65.



children ate significantly more meals per week in front of a television than low normal weight children. Child BMI was not related to consuming meals at the kitchen or dining room table or in the car. Mothers of high normal weight children planned significantly less for family meals than overweight or obese children. Mothers of obese children also reported significantly more time and energy for family meals than normal middle weight children.

**Family Meals.** No differences were found between the Frequency of Family Meals, Importance of Family Meals, or Family Meal Atmosphere scales and child BMI categories (Table 68). Child BMI differed significantly with days per week family meals were consumed in fast food restaurants, with obese and underweight children having more fast food meals per week. Obese children ate significantly more meals per week in front of a television than low normal weight children. Child BMI was not related to consuming meals at the kitchen or dining room table or in the car. Mothers of high normal weight children planned significantly less for family meals than overweight or obese children. Mothers of obese children also reported significantly more time and energy for family meals than normal middle weight children.

**Family and Household Interactions and Organization.** No significant differences were found between child BMI category and family support for healthy behaviors, family conflict and cohesion, or disorganization in the home scales. Mothers did not differ in their verbal and physical engagement with their child (Table 69).

#### **Child Environmental Factors and Weight Status**

##### **Home and Neighborhood Physical Activity Environment: Availability and Accessibility.**

Home and neighborhood physical activity availability or accessibility did not differ by child BMI category (Table 70). While not significant, there was a trend for overweight and obese children who had dogs, to go on walks with the dog more days per week than other children with dogs.

##### **Home Media Environment: Availability, Accessibility, and Policies about Screentime.**

The number of media devices in homes did not differ by child BMI category. Obese children, however, had significantly more media devices in their bedrooms than middle normal weight

**Table 68: Family Meals Behaviors, Importance, Atmosphere, Locations, and Maternal Time and Energy for Family Meals, Split by Child BMI Percentile Category (N=496)**

Characteristic	Underweight BMI (<5 <sup>th</sup> percentile) (N=41)			Low Normal BMI (5 <sup>th</sup> to 25 <sup>th</sup> percentile) (N=50)			Middle Normal BMI (25 <sup>th</sup> to 74 <sup>th</sup> percentile) (N=148)			High Normal BMI (75 <sup>th</sup> to 84 <sup>th</sup> percentile) (N=50)			Overweight BMI (85 <sup>th</sup> to 94 <sup>th</sup> percentile) (N=60)			Obese BMI (>=95 <sup>th</sup> percentile) (N=147)			p-value *
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Frequency of Family Meals (days/week)</b>	15.1	4.7	5-21	13.5	4.3	2-21	13.7	5.1	0-21	14.0	5.7	0-21	13.9	4.8	1-21	13.2	5.2	0-21	0.432
<b>Importance of Family Meals<sup>a</sup></b>	4.5	0.6	2-5	4.6	0.6	2.67-5	4.5	0.6	2.7-5	4.5	0.7	2-5	4.4	0.8	2-5	4.6	0.6	2.3-5	0.276
<b>Family Meal Atmosphere<sup>b</sup></b>	4.0	0.9	1.5-5	4.1	0.7	2-5	4.1	0.9	1-5	4.2	0.8	1-5	4.2	0.7	2-5	4.2	0.9	1-5	0.603

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Higher score indicates more importance placed on family meals; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.70.

<sup>b</sup> Higher score indicates more positive family meal atmosphere; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.70.

<sup>c</sup> Higher score indicates more meal planning ; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.70.

<sup>d</sup> Higher score indicates more time and energy for family meals; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.78.

**Table 68: Family Meals Behaviors, Importance, Atmosphere, Locations, and Maternal Time and Energy for Family Meals, Split by Child BMI Percentile Category (N=496) Cont'd.**

Characteristic	Underweight BMI (<5 <sup>th</sup> percentile) (N=41)			Low Normal BMI (5 <sup>th</sup> to 25 <sup>th</sup> percentile) (N=50)			Middle Normal BMI (25 <sup>th</sup> to 74 <sup>th</sup> percentile) (N=148)			High Normal BMI (75 <sup>th</sup> to 84 <sup>th</sup> percentile) (N=50)			Overweight BMI (85 <sup>th</sup> to 94 <sup>th</sup> percentile) (N=60)			Obese BMI (≥95 <sup>th</sup> percentile) (N=147)			p-value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Location</b>																			
<b>Where Family Meals Eaten</b>																			
Fast Food Restaurants (days/week)	1.2	1.6	0-7	0.7	1.1	0-7	0.7	0.8	0-3	0.8	0.7	0-3	1.0	1.3	0-7	1.1	1.4	0-7	0.036
In Front of TV (days/week)	2.3	2.7	0-7	1.6 <sub>A</sub>	2.4	0-7	2.3	2.4	0-7	2.2	2.6	0-7	1.9	2.2	0-7	2.8 <sup>A</sup>	2.5	0-7	0.026
At Kitchen or Dining Room Table (days/week)	4.3	2.9	0-7	5.4	2.1	0-7	4.8	2.5	0-7	4.8	2.8	0-7	4.9	2.2	0-7	4.4	2.6	0-7	0.18
In the Car (days/week)	0.4	1.3	0-7	0.3	1.0	0-7	0.2	0.6	0-4	0.5	1.0	0-5	0.6	1.5	0-7	0.5	1.2	0-7	0.150
<b>Family Meal Planning<sup>c</sup></b>	3.5	0.9	1.3-5	3.5	0.8	1.3-4.7	3.3	0.8	1-5	3.0 <sup>AB</sup>	1.0	1-5	3.6 <sup>A</sup>	1.0	1-5	3.4 <sup>B</sup>	0.9	1-5	0.011
<b>Time and Energy for Family Meals<sup>d</sup></b>	4.4	0.9	1-5	4.3	0.8	1.5-5	4.2 <sup>A</sup>	0.9	2-5	4.5	0.7	1-5	4.2	0.9	1.5-5	4.5 <sup>A</sup>	0.8	1-5	0.027

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Higher score indicates more importance placed on family meals; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.70.

<sup>b</sup> Higher score indicates more positive family meal atmosphere; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.70.

<sup>c</sup> Higher score indicates more meal planning ; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.70.

<sup>d</sup> Higher score indicates more time and energy for family meals; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.78.

**Table 69: Family and Household Interactions and Organization, Split by Child BMI Percentile Category (N=496)**

Characteristic	Underweight BMI (<5 <sup>th</sup> percentile) (N=41)			Low Normal BMI (5 <sup>th</sup> to 25 <sup>th</sup> percentile) (N=50)			Middle Normal BMI (25 <sup>th</sup> to 74 <sup>th</sup> percentile) (N=148)			High Normal BMI (75 <sup>th</sup> to 84 <sup>th</sup> percentile) (N=50)			Overweight BMI (85 <sup>th</sup> to 94 <sup>th</sup> percentile) (N=60)			Obese BMI (>=95 <sup>th</sup> percentile) (N=147)			p-value *
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Family Support for Healthy Behaviors<sup>a</sup></b>	4.3	0.7	1.8-5	4.4	0.7	2.3-5	4.5	0.6	2.7-5.5	4.5	0.6	1.3-5	4.4	0.7	1.3-5	4.4	0.8	1.3-5	0.77
<b>Family Conflict and Cohesion<sup>b</sup></b>	1.8	0.7	1-4	1.9	0.7	1-4.8	1.9	0.7	1-4.4	1.7	0.5	1-2.8	1.7	0.6	1-3.8	1.8	0.7	1-5	0.289
<b>Household Disorganization<sup>c</sup></b>	2.5	0.9	1-5	2.6	0.9	1-5	2.5	0.9	1-5	2.3	0.9	1-5	2.5	0.9	1-4.3	2.5	0.9	1-5	0.782
<b>Verbal Engagement with Children<sup>d</sup></b>	4.1	1.0	1-5	4.3	0.7	3-5	4.2	0.9	1-5	4.1	0.9	1-5	4.3	1.1	1-5	4.3	0.97	1-5	0.525
<b>Physical Engagement with Children<sup>e</sup></b>	4.7	0.5	3-5	4.8	0.4	4-5	4.7	0.5	3-5	4.9	0.3	4-5	4.7	0.5	3-5	4.80	0.5	2-5	0.481

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Higher score indicates more support; scale includes 4 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.81.

<sup>b</sup> Higher score indicates more conflict and less cohesion; scale includes 5 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.84.

<sup>c</sup> Higher score indicates more chaos, disorganization, and hurriedness in the home; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.76.

<sup>d</sup> Higher score indicates more verbal engagement with children while doing chores around the house; scale includes 2 5-point (SA to SD) Likert-type item.

<sup>e</sup> Higher score indicates more physical interaction with children; scale includes 1 5-point (SA to SD) Likert-type item.

**Table 70: Mean Home and Neighborhood Physical Activity Environment<sup>a</sup> Scores for Households with Young Children, Split by Child BMI Percentile Category (N=496)**

	Underweight BMI (<5 <sup>th</sup> percentile) (N=41)			Low Normal BMI (5 <sup>th</sup> to 25 <sup>th</sup> percentile) (N=50)			Middle Normal BMI (25 <sup>th</sup> to 74 <sup>th</sup> percentile) (N=148)			High Normal BMI (75 <sup>th</sup> to 84 <sup>th</sup> percentile) (N=50)			Overweight BMI (85 <sup>th</sup> to 94 <sup>th</sup> percentile) (N=60)			Obese BMI (>=95 <sup>th</sup> percentile) (N=147)			p-value *
Characteristic	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
Physical Activity Availability <sup>b</sup>	3.6	0.8	1.3-4.6	3.8	0.5	2.2-4.8	3.8	0.6	1.8-4.8	3.9	0.7	1.83-4.92	4.0	0.7	1.5-4.75	3.7	0.7	1.2-4.9	0.414
Physical Activity Accessibility <sup>c #</sup>	4.0	1.2	1-6	4.4	1.0	1-6	4.3	1.0	1-6	4.1	1.0	1-6	4.5	0.8	2-6	4.2	1.2	1-6	0.218
How often do your preschool kids go on walks with the dog? (days/week) <sup>†</sup>	2.8	2.4	0-7	3.1	2.2	0-7	3.5	2.6	0-7	3.4	2.4	0-7	4.5	2.4	0-7	4.2	2.6	0-7	0.079

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

#N=529 , removed 21 answers of “not sure”

†N=231; only those who have a dog

<sup>a</sup> Home environment included inside the home, yard ( rear right outside the home), and neighborhood (area nearby the home).

<sup>b</sup> Physical activity availability scale includes 12 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.72.

<sup>c</sup> Physical activity accessibility scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.90; n=524; respondents who answered “not sure” were removed from analysis.

children. There were no differences between child BMI and access to TV shows, computers or laptops, video games played standing up, or tablets, smart phones, or other electronic educational devices. Obese children had more access to video games played sitting down than middle normal weight children. Child BMI categories were not associated with hours of screentime (i.e., TV, computer, and video game time) or limits mothers placed on TV commercials and shows that are not appropriate for young children. Underweight children tended to be permitted to only watch educational television (Table 71).

**Household Food Availability, Accessibility, and Policies.** No differences occurred among child BMI category and availability of fruit and vegetable servings, fiber, vitamin C, magnesium, nor potassium in the home (Table 72). The availability of fat, salty, and sweet snack servings and energy, sugar, and saturated and total fat from those foods did not differ by child BMI. Although not significant, underweight, low normal and middle normal weight children had less breakfast, granola or protein bars available in their homes. There was no difference between child BMI and availability of plain or fiber cereal or sweet cereals.

No significant differences were found between child BMI and household availability of milk or 100% fruit juice, but there was a trend that underweight children had fewer milk servings available. High normal weight children had fewer vegetable juice servings available than homes with overweight children. Homes of overweight children also had significantly fewer servings of soft drinks (not diet) available in the home per day than homes of high normal weight children. Homes of obese children had more sugar-sweetened drink servings available than other children, although this difference was not significant. No differences were found between child BMI categories and availability of energy drinks, sugar-sweetened specialty coffee drinks, and sugar grams and calories from soft drinks and other sugar-sweetened drinks.

Mothers did differ in the number of different nutrient dense or nutrient poor foods they permitted children to serve themselves for snacks without help. Mothers also did not differ in the

**Table 71: Mean Home Media Equipment Environment in Households with Preschool Children, Split by Child BMI Percentile Category (N=496)**

	Underweight BMI (<5 <sup>th</sup> percentile) (N=41)			Low Normal BMI (5 <sup>th</sup> to 25 <sup>th</sup> percentile) (N=50)			Middle Normal BMI (25 <sup>th</sup> to 74 <sup>th</sup> percentile) (N=148)			High Normal BMI (75 <sup>th</sup> to 84 <sup>th</sup> percentile) (N=50)			Overweight BMI (85 <sup>th</sup> to 94 <sup>th</sup> percentile) (N=60)			Obese BMI (>=95 <sup>th</sup> percentile) (N=147)			P-value *
Characteristic	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Media Equipment<sup>a</sup> Availability</b>																			
Number of Media Devices in the Home	11.0	3.7	6-20	10.9	4.0	3-22	11.1	4.0	4-27	11.8	5.0	5-32	11.5	4.1	3-28	11.8	4.2	4-31	0.577
Number of Media Devices in Child's Bedroom	1.5	1.8	0-6	1.1	1.5	0-6	1.1 <sup>A</sup>	1.4	0-7	1.1	1.4	0-5	1.4	1.4	0-6	1.6 <sup>A</sup>	1.7	0-7	0.036

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Equipment included TV, DVD player, computer/laptop, smart phone/tablet/LeapPad, video game devices placed sitting down, video game devices played standing up and require lots of moving (like Wii Fit, Xbox Kinect), and Internet access.

<sup>b</sup> Higher score indicates mother more strongly agrees that item is easy for her preschool kids to turn on an play with with little or no help; media equipment accessibility scale includes 5 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.84

<sup>c</sup> Note that mothers did not limit on screen time were coded as 1440 (24 hours).

<sup>d</sup> Higher score indicates a mother tries to limit TV commercials and movies/shows to those made for children; activity accessibility scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.50.

<sup>e</sup> Higher score indicates a mother more strongly agrees that she only lets her preschool children watch educational TV programs; includes 1 5-point (SA to SD) Likert-type item.

**Table 71: Mean Home Media Equipment Environment in Households with Preschool Children, Split by Child BMI Percentile Category (N=496) Cont'd.**

Characteristic	Underweight BMI (<5 <sup>th</sup> percentile) (N=41)			Low Normal BMI (5 <sup>th</sup> to 25 <sup>th</sup> percentile) (N=50)			Middle Normal BMI (25 <sup>th</sup> to 74 <sup>th</sup> percentile) (N=148)			High Normal BMI (75 <sup>th</sup> to 84 <sup>th</sup> percentile) (N=50)			Overweight BMI (85 <sup>th</sup> to 94 <sup>th</sup> percentile) (N=60)			Obese BMI (>=95 <sup>th</sup> percentile) (N=147)			p-value *
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Media Equipment Accessibility<sup>b</sup></b>																			
TV, DVD, Watch Shows or Movies	2.8	1.5	1-5	3.1	1.4	1-5	3.2	1.4	1-5	3.5	1.4	1-5	3.3	1.5	1-5	3.2	1.5	1-5	0.222
Computers and Laptops	2.8	1.3	1-5	2.4	1.4	1-5	2.4	1.4	1-5	2.5	1.3	1-5	2.4	1.3	1-5	2.7	1.6	1-5	0.307
Video games that are played standing up and require lots of moving	2.0	1.2	1-5	2.1	1.4	1-5	2.2	1.3	1-5	2.4	1.3	1-5	2.4	1.4	1-5	2.6	1.5	1-5	0.112
Video games played sitting down	2.1	1.4	1-5	2.1	1.4	1-5	2.2 <sub>A</sub>	1.3	1-5	2.4	1.4	1-5	2.3	1.4	1-5	2.7 <sup>A</sup>	1.5	1-5	0.007
Tablets, Smart phones, or Electronic educational devices (like LeapPad)	3.2	1.5	1-5	3.4	1.5	1-5	3.3	1.5	1-5	3.6	1.4	1-5	3.6	1.4	1-5	3.4	1.5	1-5	0.841

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>b</sup> Higher score indicates mother more strongly agrees that item is easy for her preschool kids to turn on an play with with little or no help; media equipment accessibility scale includes 5 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.84

<sup>c</sup> Note that mothers did not limit on screen time were coded as 1440 (24 hours).

<sup>d</sup> Higher score indicates a mother tries to limit TV commercials and movies/shows to those made for children; activity accessibility scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.50.



**Table 71: Mean Home Media Equipment Environment in Households with Preschool Children, Split by Child BMI Percentile Category (N=496) Cont'd.**

Characteristic	Underweight BMI (<5 <sup>th</sup> percentile) (N=41)			Low Normal BMI (5 <sup>th</sup> to 25 <sup>th</sup> percentile) (N=50)			Middle Normal BMI (25 <sup>th</sup> to 74 <sup>th</sup> percentile) (N=148)			High Normal BMI (75 <sup>th</sup> to 84 <sup>th</sup> percentile) (N=50)			Overweight BMI (85 <sup>th</sup> to 94 <sup>th</sup> percentile) (N=60)			Obese BMI (>=95 <sup>th</sup> percentile) (N=147)			p-value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Hours of Screen Time Child Allowed Per Day</b>																			
TV/Movie Time (hours)	5.9	7.0	0-32	6.5	9.0	0.5-48	8.7	14.1	0.5-72	8.0	10.6	1.75-50	8.9	13.9	0.75-72	8.5	10.7	1-53	0.665
Computer Time (hours)	3.4	5.0	0-24	3.7	5.4	0.5-24	4.5	6.3	0-24	4.2	5.5	1-24	4.3	6.7	0-24	4.4	5.9	0.5-24	0.896
Video Game Time (hours)	1.3	1.6	0-8	1.5	3.4	0-24	2.2	5.0	0-24	3.0	6.3	0-24	2.8	5.8	0-24	2.7	5.4	0-24	0.350
<b>Limiting TV Commercials and Shows Not Appropriate</b>																			
Is this Children Permitted to Watch Ed TV Only <sup>e</sup>	1.2	3.8	0-24	1.3	4.7	0-24	2.0	5.8	0-24	0.9	1.2	0-7	1.8	5.2	0-24	1.4	3.7	0-24	0.616
	3.7	0.9	1.5-5	3.8	0.8	1-5	3.7	1.0	1-5	3.6	0.9	1-5	3.8	0.9	1.5-5	3.6	1.0	1-5	0.798
	5.9	7.0	2-5	6.5	9.0	1-5	8.7	14.1	1-5	8.0	10.6	1-5	8.9	13.9	2-5	8.5	10.7	1-5	0.056

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>c</sup> Note that mothers did not limit on screen time were coded as 1440 (24 hours).

<sup>d</sup> Higher score indicates a mother tries to limit TV commercials and movies/shows to those made for children; activity accessibility scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.50.

<sup>e</sup> Higher score indicates a mother more strongly agrees that she only lets her preschool children watch educational TV programs; includes 1 5-point (SA to SD) Likert-type item.

**Table 72: Household Availability of Foods and Food Components, Split by Child BMI Percentile Category (N=496)**

	Underweight BMI (<5 <sup>th</sup> percentile) (N=41)			Low Normal BMI (5 <sup>th</sup> to 25 <sup>th</sup> percentile) (N=50)			Middle Normal BMI (25 <sup>th</sup> to 74 <sup>th</sup> percentile) (N=148)			High Normal BMI (75 <sup>th</sup> to 84 <sup>th</sup> percentile) (N=50)			Overweight BMI (85 <sup>th</sup> to 94 <sup>th</sup> percentile) (N=60)			Obese BMI (≥95 <sup>th</sup> percentile) (N=147)			p- value*
Charac- teristic	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Fruit and Vege- tables Servings (per day)</b>	1.3	0.6	0.2- 2.6	1.2	0.6	0-2.4	1.4	0.6	0- 2.9	1.4	0.6	0.2- 2.9	1.4	0.6	0.3- 2.6	1.4	0.7	0- 2.9	0.186
Dietary Fiber (grams/ day)	4.6	1.8	0.9- 8.3	4.6	1.6	1.3- 7.2	5.0	1.8	0.3 -9.1	5.2	1.9	1.7- 9.0	5.1	1.8	1.2- 8.4	5.1	2.1	0.7- 9.4	0.377
Vitamin C (mg/day)	39	15	8-70	39	14	11- 61	43	15	2 -78	44	16	13- 78	43	16	10- 71	43	18	5- 78	0.389
Mag- nesium (mg/day)	83	27	27- 138	82	25	33- 121	89	27	17 - 150	91	29	38- 149	90	27	31- 139	89	32	23- 153	0.382
Potassium (mg/day)	805	262	257- 1347	795	246	310- 1183	866	267	156 - 148	888	285	356- 1462	878	271	3007 - 1359	870	313	213 - 150	0.384

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Highest possible response choice was more than 1 time each day; lowest response choice was less than 1 time per week.

<sup>b</sup> Scores indicate the number of nutrient dense or nutrient poor foods that a mother allows her child to get for a snack without her help.

<sup>c</sup> Score indicates the number of nutrient dense or nutrient-poor foods that a mother keeps in places that are easy for her child to see and reach.

**Table 72: Household Availability of Foods and Food Components, Split by Child BMI Percentile Category (N=496) Cont'd.**

Characteristic	Underweight BMI (<5 <sup>th</sup> percentile) (N=41)			Low Normal BMI (5 <sup>th</sup> to 25 <sup>th</sup> percentile) (N=50)			Middle Normal BMI (25 <sup>th</sup> to 74 <sup>th</sup> percentile) (N=148)			High Normal BMI (75 <sup>th</sup> to 84 <sup>th</sup> percentile) (N=50)			Overweight BMI (85 <sup>th</sup> to 94 <sup>th</sup> percentile) (N=60)			Obese BMI (>=95 <sup>th</sup> percentile) (N=147)			p-value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Fat, Salty, and Sweet Snack Servings (Chips, Doughnuts, Ice Cream, Candy) per day</b>																			
	1.1	0.8	0-3.3	1.2	1.1	0-4.6	1.2	1.0	0-4.6	1.1	0.9	0-4	1.3	1.3	0-4.6	1.0	0.9	0-4.6	0.485
Energy (kcal/day)	290	241	0-943	333	284	0-1268	318	276	0-1268	291	259	0-1155	350	346	0-1268	275	252	0-1268	0.483
Sugar (gm/day)	18	20	0-74	23	22	0-95	21	21	0-95	20	20	0-83	23	25	0-95	19	20	0-95	0.694
Saturated fat gm/day)	6.2	6.3	0-23.5	7.6	7.0	0-31.1	7.1	6.7	0-31.1	6.6	6.2	0-26.6	7.9	8.2	0-31.1	6.4	6.47	0-31.1	0.648
Total fat (gm/day)	13	11	0-45	16	14	0-61	15	13	0-61	13.6	12.1	0-54	16	16	0-61	13	12	0-61	0.493

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Highest possible response choice was more than 1 time each day; lowest response choice was less than 1 time per week.

<sup>b</sup> Scores indicate the number of nutrient dense or nutrient poor foods that a mother allows her child to get for a snack without her help.

<sup>c</sup> Score indicates the number of nutrient dense or nutrient-poor foods that a mother keeps in places that are easy for her child to see and reach.

**Table 72: Household Availability of Foods and Food Components, Split by Child BMI Percentile Category (N=496) Cont'd**

Characteristic	Underweight BMI (<5 <sup>th</sup> percentile) (N=41)			Low Normal BMI (5 <sup>th</sup> to 25 <sup>th</sup> percentile) (N=50)			Middle Normal BMI (25 <sup>th</sup> to 74 <sup>th</sup> percentile) (N=148)			High Normal BMI (75 <sup>th</sup> to 84 <sup>th</sup> percentile) (N=50)			Overweight BMI (85 <sup>th</sup> to 94 <sup>th</sup> percentile) (N=60)			Obese BMI (≥95 <sup>th</sup> percentile) (N=147)			p- value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Breakfast</b>																			
<b>Food</b>																			
<b>Servings</b>																			
<b>per day</b>																			
Plain or fiber cereal	0.70	0.43	0- >1 <sup>a</sup>	0.76	0.37	0- >1	0.75	0.42	0- >1	0.75	0.41	0- >1	0.82	0.37	0- >1	0.78	0.36	0- >1	0.722
Sweet cereal	0.59	0.40	0- >1	0.59	0.41	0- >1	0.64	0.42	0- >1	0.67	0.41	0- >1	0.69	0.41	0- >1	0.66	0.40	0- >1	0.726
Breakfast, granola, or protein bar	0.47	0.36	0- >1	0.56	0.40	0- >1	0.56	0.38	0- >1	0.69	0.40	0- >1	0.66	0.41	0- >1	0.60	0.40	0- >1	0.064

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Highest possible response choice was more than 1 time each day; lowest response choice was less than 1 time per week.

<sup>b</sup> Scores indicate the number of nutrient dense or nutrient poor foods that a mother allows her child to get for a snack without her help.

<sup>c</sup> Score indicates the number of nutrient dense or nutrient-poor foods that a mother keeps in places that are easy for her child to see and reach.

**Table 72: Household Availability of Foods and Food Components, Split by Child BMI Percentile Category (N=496) Cont'd.**

Characteristic	Underweight BMI (<5 <sup>th</sup> percentile) (N=41)			Low Normal BMI (5 <sup>th</sup> to 25 <sup>th</sup> percentile) (N=50)			Middle Normal BMI (25 <sup>th</sup> to 74 <sup>th</sup> percentile) (N=148)			High Normal BMI (75 <sup>th</sup> to 84 <sup>th</sup> percentile) (N=50)			Overweight BMI (85 <sup>th</sup> to 94 <sup>th</sup> percentile) (N=60)			Obese BMI (>=95 <sup>th</sup> percentile) (N=147)			p-value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Beverage Servings per day</b>																			
Milk	0.86	0.32	0- <sup>a</sup> <sub>&gt;1</sub>	0.90	0.30	0.14- <sub>&gt;1</sub>	0.98	0.26	0- <sub>&gt;1</sub>	0.90	0.33	0- <sub>&gt;1</sub>	0.94	0.29	0- <sub>&gt;1</sub>	0.90	0.31	0- <sub>&gt;1</sub>	0.095
100% fruit juice	0.66	0.38	0- <sub>&gt;1</sub>	0.73	0.36	0- <sub>&gt;1</sub>	0.77	0.36	0- <sub>&gt;1</sub>	0.72	0.38	0- <sub>&gt;1</sub>	0.79	0.37	0- <sub>&gt;1</sub>	0.76	0.37	0- <sub>&gt;1</sub>	0.520
Vegetable juice	0.22	0.30	0-1	0.19	0.30	0- <sub>&gt;1</sub>	0.25	0.35	0- <sub>&gt;1</sub>	0.18	0.30	0- <sub>&gt;1</sub>	0.35	0.41	0- <sub>&gt;1</sub>	0.31	0.39	0- <sub>&gt;1</sub>	0.039
Soft drink (not diet)	0.41	0.44	0- <sub>&gt;1</sub>	0.37	0.39	0- <sub>&gt;1</sub>	0.38	0.40	0- <sub>&gt;1</sub>	0.56 <sup>A</sup>	0.49	0- <sub>&gt;1</sub>	0.30 <sup>A</sup>	0.38	0- <sub>&gt;1</sub>	0.45	0.41	0- <sub>&gt;1</sub>	0.021

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Highest possible response choice was more than 1 time each day; lowest response choice was less than 1 time per week.

<sup>b</sup> Scores indicate the number of nutrient dense or nutrient poor foods that a mother allows her child to get for a snack without her help.

<sup>c</sup> Score indicates the number of nutrient dense or nutrient-poor foods that a mother keeps in places that are easy for her child to see and reach.

**Table 72: Household Availability of Foods and Food Components, Split by Child BMI Percentile Category (N=496) Cont'd.**

Characteristic	Underweight BMI (<5 <sup>th</sup> percentile) (N=41)			Low Normal BMI (5 <sup>th</sup> to 25 <sup>th</sup> percentile) (N=50)			Middle Normal BMI (25 <sup>th</sup> to 74 <sup>th</sup> percentile) (N=148)			High Normal BMI (75 <sup>th</sup> to 84 <sup>th</sup> percentile) (N=50)			Overweight BMI (85 <sup>th</sup> to 94 <sup>th</sup> percentile) (N=60)			Obese BMI (>=95 <sup>th</sup> percentile) (N=147)			p-value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
Other sugar-sweetened drink (e.g., fruit drinks)	0.3	0.4	0->1	0.3	0.4	0->1	0.3	0.4	0->1	0.3	0.4	0->1	0.3	0.3	0->1	0.4	0.4	0->1	0.054
Energy drink	0.1	0.3	0-1	0.1	0.2	0->1	0.1	0.2	0->1	0.1	0.2	0->1	0.1	0.2	0->1	0.1	0.2	0->1	0.202
Sugar-sweetened specialty coffee drink	0.2	0.3	0->1	0.2	0.3	0->1	0.2	0.3	0->1	0.2	0.4	0->1	0.2	0.3	0->1	0.2	0.3	0->1	0.962
Sugar (gm/day)	37	24	0-102	45	28	4-127	42	28	0-145	41	22	5-91	45.0	31	0-145	42	28	2-145	0.736
Energy (gm/day)	200	115	0-500	240	138	29-653	226	138	0-746	221	108	36-477	240	155	0-746	225	142	12-746	0.748

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Highest possible response choice was more than 1 time each day; lowest response choice was less than 1 time per week.

<sup>b</sup> Scores indicate the number of nutrient dense or nutrient poor foods that a mother allows her child to get for a snack without her help.

<sup>c</sup> Score indicates the number of nutrient dense or nutrient-poor foods that a mother keeps in places that are easy for her child to see and reach.

**Table 72: Household Availability of Foods and Food Components, Split by Child BMI Percentile Category (N=496) Cont'd.**

	Underweight BMI (<5 <sup>th</sup> percentile) (N=41)			Low Normal BMI ( 5 <sup>th</sup> to 25 <sup>th</sup> percentile) (N=50)			Middle Normal BMI (25 <sup>th</sup> to 74 <sup>th</sup> percentile) (N=148)			High Normal BMI (75 <sup>th</sup> to 84 <sup>th</sup> percentile) (N=50)			Overweight BMI (85 <sup>th</sup> to 94 <sup>th</sup> percentile) (N=60)			Obese BMI (>=95 <sup>th</sup> percentile) (N=147)			p-value*
Characteristic	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Child Food Access Policy<sup>b</sup></b>																			
Mean																			
Number of Nutrient Dense Foods Available	1.9	1.9	0-5	1.6	1.8	0-5	1.7	1.7	0-5	1.9	1.6	0-5	2.2	1.8	0-5	1.9	1.8	0-5	0.501
Mean																			
Number of Low Nutrient Density Foods Available	0.6	1.3	0-5	0.5	1.2	0-5	0.5	1.2	0-6	0.7	1.2	0-5	0.4	0.9	0-4	0.8	1.5	0-6	0.193
<b>Child Food Accessibility<sup>c</sup></b>																			
Nutrient Dense Foods	2.3	1.9	0-5	2.2	1.7	0-5	2.5	1.6	0-5	2.6	1.8	0-5	2.9	1.7	0-5	2.6	1.8	0-5	0.360
Low Nutrient Density Foods	0.7	1.3	0-5	0.7	1.4	0-6	0.7	1.1	0-5	0.7	1.2	0-5	0.6	1.2	0-6	1.0	1.5	0-6	0.506

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Highest possible response choice was more than 1 time each day; lowest response choice was less than 1 time per week.

<sup>b</sup> Scores indicate the number of nutrient dense or nutrient poor foods that a mother allows her child to get for a snack without her help.

<sup>c</sup> Score indicates the number of nutrient dense or nutrient-poor foods that a mother keeps in places that are easy for her child to see and reach.

number of nutrient dense or nutrient poor foods kept in places easy for children to see and reach and child BMI categories.

### **PREDICTING MATERNAL OBESITY RISK**

Using the comprehensive data collected from mothers in this survey, it was possible to identify the variables associated with increased risk of obese weight status. Research Question 2 uncovered how intrapersonal, interpersonal, and home environment characteristics differ between maternal and child weight status categories, yet the influence of these characteristics and their interactions for predicting obesity is uncertain. To address this, the 3-part Research Question 3 was posed: *3A: What intrapersonal, interpersonal, and home environment characteristics were associated with maternal obese vs. non-obese weight status? 3B: What is the obesity risk of non-obese mothers based on a score derived using the characteristics elucidated in Question 3A? 3C: How do non-obese mothers' intrapersonal, interpersonal, and home environmental characteristics differ based on their obesity risk score tertile?* To answer these questions, binomial regression modeling was conducted; an obesity risk score based on the significant variables from the regression model was calculated for each non-obese participant; and maternal intrapersonal, interpersonal, and home environmental characteristics were compared by obesity risk scores tertile (i.e., low risk, moderate risk, high risk) .

To determine which factors were predictive of maternal non-obese vs. obese weight status, binomial logistic regression was conducted. First, all maternal variables included in this study were examined for multicollinearity using 2-way Pearson correlations (see Table 73). All maternal variables were included to obtain a comprehensive picture of the variables that may be affecting obesity risk among mothers in the regression model. Variables that were highly intercorrelated (i.e.,  $r > 0.5$ ) were examined and only one of them was chosen to include in the



**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550)**

Characteristics	1	2	3	4	5	6	7	8	9	10	11	12	13
1 <u>Race</u>	1.00	0.06	0.03	-0.03	-0.01	.109*	0.00	-0.05	0.00	-.095*	0.04	0.06	0.03
2 <u>Education</u>	0.06	1.00	.253**	-0.06	.237**	-.211**	.112**	-0.06	-0.02	.350**	-0.06	-.128**	0.07
3 Maternal Employment	0.03	.253**	1.00	-0.03	.084*	-0.02	0.07	0.00	0.04	.099*	.101*	-.129**	-0.08
4 <u>Number of Children</u>	-0.03	-0.06	-0.03	1.00	0.02	0.04	.102*	-0.03	-.090*	-.219**	.092*	-0.01	-0.08
5 Family Affluence Score	-0.01	.237**	.084*	0.02	1.00	-.230**	.138**	-0.06	-.119**	0.07	0.07	-0.02	0.06
6 Food Security Risk Score	.109*	-.211**	-0.02	0.04	-.230**	1.00	-.218**	.228**	.288**	-.104*	-0.01	.110*	-.093*
7 <u>General Health</u>	0.00	.112**	0.07	.102*	.138**	-.218**	1.00	-.387**	-.303**	0.02	.235**	-0.05	0.08
8 Number of Days Health Not Good	-0.05	-0.06	0.00	-0.03	-0.06	.228**	-.387**	1.00	.539**	0.01	-.113**	0.03	-.087*
9 Depression Severity	0.00	-0.02	0.04	-.090*	-.119**	.288**	-.303**	.539**	1.00	-0.01	-0.03	0.02	0.02
10 Age at Birth of First Child	-.095*	.350**	.099*	-.219**	0.07	-.104*	0.02	0.01	-0.01	1.00	-.173**	-.113**	-0.01
11 Physical Activity (IPAQ Score)	0.04	-0.06	.101*	.092*	0.07	-0.01	.235**	-.113**	-0.03	-.173**	1.00	0.03	0.07
12 Screen time Hours	0.06	-.128**	-.129**	-0.01	-0.02	.110*	-0.05	0.03	0.02	-.113**	0.03	1.00	.159**
13 Sleep Hours	0.03	0.07	-0.08	-0.08	0.06	-.093*	0.08	-.087*	0.02	-0.01	0.07	.159**	1.00
14 <u>Sleep Quality</u>	.106*	.102*	0.01	-.094*	0.06	-.204**	.312**	-.304**	-.204**	0.05	.182**	-0.05	.311**
15 Fruit and Vegetable Servings	.136**	-0.03	.154**	0.05	0.04	-0.02	.257**	-.113**	-0.02	-.127**	.404**	0.07	0.06
16 Fiber	.137**	-0.02	.141**	0.06	0.04	-0.01	.282**	-.148**	-0.03	-.182**	.429**	0.05	0.08
17 Vitamin C	.132**	0.00	.153**	0.07	0.04	-0.01	.283**	-.143**	-0.03	-.140**	.422**	0.05	0.07
18 Magnesium	.135**	-0.01	.146**	0.06	0.04	-0.01	.283**	-.146**	-0.03	-.164**	.426**	0.05	0.07
19 Potassium	.134**	-0.01	.148**	0.06	0.04	-0.01	.283**	-.145**	-0.03	-.156**	.425**	0.05	0.07
20 Total Fat	.101*	-0.06	0.07	0.08	-0.02	.194**	0.01	0.01	.180**	-.108*	.168**	.162**	0.07
21 Saturated Fat	.101*	-0.06	0.07	0.08	-0.02	.194**	0.01	0.01	.180**	-.108*	.168**	.162**	0.07
22 Percent of Kcal from Fat	.101*	-0.06	0.07	0.08	-0.02	.194**	0.01	0.01	.180**	-.108*	.168**	.162**	0.07
23 Cholesterol	.112**	-0.06	0.07	0.08	-0.02	.195**	0.01	0.01	.179**	-.109*	.169**	.163**	0.07
24 Milk Servings	0.00	0.02	.092*	0.08	0.02	-0.01	.178**	-.097*	-0.04	-0.04	.186**	0.07	0.05
25 Fruit Juice Servings	.184**	-0.06	.101*	0.03	0.01	0.01	.184**	-0.06	-0.02	-.165**	.279**	0.08	0.07
26 Vegetable Juice Servings	.148**	-0.01	.166**	0.00	-0.04	0.02	.236**	-.165**	0.02	-.086*	.317**	0.05	0.08

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed). Variables included in the final regression model are underlined.

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	14	15	16	17	18	19	20	21	22	23	24	25
1 <u>Race</u>	.106*	.136**	.137**	.132**	.135**	.134**	.101*	.101*	.101*	.112**	0.00	.184**
2 <u>Education</u>	.102*	-0.03	-0.02	0.00	-0.01	-0.01	-0.06	-0.06	-0.06	-0.06	0.02	-0.06
3 Maternal Employment	0.01	.154**	.141**	.153**	.146**	.148**	0.07	0.07	0.07	0.07	.092*	.101*
4 Number of Children	-.094*	0.05	0.06	0.07	0.06	0.06	0.08	0.08	0.08	0.08	0.08	0.03
5 Family Affluence Score	0.06	0.04	0.04	0.04	0.04	0.04	-0.02	-0.02	-0.02	-0.02	0.02	0.01
6 Food Security Risk Score	-.204**	-0.02	-0.01	-0.01	-0.01	-0.01	.194**	.194**	.194**	.195**	-0.01	0.01
7 <u>General Health</u>	.312**	.257**	.282**	.283**	.283**	.283**	0.01	0.01	0.01	0.01	.178**	.184**
8 Number of Days Health Not Good	-.304**	-.113**	-.148**	-.143**	-.146**	-.145**	0.01	0.01	0.01	0.01	-.097*	-0.06
9 Depression Severity	-.204**	-0.02	-0.03	-0.03	-0.03	-0.03	.180**	.180**	.180**	.179**	-0.04	-0.02
10 Age at Birth of First Child	0.05	-.127**	-.182**	-.140**	-.164**	-.156**	-.108*	-.108*	-.108*	-.109*	-0.04	-.165**
11 Physical Activity (IPAQ Score)	.182**	.404**	.429**	.422**	.426**	.425**	.168**	.168**	.168**	.169**	.186**	.279**
12 Screen time Hours	-0.05	0.07	0.05	0.05	0.05	0.05	.162**	.162**	.162**	.163**	0.07	0.08
13 Sleep Hours	.311**	0.06	0.08	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.05	0.07
14 Sleep Quality	1.00	.147**	.165**	.165**	.165**	.165**	0.03	0.03	0.03	0.03	0.08	.104*
15 Fruit and Vegetable Servings	.147**	1.00	.958**	.963**	.961**	.962**	.338**	.338**	.338**	.340**	.480**	.771**
16 Fiber	.165**	.958**	1.00	.997**	.999**	.999**	.330**	.330**	.330**	.332**	.479**	.713**
17 Vitamin C	.165**	.963**	.997**	1.00	.999**	1.00**	.333**	.333**	.333**	.335**	.487**	.714**
18 Magnesium	.165**	.961**	.999**	.999**	1.00	1.00**	.331**	.331**	.331**	.333**	.483**	.714**
19 Potassium	.165**	.962**	.999**	1.000**	1.0**	1.00	.332**	.332**	.332**	.334**	.484**	.714**
20 Total Fat	0.03	.338**	.330**	.333**	.331**	.332**	1.00	1.00**	1.00**	1.00**	.237**	.310**
21 Saturated Fat	0.03	.338**	.330**	.333**	.331**	.332**	1.00**	1.00	1.00**	1.00**	.237**	.310**
22 Percent of Kcal from Fat	0.03	.338**	.330**	.333**	.331**	.332**	1.00**	1.0**	1.00	1.00**	.237**	.310**
23 Cholesterol	0.03	.340**	.332**	.335**	.333**	.334**	1.00**	1.00**	1.00**	1.00	.236**	.313**
24 Milk Servings	0.08	.480**	.479**	.487**	.483**	.484**	.237**	.237**	.237**	.236**	1.00	.530**
25 Fruit Juice Servings	.104*	.771**	.713**	.714**	.714**	.714**	.310**	.310**	.310**	.313**	.530**	1.00
26 Vegetable Juice Servings	.161**	.729**	.693**	.693**	.694**	.694**	.218**	.218**	.218**	.220**	.331**	.494**

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	26	27	28	29	30	31	32	33	34	35	36	37
1 Race	.148**	-0.04	.186**	.160**	.155**	.133**	.152**	.142**	0.00	0.02	0.00	-.096*
2 Education	-0.01	-.149**	-.134**	-0.08	-0.03	-.142**	-.133**	-.149**	-0.01	0.07	.134**	0.03
3 Maternal Employment	.166**	-0.05	0.04	0.02	0.02	0.00	0.01	0.01	0.00	0.01	0.03	-0.04
4 Number of Children	0.00	0.05	0.03	0.04	0.00	0.04	0.04	0.04	-0.03	-0.06	-0.01	0.01
5 Family Affluence Score	-0.04	-0.08	-0.06	-0.03	0.01	-0.06	-0.05	-0.06	-0.06	-0.05	.110**	.086*
6 Food Security Risk Score	0.02	.136**	.119**	.195**	0.06	.179**	.171**	.178**	.307**	.258**	0.05	-.161**
7 General Health	.236**	-.143**	0.02	0.04	0.03	-0.04	-0.03	-0.04	-.112**	-.264**	0.06	0.01
8 Number of Days Health Not Good	-.165**	.097*	0.02	-0.04	-0.04	0.03	0.02	0.03	.133**	.271**	-0.04	0.00
9 Depression Severity	0.02	.188**	.123**	.114**	0.08	.189**	.179**	.189**	.240**	.345**	-0.03	-.178**
10 Age at Birth of First Child	-.086*	-.165**	-.225**	-.132**	-0.07	-.205**	-.200**	-.218**	0.06	.115**	0.07	-0.02
11 Physical Activity (IPAQ Score)	.317**	-0.07	.131**	.120**	.161**	.098*	.119**	.103*	-0.02	-0.07	.133**	0.01
12 Screen time Hours	0.05	.156**	.173**	.118**	.101*	.195**	.191**	.201**	0.00	-0.02	-0.07	-0.04
13 Sleep Hours	0.08	-0.01	0.03	0.04	0.03	0.03	0.03	0.03	0.00	0.03	-0.02	0.03
14 Sleep Quality	.161**	-0.07	0.08	0.05	0.07	0.03	0.04	0.04	-.099*	-.135**	0.05	0.02
15 Fruit and Vegetable Servings	.729**	-0.06	.309**	.223**	.208**	.197**	.223**	.215**	-0.06	-.145**	.126**	0.06
16 Fiber	.693**	-0.07	.282**	.221**	.211**	.182**	.210**	.198**	-0.07	-.144**	.139**	0.06
17 Vitamin C	.693**	-0.08	.278**	.219**	.204**	.176**	.204**	.192**	-0.07	-.144**	.148**	0.07
18 Magnesium	.694**	-0.07	.280**	.220**	.208**	.180**	.208**	.196**	-0.07	-.144**	.143**	0.07
19 Potassium	.694**	-0.08	.279**	.220**	.207**	.179**	.206**	.195**	-0.07	-.144**	.145**	0.07
20 Total Fat	.218**	.322**	.477**	.328**	.285**	.488**	.488**	.507**	.199**	.116**	-.094*	-.116**
21 Saturated Fat	.218**	.322**	.477**	.328**	.285**	.488**	.488**	.507**	.199**	.116**	-.094*	-.116**
22 Percent of Kcal from Fat	.218**	.322**	.477**	.328**	.285**	.488**	.488**	.507**	.199**	.116**	-.094*	-.116**
23 Cholesterol	.220**	.320**	.480**	.329**	.288**	.489**	.489**	.508**	.198**	.115**	-.095*	-.117**
24 Milk Servings	.331**	-.089*	.176**	0.06	0.04	0.03	0.05	0.05	-0.07	-0.08	0.03	-0.03
25 Fruit Juice Servings	.494**	0.00	.373**	.197**	.198**	.230**	.252**	.256**	-0.07	-.138**	-0.01	0.04
26 Vegetable Juice Servings	1.00	-0.05	.250**	.245**	.186**	.186**	.208**	.198**	0.00	-.154**	0.08	-0.01

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	38	39	40	41	42	43	44	45	46	47	48	49
1 Race	0.01	.094*	0.07	0.03	-0.06	-0.01	0.00	0.04	-0.05	0.03	-0.03	-.092*
2 Education	-0.05	.142**	-0.04	0.02	0.07	-0.07	-0.04	-0.03	0.04	0.02	-0.01	0.02
3 Maternal Employment	-.105*	.186**	0.04	-0.05	0.04	0.00	-0.01	0.00	0.08	.125**	.086*	0.02
4 Number of Children	0.00	-0.01	0.00	.096*	0.04	-.094*	-0.08	0.01	-0.03	0.07	0.04	-0.03
5 Family Affluence Score	0.05	.107*	0.07	.168**	.169**	-0.04	-0.02	-0.07	-0.01	.103*	0.04	.110*
6 Food Security Risk Score	-.207**	-0.03	-.089*	-.333**	-.269**	.251**	.187**	0.07	.132**	-.194**	-.182**	-.185**
7 General Health	.256**	.166**	.209**	.280**	.210**	-.194**	-.179**	0.04	-.121**	.393**	.184**	.206**
8 Number of Days Health Not Good	-.245**	-0.07	-.251**	-.545**	-.226**	.192**	.161**	-0.02	.096*	-.256**	-.169**	-.137**
9 Depression Severity	-.305**	-.104*	-.204**	-.761**	-.228**	.238**	.198**	0.08	.195**	-.219**	-.183**	-.199**
10 Age at Birth of First Child	-.113**	-0.02	-.123**	-0.02	0.04	0.00	0.02	0.00	0.04	-.103*	-0.04	-0.01
11 Physical Activity (IPAQ Score)	.144**	.222**	.142**	0.04	.160**	0.00	0.01	0.05	-0.02	.536**	.284**	.201**
12 Screen time Hours	0.03	-0.02	-0.01	-0.05	-0.04	0.06	0.01	-0.01	0.05	-0.02	-0.01	-0.03
13 Sleep Hours	0.04	0.02	0.07	0.03	0.05	-0.01	0.00	0.03	0.08	0.03	0.00	0.05
14 Sleep Quality	.190**	.157**	.214**	.251**	.223**	-.092*	-.103*	0.03	0.01	.283**	.127**	.154**
15 Fruit and Vegetable Servings	.178**	.273**	.195**	.086*	.193**	0.03	0.05	0.05	0.00	.376**	.269**	.219**
16 Fiber	.186**	.287**	.218**	.096*	.196**	0.02	0.05	0.04	-0.02	.401**	.288**	.227**
17 Vitamin C	.184**	.288**	.212**	.097*	.201**	0.02	0.05	0.04	-0.02	.402**	.290**	.229**
18 Magnesium	.185**	.288**	.215**	.097*	.198**	0.02	0.05	0.04	-0.02	.402**	.289**	.228**
19 Potassium	.185**	.288**	.214**	.097*	.199**	0.02	0.05	0.04	-0.02	.402**	.289**	.228**
20 Total Fat	-.094*	.085*	.104*	-.105*	0.07	.093*	.099*	.178**	0.07	0.02	-0.06	-0.04
21 Saturated Fat	-.094*	.085*	.104*	-.105*	0.07	.093*	.099*	.178**	0.07	0.02	-0.06	-0.04
22 Percent of Kcal from Fat	-.094*	.085*	.104*	-.105*	0.07	.093*	.099*	.178**	0.07	0.02	-0.06	-0.04
23 Cholesterol	-.093*	.087*	.106*	-.103*	0.07	.092*	.099*	.178**	0.07	0.02	-0.06	-0.05
24 Milk Servings	.189**	.146**	.134**	0.07	.086*	0.06	0.04	0.08	-0.02	.201**	.176**	.128**
25 Fruit Juice Servings	.160**	.170**	.193**	.084*	.110**	0.07	0.07	0.07	-0.01	.226**	.130**	.106*
26 Vegetable Juice Servings	.138**	.209**	.209**	0.03	0.08	0.03	0.05	.114**	0.00	.246**	.165**	.131**

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	50	51	52	53	54	55	56	57	58	59	60	61
1 Race	-0.01	-0.01	-.084*	-.107*	0.00	0.07	-0.04	.096*	.138**	.131**	.205**	.145**
2 Education	0.04	-0.01	0.04	.130**	-0.04	0.08	.123**	-0.03	.094*	0.04	-0.06	0.01
3 Maternal Employment	0.05	-0.02	0.05	.100*	0.07	.103*	0.08	0.03	0.08	0.07	.106*	.133**
4 Number of Children	0.04	0.00	0.06	0.02	-0.08	0.06	-0.01	-0.01	-0.05	0.01	-0.01	-0.08
5 Family Affluence Score	.123**	0.08	0.06	0.03	0.00	0.02	0.04	0.00	-0.04	0.05	-0.06	0.03
6 Food Security Risk Score	-.167**	-0.07	-.143**	-.128**	0.00	0.00	-.151**	0.02	.115**	0.03	.096*	.086*
7 General Health	.304**	.170**	.292**	.135**	0.07	.159**	.271**	0.06	-0.04	.191**	.215**	.143**
8 Number of Days Health Not Good	-.185**	-0.06	-.148**	-.104*	0.03	-0.07	-.161**	-0.05	0.02	-.151**	-0.07	-.108*
9 Depression Severity	-.201**	-0.05	-.126**	-.116**	0.01	-0.02	-.192**	0.01	.170**	-0.06	0.07	0.07
10 Age at Birth of First Child	-.085*	-.098*	-0.07	.099*	0.02	-0.02	0.00	-0.08	.144**	-.122**	-.089*	-0.03
11 Physical Activity (IPAQ Score)	.358**	.453**	.505**	-0.07	0.05	.222**	.204**	.088*	0.03	.219**	.168**	.128**
12 Screen time Hours	-0.05	.105*	-0.04	-.175**	0.04	0.04	-0.06	0.00	0.03	0.01	.111**	0.06
13 Sleep Hours	0.05	.098*	0.03	-0.07	-0.01	.087*	0.00	0.07	.105*	.091*	0.08	.109*
14 Sleep Quality	.193**	.108*	.149**	0.03	0.03	.119**	.148**	0.04	.104*	.194**	.150**	.151**
15 Fruit and Vegetable Servings	.311**	.366**	.343**	-0.03	0.08	.319**	.382**	0.07	0.01	.281**	.197**	.163**
16 Fiber	.326**	.373**	.370**	-0.01	0.06	.318**	.385**	0.08	0.02	.305**	.211**	.173**
17 Vitamin C	.327**	.370**	.368**	-0.01	0.07	.327**	.390**	0.07	0.02	.296**	.206**	.160**
18 Magnesium	.327**	.372**	.369**	-0.01	0.06	.322**	.387**	0.08	0.02	.302**	.209**	.168**
19 Potassium	.327**	.372**	.369**	-0.01	0.06	.324**	.388**	0.08	0.02	.300**	.208**	.165**
20 Total Fat	0.01	.136**	0.02	-.183**	.089*	.135**	-.112**	0.01	.145**	0.04	.178**	.221**
21 Saturated Fat	0.01	.136**	0.02	-.183**	.089*	.135**	-.112**	0.01	.145**	0.04	.178**	.221**
22 Percent of Kcal from Fat	0.01	.136**	0.02	-.183**	.089*	.135**	-.112**	0.01	.145**	0.04	.178**	.221**
23 Cholesterol	0.01	.135**	0.02	-.185**	.089*	.136**	-.112**	0.02	.148**	0.05	.183**	.223**
24 Milk Servings	.215**	.213**	.161**	-0.04	0.07	.226**	.204**	-0.05	-0.05	.167**	.158**	.106*
25 Fruit Juice Servings	.210**	.229**	.192**	-0.07	0.06	.234**	.197**	0.05	0.00	.216**	.244**	.148**
26 Vegetable Juice Servings	.186**	.188**	.204**	-0.05	.105*	.284**	.241**	0.06	0.08	.274**	.233**	.212**

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	62	63	64	65	66	67	68	69	70	71	72	73
1 Race	.090*	-.091*	-.084*	-0.03	.274**	.127**	-.114**	.159**	0.00	-0.04	-.140**	.087*
2 Education	0.04	-0.05	-0.08	-0.08	0.01	-.092*	.106*	0.05	0.08	-.213**	-0.03	0.04
3 Maternal Employment	0.08	-.158**	-.150**	-0.08	0.07	0.00	-0.05	0.07	0.06	-.198**	-.151**	0.08
4 Number of Children	-0.08	0.02	0.01	-.096*	-0.06	-.198**	.241**	-0.02	0.04	0.01	-0.01	.118**
5 Family Affluence Score	0.04	0.05	0.06	.087*	0.04	-.132**	.105*	-0.01	.109*	0.03	0.03	-.096*
6 Food Security Risk Score	0.06	-.091*	-.167**	-.175**	.133**	.213**	-.201**	.170**	-.095*	-.164**	-.226**	.242**
7 General Health	0.06	.152**	.153**	0.05	0.04	-.150**	.167**	.109*	.161**	.161**	0.02	-.202**
8 Number of Days Health Not Good	-0.03	-.086*	-.116**	-.112**	-.089*	.173**	-.164**	-0.04	-.114**	-.151**	-0.01	.206**
9 Depression Severity	.124**	-.168**	-.247**	-.243**	.155**	.265**	-.203**	.191**	-.148**	-.238**	-.277**	.337**
10 Age at Birth of First Child	-0.03	0.00	-0.06	-0.07	-0.08	-0.04	0.05	-0.02	0.02	-.161**	0.03	0.02
11 Physical Activity (IPAQ Score)	0.07	.177**	.087*	0.05	.212**	0.01	.152**	.259**	.196**	.106*	-.130**	-0.05
12 Screen time Hours	0.04	0.00	-0.06	0.01	.164**	.224**	-.183**	.110*	-0.01	0.05	0.02	-0.05
13 Sleep Hours	.103*	.085*	-0.04	0.00	.101*	0.04	0.04	.106*	0.05	-0.02	-.101*	-0.05
14 Sleep Quality	.104*	.133**	.110**	.110**	.148**	-0.08	.129**	.137**	.216**	.120**	-.132**	-.174**
15 Fruit and Vegetable Servings	.125**	.204**	0.06	0.08	.299**	0.03	0.08	.345**	.285**	.088*	-.155**	-.170**
16 Fiber	.138**	.224**	0.07	0.07	.320**	0.02	.118**	.356**	.296**	.088*	-.174**	-.175**
17 Vitamin C	.127**	.217**	0.06	0.06	.317**	0.02	.124**	.356**	.302**	0.08	-.175**	-.170**
18 Magnesium	.133**	.221**	0.06	0.07	.319**	0.02	.121**	.357**	.299**	.086*	-.175**	-.173**
19 Potassium	.131**	.220**	0.06	0.07	.319**	0.02	.122**	.357**	.300**	.085*	-.175**	-.172**
20 Total Fat	.139**	0.03	-.124**	-.128**	.391**	.197**	-0.04	.316**	0.02	-.101*	-.290**	0.08
21 Saturated Fat	.139**	0.03	-.124**	-.128**	.391**	.197**	-0.04	.316**	0.02	-.101*	-.290**	0.08
22 Percent of Kcal from Fat	.139**	0.03	-.124**	-.128**	.391**	.197**	-0.04	.316**	0.02	-.101*	-.290**	0.08
23 Cholesterol	.139**	0.03	-.124**	-.127**	.396**	.199**	-0.05	.318**	0.02	-.101*	-.291**	0.08
24 Milk Servings	.131**	.144**	.096*	0.01	.107*	-0.02	.127**	.124**	.282**	.111**	-0.07	-.139**
25 Fruit Juice Servings	.094*	.131**	0.07	0.07	.217**	0.05	0.01	.211**	.211**	0.07	-.084*	-0.07
26 Vegetable Juice Servings	.157**	.105*	0.00	0.02	.321**	0.03	0.04	.370**	.149**	0.02	-.215**	-.096*

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	74	75	76	77	78	79	80	81	82	83	84	85
1 Race	0.01	-0.01	-0.05	-.151**	0.03	0.03	.221**	.090*	.129**	.131**	.118**	.136**
2 Education	0.00	0.00	-0.01	0.04	.172**	0.04	-.090*	-0.07	0.00	-0.03	-0.04	0.04
3 Maternal Employment	0.07	-0.02	0.00	0.02	.131**	0.07	.110**	0.06	.106*	.143**	.127**	.100*
4 Number of Children	.240**	0.06	-.101*	.213**	-0.03	.263**	0.03	.150**	0.08	.164**	.145**	0.01
5 Family Affluence Score	-0.08	.086*	0.00	.260**	.154**	.372**	0.04	-0.04	0.00	0.03	0.03	.110**
6 Food Security Risk Score	.247**	-0.03	-0.06	-.232**	-.272**	-.114**	.157**	.095*	.106*	.101*	.126**	-0.03
7 General Health	-0.06	.123**	0.03	.183**	.187**	-0.01	0.01	0.07	.091*	.103*	0.05	0.00
8 Number of Days Health Not Good	.149**	-0.08	-0.03	-0.07	-.137**	0.00	0.01	0.05	-0.06	-0.07	-0.04	-0.02
9 Depression Severity	.253**	-.113**	-0.06	-.112**	-.213**	-0.08	.125**	.114**	.085*	0.00	0.04	0.00
10 Age at Birth of First Child	0.03	-0.05	0.00	-.122**	0.00	-.149**	-.224**	-.128**	-0.06	-.159**	-.121**	-0.05
11 Physical Activity (IPAQ Score)	0.00	.171**	0.03	.224**	.168**	0.07	.171**	.158**	.160**	.232**	.199**	.123**
12 Screen time Hours	0.00	0.02	-0.07	0.00	-0.05	.088*	.120**	0.06	0.01	0.08	0.07	0.01
13 Sleep Hours	-.104*	0.07	-0.02	0.03	0.08	0.01	0.01	0.03	0.07	0.02	0.03	0.03
14 Sleep Quality	-.196**	.099*	0.02	0.06	.227**	0.00	0.07	0.02	0.04	0.08	0.08	0.07
15 Fruit and Vegetable Servings	-0.07	.134**	.159**	.244**	.142**	0.02	.175**	.160**	.181**	.222**	.167**	0.03
16 Fiber	-0.06	.152**	.150**	.249**	.172**	0.01	.185**	.155**	.180**	.227**	.175**	0.02
17 Vitamin C	-0.05	.151**	.147**	.250**	.176**	0.02	.181**	.154**	.184**	.228**	.179**	0.02
18 Magnesium	-0.06	.152**	.149**	.249**	.174**	0.01	.184**	.155**	.182**	.228**	.177**	0.02
19 Potassium	-0.05	.152**	.148**	.250**	.175**	0.01	.183**	.154**	.182**	.228**	.178**	0.02
20 Total Fat	.137**	0.05	0.02	0.08	0.05	.114**	.336**	.222**	.160**	.197**	.230**	.098*
21 Saturated Fat	.137**	0.05	0.02	0.08	0.05	.114**	.336**	.222**	.160**	.197**	.230**	.098*
22 Percent of Kcal from Fat	.137**	0.05	0.02	0.08	0.05	.114**	.336**	.222**	.160**	.197**	.230**	.098*
23 Cholesterol	.135**	0.05	0.01	0.07	0.05	.115**	.340**	.226**	.164**	.200**	.233**	.102*
24 Milk Servings	0.00	0.07	.144**	.163**	0.08	-0.01	.144**	.095*	.117**	.148**	.118**	0.04
25 Fruit Juice Servings	-0.05	.098*	.091*	.110*	0.08	0.01	.189**	.131**	.166**	.166**	.120**	0.08
26 Vegetable Juice Servings	-.087*	0.05	.086*	.102*	0.07	0.04	.191**	.142**	.179**	.231**	.185**	0.02

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	86	87	88	89	90	91	92	93	94	95	96	97
1 Race	-0.02	-0.03	0.03	-0.04	-.096*	0.06	0.02	0.01	0.00	0.01	0.00	.194**
2 Education	-0.07	-.129**	-.084*	0.06	.109*	-0.01	0.05	0.05	0.06	0.05	0.06	0.04
3 Maternal Employment	-0.04	-.095*	-0.01	0.04	-0.03	0.01	0.08	0.07	0.08	0.07	0.07	0.05
4 Number of Children	0.03	0.00	0.01	0.05	-0.03	-.118**	-0.02	-0.01	-0.01	-0.01	-0.01	-0.07
5 Family Affluence Score	0.02	-0.03	0.02	0.06	0.06	0.01	.133**	.139**	.142**	.141**	.141**	0.02
6 Food Security Risk Score	.121**	.124**	.085*	0.06	-0.03	0.05	-.370**	-.365**	-.368**	-.366**	-.367**	-0.05
7 General Health	-.156**	-.153**	-.135**	-0.06	.087*	.100*	.224**	.231**	.231**	.231**	.231**	.110**
8 Number of Days Health Not Good	.128**	.123**	.103*	0.06	-0.04	-.090*	-.143**	-.159**	-.155**	-.157**	-.157**	-0.03
9 Depression Severity	.101*	.150**	0.06	0.00	-0.03	-0.05	-.129**	-.149**	-.149**	-.149**	-.149**	.135**
10 Age at Birth of First Child	-.085*	-0.08	-0.07	-0.04	0.08	-0.04	-0.02	-0.04	-0.02	-0.03	-0.03	-0.05
11 Physical Activity (IPAQ Score)	-0.04	-.100*	0.01	0.01	0.00	0.04	.239**	.264**	.257**	.261**	.260**	.160**
12 Screen time Hours	.138**	.131**	.086*	.094*	-0.06	0.07	0.02	0.02	0.01	0.02	0.02	0.06
13 Sleep Hours	0.06	0.04	0.03	0.07	0.08	-0.01	.085*	.103*	.099*	.101*	.101*	.094*
14 Sleep Quality	-.114**	-.131**	-0.08	-0.04	.090*	.109*	.177**	.194**	.194**	.194**	.194**	.141**
15 Fruit and Vegetable Servings	-.108*	-.157**	-0.06	-0.01	.123**	.164**	.506**	.491**	.489**	.490**	.490**	.217**
16 Fiber	-.122**	-.177**	-0.08	0.00	.142**	.178**	.493**	.515**	.508**	.512**	.511**	.199**
17 Vitamin C	-.125**	-.182**	-0.08	0.00	.142**	.174**	.498**	.516**	.512**	.514**	.514**	.198**
18 Magnesium	-.124**	-.179**	-0.08	0.00	.142**	.176**	.496**	.516**	.510**	.514**	.513**	.199**
19 Potassium	-.124**	-.180**	-0.08	0.00	.142**	.175**	.497**	.516**	.511**	.514**	.513**	.199**
20 Total Fat	0.07	0.06	0.03	0.06	-.097*	-0.04	.103*	0.08	0.08	0.08	0.08	.410**
21 Saturated Fat	0.07	0.06	0.03	0.06	-.097*	-0.04	.103*	0.08	0.08	0.08	0.08	.410**
22 Percent of Kcal from Fat	0.07	0.06	0.03	0.06	-.097*	-0.04	.103*	0.08	0.08	0.08	0.08	.410**
23 Cholesterol	0.07	0.06	0.03	0.06	-.100*	-0.04	.103*	0.08	0.08	0.08	0.08	.412**
24 Milk Servings	-0.06	-0.08	-.094*	0.04	.099*	0.04	.225**	.226**	.228**	.227**	.227**	.131**
25 Fruit Juice Servings	-0.04	-0.05	-0.03	0.00	0.02	.111**	.355**	.333**	.330**	.332**	.331**	.195**
26 Vegetable Juice Servings	-.085*	-.124**	-0.05	-0.01	.091*	.152**	.323**	.290**	.287**	.289**	.288**	.218**

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).



**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	98	99	100	101	102	103	104	105	106	107	108	109
1 Race	.199**	.204**	.206**	.202**	-0.01	0.07	-0.04	-0.07	0.04	.161**	0.03	.138**
2 Education	0.04	0.02	0.03	0.03	0.01	-0.06	0.02	0.02	-0.06	-0.05	-.122**	-.100*
3 Maternal Employment	0.04	0.04	0.04	0.04	0.02	0.02	.097*	-0.07	0.00	.145**	-0.04	0.03
4 Number of Children	-0.07	-0.07	-0.07	-0.07	0.02	0.01	0.04	0.02	0.00	-0.01	-0.07	0.04
5 Family Affluence Score	0.01	-0.01	-0.01	0.01	.102*	0.03	.124**	.087*	0.04	0.01	-0.03	0.00
6 Food Security Risk Score	-0.04	-0.03	-0.03	-0.04	-.157**	-0.08	-.250**	-.214**	-.201**	-.123**	0.01	0.04
7 General Health	.123**	.149**	.142**	.125**	.113**	0.03	.134**	0.03	0.07	.186**	-0.07	0.02
8 Number of Days Health Not Good	-0.04	-0.06	-0.06	-0.04	-0.06	-0.03	-0.04	0.00	-0.05	-.159**	0.03	-0.02
9 Depression Severity	.128**	.107*	.116**	.129**	-0.06	0.04	-0.03	-.132**	-.098*	-0.04	.116**	.085*
10 Age at Birth of First Child	-0.06	-0.07	-0.07	-0.07	0.01	-0.06	-0.01	0.04	-.103*	-.125**	-.113**	-.161**
11 Physical Activity (IPAQ Score)	.181**	.198**	.189**	.181**	.158**	0.07	.195**	-0.04	0.06	.231**	-0.02	0.06
12 Screen time Hours	0.07	0.08	0.07	0.06	0.02	0.03	0.08	0.03	0.02	0.02	.122**	.121**
13 Sleep Hours	.097*	.106*	.106*	.100*	.085*	0.04	0.07	0.01	0.01	0.06	0.06	0.06
14 Sleep Quality	.146**	.153**	.155**	.151**	.105*	0.08	0.07	0.04	.104*	.150**	0.00	0.07
15 Fruit and Vegetable Servings	.248**	.284**	.269**	.250**	.296**	0.03	.210**	0.02	.264**	.531**	-0.01	.163**
16 Fiber	.233**	.270**	.253**	.234**	.337**	0.02	.214**	0.02	.249**	.514**	-0.03	.135**
17 Vitamin C	.232**	.269**	.253**	.233**	.345**	0.02	.217**	0.02	.246**	.513**	-0.03	.133**
18 Magnesium	.232**	.270**	.253**	.234**	.341**	0.02	.216**	0.02	.248**	.514**	-0.03	.134**
19 Potassium	.232**	.270**	.253**	.233**	.342**	0.02	.216**	0.02	.248**	.514**	-0.03	.134**
20 Total Fat	.424**	.414**	.415**	.422**	.099*	.222**	0.07	0.00	.109*	.167**	.256**	.350**
21 Saturated Fat	.424**	.414**	.415**	.422**	.099*	.222**	0.07	0.00	.109*	.167**	.256**	.350**
22 Percent of Kcal from Fat	.424**	.414**	.415**	.422**	.099*	.222**	0.07	0.00	.109*	.167**	.256**	.350**
23 Cholesterol	.426**	.415**	.417**	.423**	.098*	.223**	0.07	0.00	.110*	.170**	.255**	.351**
24 Milk Servings	.152**	.172**	.161**	.151**	.200**	0.03	.108*	.171**	.147**	.265**	-0.04	.096*
25 Fruit Juice Servings	.225**	.261**	.246**	.228**	.199**	0.07	.133**	0.05	.364**	.393**	0.06	.219**
26 Vegetable Juice Servings	.243**	.280**	.269**	.247**	.124**	0.04	.152**	-0.08	.145**	.622**	0.03	.149**

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	110	111	112	113	114	115	116	117	118	119	120
1 Race	.186**	.200**	.160**	.165**	0.01	.133**	-0.07	.086*	-0.02	-0.05	0.05
2 Education	-0.04	-0.02	-.096*	-.086*	0.04	-0.03	-0.06	-0.06	-0.05	0.08	-0.05
3 Maternal Employment	0.01	0.00	-0.01	-0.01	.096*	0.03	0.06	0.03	-0.08	0.07	0.05
4 Number of Children	-0.08	-0.03	-0.04	-0.04	0.07	0.05	.091*	0.03	0.01	-.110**	-0.02
5 Family Affluence Score	-0.02	0.02	0.01	0.01	0.07	0.01	0.06	0.07	-0.05	0.02	.085*
6 Food Security Risk Score	0.08	-0.04	-0.03	-0.04	0.03	.095*	0.00	.106*	.214**	-0.01	0.04
7 General Health	.148**	.122**	0.07	.084*	.131**	0.04	.090*	0.00	-.482**	-0.05	-.113**
8 Number of Days Health Not Good	-.120**	-.092*	-0.06	-0.07	-0.01	-0.02	0.00	.094*	.341**	-0.01	.097*
9 Depression Severity	.130**	.134**	.124**	.116**	0.01	.110**	-0.04	.125**	.260**	0.04	0.04
10 Age at Birth of First Child	-.143**	-0.08	-.153**	-.147**	-.119**	-0.08	-.131**	-0.06	-0.02	.101*	-0.05
11 Physical Activity (IPAQ Score)	.202**	.177**	.124**	.132**	.195**	.133**	.207**	0.08	-.169**	-0.03	-0.04
12 Screen time Hours	0.05	0.01	.102*	.096*	0.05	0.07	0.06	0.02	0.05	-0.04	0.03
13 Sleep Hours	.164**	.135**	.132**	.134**	0.06	0.07	0.02	.093*	-0.07	0.07	-0.05
14 Sleep Quality	.157**	.162**	.131**	.142**	0.08	.107*	0.06	0.07	-.255**	0.00	-0.05
15 Fruit and Vegetable Servings	.352**	.287**	.258**	.276**	.274**	.171**	.209**	0.08	-.178**	-0.06	-0.02
16 Fiber	.355**	.285**	.243**	.261**	.286**	.168**	.212**	0.06	-.194**	-.086*	-0.02
17 Vitamin C	.349**	.280**	.237**	.255**	.285**	.169**	.209**	0.06	-.190**	-0.08	-0.02
18 Magnesium	.353**	.283**	.241**	.259**	.286**	.168**	.211**	0.06	-.192**	-0.08	-0.02
19 Potassium	.352**	.282**	.239**	.258**	.286**	.169**	.210**	0.06	-.192**	-0.08	-0.02
20 Total Fat	.308**	.292**	.385**	.383**	.159**	.304**	.113**	.237**	0.02	0.01	-0.03
21 Saturated Fat	.308**	.292**	.385**	.383**	.159**	.304**	.113**	.237**	0.02	0.01	-0.03
22 Percent of Kcal from Fat	.308**	.292**	.385**	.383**	.159**	.304**	.113**	.237**	0.02	0.01	-0.03
23 Cholesterol	.311**	.295**	.387**	.385**	.161**	.307**	.112**	.239**	0.02	0.01	-0.03
24 Milk Servings	.171**	.145**	.139**	.160**	.153**	.176**	.178**	.113**	-.085*	0.01	0.00
25 Fruit Juice Servings	.294**	.323**	.310**	.326**	.206**	.189**	.217**	.120**	-.103*	-0.03	-0.04
26 Vegetable Juice Servings	.394**	.232**	.240**	.246**	.227**	.183**	0.06	0.07	-.192**	-0.01	-0.05

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550)**

Characteristics	1	2	3	4	5	6	7	8	9	10	11	12	13
<b>27</b> Soft Drink Servings	-0.04	-.149**	-0.05	0.05	-0.08	.136**	-.143**	.097*	.188**	-.165**	-0.07	.156**	-0.01
<b>28</b> Fruit Drink Servings	.186**	-.134**	0.04	0.03	-0.06	.119**	0.02	0.02	.123**	-.225**	.131**	.173**	0.03
<b>29</b> Energy Drink Servings	.160**	-0.08	0.02	0.04	-0.03	.195**	0.04	-0.04	.114**	-.132**	.120**	.118**	0.04
<b>30</b> Sugar-Sweetened Coffee Drink Servings	.155**	-0.03	0.02	0.00	0.01	0.06	0.03	-0.04	0.08	-0.07	.161**	.101*	0.03
<b>31</b> Grams of Sugar from Sugar-Sweetened Beverages	.133**	-.142**	0.00	0.04	-0.06	.179**	-0.04	0.03	.189**	-.205**	.098*	.195**	0.03
<b>32</b> Energy from Sugar-Sweetened Beverages	.152**	-.133**	0.01	0.04	-0.05	.171**	-0.03	0.02	.179**	-.200**	.119**	.191**	0.03
<b>33</b> Sugar-Sweetened Beverage Servings	.142**	-.149**	0.01	0.04	-0.06	.178**	-0.04	0.03	.189**	-.218**	.103*	.201**	0.03
<b>34</b> Disinhibited Eating	0.00	-0.01	0.00	-0.03	-0.06	.307**	-.112**	.133**	.240**	0.06	-0.02	0.00	0.00
<b>35</b> Emotional Eating	0.02	0.07	0.01	-0.06	-0.05	.258**	-.264**	.271**	.345**	.115**	-0.07	-0.02	0.03
<b>36</b> Dietary Restraint	0.00	.134**	0.03	-0.01	.110**	0.05	0.06	-0.04	-0.03	0.07	.133**	-0.07	-0.02
<b>37</b> Adventurous Eating	-.096*	0.03	-0.04	0.01	.086*	-.161**	0.01	0.00	-.178**	-0.02	0.01	-0.04	0.03
<b>38</b> Self Effectiveness	0.01	-0.05	-.105*	0.00	0.05	-.207**	.256**	-.245**	-.305**	-.113**	.144**	0.03	0.04
<b>39</b> Need for Cognition	.094*	.142**	.186**	-0.01	.107*	-0.03	.166**	-0.07	-.104*	-0.02	.222**	-0.02	0.02
<b>40</b> Parenting Self-Efficacy	0.07	-0.04	0.04	0.00	0.07	-.089*	.209**	-.251**	-.204**	-.123**	.142**	-0.01	0.07
<b>41</b> Stress Management	0.03	0.02	-0.05	.096*	.168**	-.333**	.280**	-.545**	-.761**	-0.02	0.04	-0.05	0.03
<b>42</b> Stress Management Self-Efficacy	-0.06	0.07	0.04	0.04	.169**	-.269**	.210**	-.226**	-.228**	0.04	.160**	-0.04	0.05
<b>43</b> Perception of Weight Teasing History	-0.01	-0.07	0.00	-.094*	-0.04	.251**	-.194**	.192**	.238**	0.00	0.00	0.06	-0.01
<b>44</b> Effect of Weight Teasing	0.00	-0.04	-0.01	-0.08	-0.02	.187**	-.179**	.161**	.198**	0.02	0.01	0.01	0.00
<b>45</b> Chubby Kids are Healthy	0.04	-0.03	0.00	0.01	-0.07	0.07	0.04	-0.02	0.08	0.00	0.05	-0.01	0.03

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed). Variables included in the final regression model are underlined.

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	14	15	16	17	18	19	20	21	22	23	24	25
27 Soft Drink Servings	-0.07	-0.06	-0.07	-0.08	-0.07	-0.08	.322**	.322**	.322**	.320**	-.089*	0.00
28 Fruit Drink Servings	0.08	.309**	.282**	.278**	.280**	.279**	.477**	.477**	.477**	.480**	.176**	.373**
29 Energy Drink Servings	0.05	.223**	.221**	.219**	.220**	.220**	.328**	.328**	.328**	.329**	0.06	.197**
30 Sugar-Sweetened Coffee Drink Servings	0.07	.208**	.211**	.204**	.208**	.207**	.285**	.285**	.285**	.288**	0.04	.198**
31 Grams of Sugar from Sugar-Sweetened Beverages	0.03	.197**	.182**	.176**	.180**	.179**	.488**	.488**	.488**	.489**	0.03	.230**
32 Energy from Sugar-Sweetened Beverages	0.04	.223**	.210**	.204**	.208**	.206**	.488**	.488**	.488**	.489**	0.05	.252**
33 Sugar-Sweetened Beverage Servings	0.04	.215**	.198**	.192**	.196**	.195**	.507**	.507**	.507**	.508**	0.05	.256**
34 Disinhibited Eating	-.099*	-0.06	-0.07	-0.07	-0.07	-0.07	.199**	.199**	.199**	.198**	-0.07	-0.07
35 Emotional Eating	-.135**	-.145**	-.144**	-.144**	-.144**	-.144**	.116**	.116**	.116**	.115**	-0.08	-.138**
36 Dietary Restraint	0.05	.126**	.139**	.148**	.143**	.145**	-.094*	-.094*	-.094*	-.095*	0.03	-0.01
37 Adventurous Eating	0.02	0.06	0.06	0.07	0.07	0.07	-.116**	-.116**	-.116**	-.117**	-0.03	0.04
38 Self Effectiveness	.190**	.178**	.186**	.184**	.185**	.185**	-.094*	-.094*	-.094*	-.093*	.189**	.160**
39 Need for Cognition	.157**	.273**	.287**	.288**	.288**	.288**	.085*	.085*	.085*	.087*	.146**	.170**
40 Parenting Self-Efficacy	.214**	.195**	.218**	.212**	.215**	.214**	.104*	.104*	.104*	.106*	.134**	.193**
41 Stress Management	.251**	.086*	.096*	.097*	.097*	.097*	-.105*	-.105*	-.105*	-.103*	0.07	.084*
42 Stress Management Self-Efficacy	.223**	.193**	.196**	.201**	.198**	.199**	0.07	0.07	0.07	0.07	.086*	.110**
43 Perception of Weight Teasing History	-.092*	0.03	0.02	0.02	0.02	0.02	.093*	.093*	.093*	.092*	0.06	0.07
44 Effect of Weight Teasing	-.103*	0.05	0.05	0.05	0.05	0.05	.099*	.099*	.099*	.099*	0.04	0.07
45 Chubby Kids are Healthy	0.03	0.05	0.04	0.04	0.04	0.04	.178**	.178**	.178**	.178**	0.08	0.07

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	26	27	28	29	30	31	32	33	34	35	36	37
27 Soft Drink Servings	-0.05	1.00	.356**	.225**	-0.07	.735**	.662**	.728**	0.06	0.02	-.149**	-0.04
28 Fruit Drink Servings	.250**	.356**	1.00	.304**	.282**	.659**	.674**	.735**	0.07	0.08	-.130**	-.128**
29 Energy Drink Servings	.245**	.225**	.304**	1.00	.221**	.640**	.647**	.612**	.142**	0.04	0.01	-.086*
30 Sugar-Sweetened Coffee Drink Servings	.186**	.209**	.373**	.384**	.211**	.708**	.770**	.677**	0.08	0.07	0.05	-0.08
31 Grams of Sugar from Sugar-Sweetened Beverages	.186**	.735**	.659**	.640**	.182**	1.00	.994**	.994**	.121**	0.07	-0.08	-.111**
32 Energy from Sugar-Sweetened Beverages	.208**	.662**	.674**	.647**	.210**	.994**	1.00	.988**	.121**	0.08	-0.07	-.115**
33 Sugar-Sweetened Beverage Servings	.198**	.728**	.735**	.612**	.198**	.994**	.988**	1.00	.118**	0.08	-.098*	-.117**
34 Disinhibited Eating	0.00	0.06	0.07	.142**	-0.07	.121**	.121**	.118**	1.00	.617**	.147**	-.260**
35 Emotional Eating	-.154**	0.02	0.08	0.04	-.144**	0.07	0.08	0.08	.617**	1.00	.220**	-.215**
36 Dietary Restraint	0.08	-.149**	-.130**	0.01	.139**	-0.08	-0.07	-.098*	.147**	.220**	1.00	-0.03
37 Adventurous Eating	-0.01	-0.04	-.128**	-.086*	0.06	-.111**	-.115**	-.117**	-.260**	-.215**	-0.03	1.00
38 Self Effectiveness	.138**	-0.04	-0.01	-.110**	.186**	-0.07	-0.07	-0.06	-.227**	-.297**	0.03	.120**
39 Need for Cognition	.209**	-0.05	.155**	0.05	.287**	0.06	0.07	0.07	-.121**	-0.06	.159**	0.08
40 Parenting Self-Efficacy	.209**	0.04	.139**	.091*	.218**	.136**	.145**	.140**	-0.07	-.153**	-0.04	0.01
41 Stress Management	0.03	-.171**	-.096*	-.095*	.096*	-.155**	-.143**	-.155**	-.239**	-.312**	0.05	.098*
42 Stress Management Self-Efficacy	0.08	-0.08	-0.02	-0.07	.196**	-0.06	-0.05	-0.06	-.117**	-.156**	0.05	.111**
43 Perception of Weight Teasing History	0.03	.120**	.132**	.115**	0.02	.131**	.123**	.138**	.193**	.291**	.129**	0.02
44 Effect of Weight Teasing	0.05	0.04	.104*	0.06	0.05	0.08	.085*	.090*	.155**	.277**	.151**	0.01
45 Chubby Kids are Healthy	.114**	0.03	.127**	.170**	0.04	.144**	.151**	.146**	.180**	.099*	0.00	-.162**

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	38	39	40	41	42	43	44	45	46	47	48	49
27 Soft Drink Servings	-0.04	-0.05	0.04	-.171**	-0.08	.120**	0.04	0.03	0.07	-.170**	-.142**	-.130**
28 Fruit Drink Servings	-0.01	.155**	.139**	-.096*	-0.02	.132**	.104*	.127**	.124**	-0.03	-.133**	-.150**
29 Energy Drink Servings	-.110**	0.05	.091*	-.095*	-0.07	.115**	0.06	.170**	0.03	0.08	-0.02	-0.05
Sugar-Sweetened												
30 Coffee Drink Servings	-0.04	0.08	.139**	-0.04	0.02	0.01	0.04	.114**	-0.04	0.04	-0.02	0.01
Grams of Sugar from												
31 Sugar-Sweetened Beverages	-0.07	0.06	.136**	-.155**	-0.06	.131**	0.08	.144**	0.06	-0.05	-.116**	-.110*
Energy from Sugar-												
32 Sweetened Beverages	-0.07	0.07	.145**	-.143**	-0.05	.123**	.085*	.151**	0.05	-0.03	-.107*	-.099*
Sugar-Sweetened												
33 Beverage Servings	-0.06	0.07	.140**	-.155**	-0.06	.138**	.090*	.146**	0.07	-0.05	-.126**	-.123**
34 Disinhibited Eating	-.227**	-.121**	-0.07	-.239**	-.117**	.193**	.155**	.180**	.208**	-.186**	-.191**	-.188**
35 Emotional Eating	-.297**	-0.06	-.153**	-.312**	-.156**	.291**	.277**	.099*	.329**	-.211**	-.150**	-.194**
36 Dietary Restraint	0.03	.159**	-0.04	0.05	0.05	.129**	.151**	0.00	.160**	.297**	.208**	.164**
37 Adventurous Eating	.120**	0.08	0.01	.098*	.111**	0.02	0.01	-.162**	-0.08	.129**	.144**	.211**
38 Self Effectiveness	1.00	.118**	.352**	.323**	.139**	-0.06	-0.07	-0.06	-.174**	.276**	.201**	.259**
39 Need for Cognition	.118**	1.00	.174**	.143**	.110**	0.06	0.05	0.00	0.04	.247**	.194**	.210**
Parenting Self-												
40 Efficacy	.352**	.174**	1.00	.265**	.129**	-0.04	-0.06	.110**	-.151**	.187**	.188**	.277**
41 Stress Management	.323**	.143**	.265**	1.00	.262**	-.227**	-.210**	-0.04	-.191**	.238**	.196**	.247**
42 Stress Management	.139**	.110**	.129**	.262**	1.00	-.109*	-.085*	0.03	-0.04	.192**	.187**	.228**
Self-Efficacy												
43 Perception of Weight	-0.06	0.06	-0.04	-.227**	-.109*	1.00	.839**	0.04	.368**	-.094*	-0.05	-.098*
Teasing History												
44 Effect of Weight	-0.07	0.05	-0.06	-.210**	-.085*	.839**	1.00	0.02	.361**	-0.07	-0.02	-0.05
Teasing												
45 Chubby Kids are	-0.06	0.00	.110**	-0.04	0.03	0.04	0.02	1.00	-0.01	-0.02	-0.01	0.02
Healthy												

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	50	51	52	53	54	55	56	57	58	59	60	61
27 Soft Drink Servings	-.158**	-0.03	-.132**	-.166**	.101*	-0.03	-.323**	-0.07	0.04	-.147**	0.01	0.06
28 Fruit Drink Servings	-0.07	.084*	-0.03	-.205**	0.08	.103*	-.154**	-0.04	.099*	0.00	.173**	.145**
29 Energy Drink Servings	-0.02	.115**	0.07	-0.06	0.08	.154**	-0.01	0.04	.158**	.152**	.210**	.234**
30 Sugar-Sweetened Coffee Drink Servings	-0.02	.096*	0.03	-.088*	0.04	0.05	-0.05	0.06	.160**	.101*	.164**	.216**
31 Grams of Sugar from Sugar-Sweetened Beverages	-.108*	0.08	-0.04	-.186**	.110*	0.08	-.219**	-0.01	.155**	0.01	.176**	.219**
32 Energy from Sugar-Sweetened Beverages	-.096*	.088*	-0.03	-.181**	.104*	.084*	-.195**	0.00	.164**	0.03	.190**	.232**
33 Sugar-Sweetened Beverage Servings	-.110*	0.08	-0.05	-.199**	.112**	0.08	-.225**	-0.01	.151**	0.01	.179**	.214**
34 Disinhibited Eating	-.179**	-.122**	-.138**	-0.04	0.01	-0.04	-.221**	-0.06	.241**	-0.08	0.03	.149**
35 Emotional Eating	-.212**	-.124**	-.194**	-.106*	-0.02	-0.07	-.227**	-0.06	.229**	-.110**	-0.08	0.07
36 Dietary Restraint	.242**	0.08	.091*	0.03	-0.04	.116**	.306**	.099*	.115**	.169**	0.05	.107*
37 Adventurous Eating	.174**	0.08	.094*	0.00	0.07	0.07	.203**	-0.05	-.273**	0.02	-.120**	-.241**
38 Self Effectiveness	.254**	.171**	.205**	0.03	0.05	0.04	.227**	0.05	-.188**	.198**	0.08	-0.05
39 Need for Cognition	.207**	.204**	.203**	0.02	.113**	.234**	.280**	0.08	-0.02	.153**	0.01	.093*
40 Parenting Self-Efficacy	.266**	.121**	.086*	-0.07	.104*	.144**	.157**	.088*	-0.03	.150**	.144**	.144**
41 Stress Management	.213**	0.08	.111**	0.08	0.00	0.06	.190**	0.05	-.117**	.128**	0.01	0.01
42 Stress Management Self-Efficacy	.170**	.174**	.193**	0.05	0.05	.101*	.192**	0.02	-0.05	0.07	0.03	-0.01
43 Perception of Weight Teasing History	-.089*	0.00	-.098*	-.157**	.113**	0.07	-0.07	-0.03	0.05	-.097*	-0.03	-0.03
44 Effect of Weight Teasing	-0.05	0.02	-0.04	-.119**	0.01	0.04	-0.04	-0.02	0.05	-0.06	-0.06	-0.02
45 Chubby Kids are Healthy	-0.06	0.04	-0.01	-0.05	.129**	0.06	-0.01	0.01	.195**	0.04	.171**	.220**

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	62	63	64	65	66	67	68	69	70	71	72	73
27 Soft Drink Servings	0.03	-0.06	-.103*	-0.04	.191**	.214**	-.186**	.093*	-.166**	-0.04	-.111**	0.05
28 Fruit Drink Servings	.130**	-0.06	-.120**	-0.01	.383**	.272**	-.144**	.316**	-0.02	-0.05	-.216**	0.05
29 Energy Drink Servings	.145**	0.00	-.187**	-.138**	.292**	.182**	-0.07	.309**	-0.02	-.137**	-.303**	0.04
30 Sugar-Sweetened Coffee Drink Servings	.205**	0.03	-0.08	-.103*	.267**	.147**	-0.08	.274**	0.05	-0.02	-.193**	0.03
31 Grams of Sugar from Sugar-Sweetened Beverages	.170**	-0.04	-.167**	-.103*	.382**	.286**	-.181**	.325**	-0.07	-0.08	-.276**	0.06
32 Energy from Sugar-Sweetened Beverages	.185**	-0.03	-.164**	-.107*	.391**	.281**	-.172**	.342**	-0.05	-0.08	-.283**	0.06
33 Sugar-Sweetened Beverage Servings	.168**	-0.04	-.167**	-.092*	.396**	.297**	-.185**	.333**	-0.07	-0.08	-.277**	0.06
34 Disinhibited Eating	0.07	-.087*	-.246**	-.225**	.098*	.158**	-.115**	.185**	-.136**	-.263**	-.347**	.250**
35 Emotional Eating	.086*	-0.08	-.186**	-.252**	0.05	.154**	-.131**	.135**	-.095*	-.215**	-.320**	.274**
36 Dietary Restraint	.163**	0.05	0.00	-.105*	0.02	-0.05	0.06	0.08	.138**	-0.01	-.177**	0.02
37 Adventurous Eating	-.161**	.107*	.247**	.193**	-.173**	-.102*	0.07	-.183**	.157**	.194**	.295**	-.136**
38 Self Effectiveness	0.01	.216**	.395**	.403**	-0.05	-.146**	.208**	-0.07	.230**	.435**	.215**	-.353**
39 Need for Cognition	.134**	.132**	0.07	.126**	.141**	0.03	0.07	.159**	.266**	0.02	-0.05	-.183**
40 Parenting Self-Efficacy	.166**	.183**	.200**	.250**	.148**	0.04	0.05	.158**	.197**	.224**	-0.03	-.286**
41 Stress Management	-0.06	.130**	.226**	.230**	-0.05	-.223**	.190**	-.146**	.144**	.286**	.185**	-.378**
42 Stress Management Self-Efficacy	-0.02	.176**	.159**	.135**	0.05	-.091*	.145**	0.03	.168**	0.06	0.06	-.156**
43 Perception of Weight Teasing History	0.01	-0.05	-0.08	-0.03	.125**	.162**	-.142**	.106*	0.00	-.103*	-.135**	0.02
44 Effect of Weight Teasing	0.04	-0.06	-0.06	-0.05	0.07	.100*	-.117**	0.07	0.02	-.097*	-.143**	0.06
45 Chubby Kids are Healthy	.182**	0.06	-0.06	-.122**	.135**	0.03	0.08	.217**	-0.05	-.097*	-.218**	-0.01

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).



**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	74	75	76	77	78	79	80	81	82	83	84	85
27 Soft Drink Servings	0.06	0.01	-0.01	-0.03	-.140**	.084*	.200**	0.07	0.05	0.00	0.07	0.00
28 Fruit Drink Servings	0.01	0.04	0.00	-0.01	-0.03	0.08	.352**	.250**	.184**	.194**	.192**	0.07
29 Energy Drink Servings	.119**	0.07	0.01	0.00	0.02	0.08	.248**	.162**	.126**	.211**	.176**	0.08
30 Sugar-Sweetened Coffee Drink Servings	0.08	0.05	0.03	0.02	0.05	0.05	.251**	.148**	.158**	.178**	.186**	0.08
31 Grams of Sugar from Sugar-Sweetened Beverages	.100*	0.06	0.01	-0.01	-0.05	.108*	.360**	.204**	.171**	.183**	.210**	0.08
32 Energy from Sugar-Sweetened Beverages	.099*	0.06	0.01	-0.01	-0.03	.105*	.366**	.213**	.182**	.199**	.220**	.084*
33 Sugar-Sweetened Beverage Servings	.091*	0.06	0.01	-0.01	-0.05	.109*	.373**	.218**	.178**	.189**	.214**	0.08
34 Disinhibited Eating	.310**	-.145**	-.126**	-.089*	-.104*	-0.05	.085*	0.00	0.03	0.02	0.02	0.01
35 Emotional Eating	.268**	-.136**	-.115**	-.132**	-.128**	-0.07	0.03	0.01	-0.01	0.00	0.05	0.04
36 Dietary Restraint	.140**	.151**	0.02	.146**	.118**	-0.02	-0.04	0.06	.084*	.122**	.092*	0.07
37 Adventurous Eating	-.210**	.093*	.106*	.118**	.103*	0.02	-.168**	-0.07	-.150**	-.119**	-.113**	-.143**
38 Self Effectiveness	-.467**	.156**	.152**	.172**	0.05	0.07	0.02	0.02	0.04	0.00	0.00	0.01
39 Need for Cognition	-0.08	.252**	.181**	.146**	.202**	0.07	.129**	0.04	.116**	.115**	.090*	.138**
40 Parenting Self-Efficacy	-.245**	.170**	.208**	.095*	.132**	.089*	.141**	.131**	.191**	.138**	.128**	.143**
41 Stress Management	-.280**	.145**	0.04	.178**	.227**	.102*	-0.06	-.098*	-0.02	0.04	0.01	0.05
42 Stress Management Self-Efficacy	-0.08	.158**	0.05	.254**	.233**	0.08	0.00	0.00	0.04	0.05	0.04	0.08
43 Perception of Weight Teasing History	0.06	0.07	0.06	-0.07	-.114**	-0.01	.084*	0.07	0.04	0.01	0.02	0.02
44 Effect of Weight Teasing	0.06	0.08	0.05	-0.07	-0.08	0.01	.085*	0.04	0.06	0.04	0.05	0.05
45 Chubby Kids are Healthy	.112**	0.01	0.04	-0.01	0.05	-0.03	.125**	.139**	.106*	0.08	0.08	0.06

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	86	87	88	89	90	91	92	93	94	95	96	97
27 Soft Drink Servings	.162**	.181**	.120**	0.05	-.200**	-0.07	-0.08	-.092*	-.094*	-.093*	-.093*	.198**
28 Fruit Drink Servings	.097*	.090*	0.06	0.07	-.202**	-0.05	0.05	0.04	0.03	0.03	0.03	.374**
29 Energy Drink Servings	0.04	0.00	0.06	0.06	-0.02	0.06	-0.01	-0.03	-0.03	-0.03	-0.03	.207**
30 Sugar-Sweetened Coffee Drink Servings	0.03	-0.01	0.03	0.05	-0.01	-0.01	0.06	0.05	0.05	0.05	0.05	.258**
31 Grams of Sugar from Sugar-Sweetened Beverages	.129**	.107*	.104*	0.08	-.158**	-0.03	-0.01	-0.02	-0.03	-0.03	-0.03	.354**
32 Energy from Sugar-Sweetened Beverages	.118**	.091*	.096*	0.08	-.145**	-0.03	0.01	-0.01	-0.02	-0.01	-0.01	.362**
33 Sugar-Sweetened Beverage Servings	.133**	.113**	.103*	.084*	-.175**	-0.04	0.00	-0.02	-0.02	-0.02	-0.02	.371**
34 Disinhibited Eating	0.03	0.01	0.00	0.07	0.00	-.092*	-.203**	-.190**	-.192**	-.191**	-.191**	.135**
35 Emotional Eating	.107*	0.07	0.06	.117**	0.01	-.085*	-.180**	-.169**	-.168**	-.169**	-.168**	.159**
36 Dietary Restraint	-0.06	-.139**	-0.01	0.03	.235**	0.04	0.06	0.08	.086*	.084*	.085*	0.02
37 Adventurous Eating	-.096*	-0.06	-.131**	-0.03	0.08	.087*	.164**	.184**	.189**	.186**	.187**	-.124**
38 Self Effectiveness	-.116**	-.112**	-.112**	-0.03	-0.04	.125**	.207**	.209**	.208**	.209**	.208**	0.00
39 Need for Cognition	-0.08	-.121**	-.088*	0.04	.097*	.098*	.256**	.245**	.245**	.245**	.245**	.088*
40 Parenting Self-Efficacy	-.092*	-.099*	-0.08	-0.02	-0.04	.140**	.200**	.209**	.204**	.207**	.206**	.096*
41 Stress Management	-.175**	-.205**	-.124**	-0.05	0.03	0.04	.208**	.227**	.227**	.227**	.227**	-0.04
42 Stress Management Self-Efficacy	-0.07	-.098*	-0.06	0.01	.102*	0.03	.169**	.180**	.182**	.181**	.181**	0.03
43 Perception of Weight Teasing History	.109*	.091*	.089*	0.07	-0.04	0.02	-0.08	-.085*	-.084*	-.085*	-.085*	0.03
44 Effect of Weight Teasing	.105*	0.05	.084*	.113**	0.00	0.02	-0.01	-0.03	-0.03	-0.03	-0.03	0.05
45 Chubby Kids are Healthy	-0.03	-0.02	-0.03	-0.01	-0.03	0.00	0.04	0.03	0.03	0.03	0.03	.202**

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	98	99	100	101	102	103	104	105	106	107	108	109
27 Soft Drink Servings	.185**	.157**	.172**	.186**	-0.04	.170**	0.01	-0.05	0.04	-0.04	.592**	.293**
28 Fruit Drink Servings	.389**	.391**	.391**	.390**	0.05	.186**	.103*	-.092*	.101*	.174**	.286**	.521**
29 Energy Drink Servings	.219**	.224**	.222**	.220**	-0.01	0.08	0.06	-.118**	-0.03	.106*	.093*	.156**
30 Sugar-Sweetened Coffee Drink Servings	.283**	.299**	.290**	.282**	0.03	.121**	.101*	-0.06	.106*	.104*	.161**	.223**
31 Grams of Sugar from Sugar-Sweetened Beverages	.365**	.359**	.362**	.366**	0.00	.202**	.088*	-.108*	0.08	.096*	.455**	.407**
32 Energy from Sugar-Sweetened Beverages	.376**	.375**	.375**	.377**	0.01	.199**	.097*	-.109*	.084*	.111**	.417**	.407**
33 Sugar-Sweetened Beverage Servings	.382**	.376**	.379**	.383**	0.01	.210**	.093*	-.110**	0.08	.108*	.459**	.442**
34 Disinhibited Eating	.134**	.125**	.130**	.135**	-0.07	0.01	-0.06	-.182**	-.163**	-.085*	0.01	-0.03
35 Emotional Eating	.147**	.123**	.136**	.149**	-0.06	-0.02	-0.07	-.142**	-.181**	-.142**	0.04	-0.01
36 Dietary Restraint	0.03	0.03	0.03	0.03	.110**	-0.07	0.04	-0.04	-0.02	0.02	-.136**	-.147**
37 Adventurous Eating	-.117**	-.091*	-.099*	-.115**	.109*	-.084*	0.02	.135**	.112**	0.05	-.088*	-0.07
38 Self Effectiveness	0.01	0.03	0.02	0.01	.097*	0.06	.107*	0.08	.162**	.162**	0.01	0.04
39 Need for Cognition	.095*	.107*	.104*	.097*	.147**	0.04	0.08	0.08	0.08	.155**	-0.03	.114**
40 Parenting Self-Efficacy	.103*	.118**	.116**	.107*	.127**	.084*	.173**	0.03	.111**	.208**	0.07	.141**
41 Stress Management	-0.03	-0.02	-0.03	-0.03	.158**	0.05	.096*	.193**	.166**	.102*	-0.04	-0.01
42 Stress Management Self-Efficacy	0.03	0.03	0.03	0.03	.156**	0.08	0.07	.098*	0.07	0.04	-0.03	-0.02
43 Perception of Weight Teasing History	0.04	0.04	0.04	0.04	0.01	-0.07	-0.03	-.087*	-0.06	0.01	0.04	0.02
44 Effect of Weight Teasing	0.05	0.06	0.05	0.05	0.02	-0.01	-0.01	-0.05	0.00	0.05	0.01	0.04
45 Chubby Kids are Healthy	.202**	.199**	.205**	.205**	0.01	.167**	0.07	0.06	0.02	.086*	0.08	0.08

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

	<b>Characteristics</b>	<b>110</b>	<b>111</b>	<b>112</b>	<b>113</b>	<b>114</b>	<b>115</b>	<b>116</b>	<b>117</b>	<b>118</b>	<b>119</b>	<b>120</b>
<b>27</b>	Soft Drink Servings	.144**	.106*	.384**	.340**	0.05	.198**	0.04	.129**	0.08	-0.01	0.01
<b>28</b>	Fruit Drink Servings	.296**	.342**	.441**	.438**	.162**	.341**	.143**	.244**	0.00	0.00	-0.01
<b>29</b>	Energy Drink Servings	.488**	.213**	.259**	.254**	.137**	.240**	0.08	.142**	-0.04	0.04	-0.07
<b>30</b>	Sugar-Sweetened Coffee Drink Servings	.284**	.524**	.387**	.401**	.092*	.222**	0.04	.145**	-0.07	0.01	-0.06
<b>31</b>	Grams of Sugar from Sugar-Sweetened Beverages	.404**	.408**	.530**	.511**	.141**	.341**	.092*	.224**	0.00	0.01	-0.04
<b>32</b>	Energy from Sugar-Sweetened Beverages	.415**	.444**	.531**	.518**	.147**	.345**	.094*	.227**	-0.01	0.01	-0.04
<b>33</b>	Sugar-Sweetened Beverage Servings	.401**	.409**	.540**	.522**	.149**	.355**	.103*	.236**	0.00	0.01	-0.03
<b>34</b>	Disinhibited Eating	.146**	0.04	0.01	0.00	0.04	.098*	0.02	.137**	.191**	0.04	-0.08
<b>35</b>	Emotional Eating	0.05	0.04	0.01	0.00	0.02	.112**	-0.01	.152**	.366**	0.08	0.01
<b>36</b>	Dietary Restraint	0.01	-0.03	-.106*	-.100*	.105*	0.03	0.06	0.02	.120**	0.03	0.03
<b>37</b>	Adventurous Eating	-.114**	-0.08	-0.08	-0.07	0.04	-.086*	0.01	-.087*	-0.03	-0.05	0.07
<b>38</b>	Self Effectiveness	0.03	.086*	0.08	.087*	0.02	-0.05	0.06	-0.05	-.208**	-0.04	0.03
<b>39</b>	Need for Cognition	0.06	.089*	0.08	.092*	.159**	0.08	0.07	0.03	-.118**	-0.03	0.03
<b>40</b>	Parenting Self-Efficacy	.184**	.196**	.196**	.204**	.138**	.097*	.093*	0.05	-.224**	-0.02	-0.05
<b>41</b>	Stress Management	-0.01	-0.01	0.01	0.03	-0.01	-0.04	0.03	-.085*	-.204**	0.00	-0.02
<b>42</b>	Stress Management Self-Efficacy	-0.07	0.01	-0.01	0.00	0.04	-0.01	.087*	0.04	-.129**	-0.02	-0.05
<b>43</b>	Perception of Weight Teasing History	.086*	0.01	0.03	0.02	0.03	0.07	-0.01	0.07	.253**	.108*	.102*
<b>44</b>	Effect of Weight Teasing	0.06	0.05	0.04	0.04	0.06	0.08	0.03	.111**	.262**	.089*	0.07
<b>45</b>	Chubby Kids are Healthy	.204**	.192**	.182**	.190**	0.07	.123**	0.02	.095*	-.136**	-0.01	-.138**

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550)**

Characteristics	1	2	3	4	5	6	7	8	9	10	11	12	13
<b>46</b> Concern for Child's Overweight Risk	-0.05	0.04	0.08	-0.03	-0.01	.132**	-.121**	.096*	.195**	0.04	-0.02	0.05	0.08
<b>47</b> Importance of Physical Activity for Self	0.03	0.02	.125**	0.07	.103*	-.194**	.393**	-.256**	-.219**	-.103*	.536**	-0.02	0.03
<b>48</b> Importance of Physical Activity for Child	-0.03	-0.01	.086*	0.04	0.04	-.182**	.184**	-.169**	-.183**	-0.04	.284**	-0.01	0.00
<b>49</b> Encouragement and Facilitation of Physical Activity	-.092*	0.02	0.02	-0.03	.110*	-.185**	.206**	-.137**	-.199**	-0.01	.201**	-0.03	0.05
<b>50</b> Importance of Modeling Physical Activity	-0.01	0.04	0.05	0.04	.123**	-.167**	.304**	-.185**	-.201**	-.085*	.358**	-0.05	0.05
<b>51</b> Mother and Child Co-Physical Activity Behavior	-0.01	-0.01	-0.02	0.00	0.08	-0.07	.170**	-0.06	-0.05	-.098*	.453**	.105*	.098*
<b>52</b> Frequency of Physical Activity	-.084*	0.04	0.05	0.06	0.06	-.143**	.292**	-.148**	-.126**	-0.07	.505**	-0.04	0.03
<b>53</b> Behavior Frequency of Maternal Modeling	-.107*	.130**	.100*	0.02	0.03	-.128**	.135**	-.104*	-.116**	.099*	-0.07	-.175**	-0.07
<b>54</b> Behavior Frequency of Media Use	0.00	-0.04	0.07	-0.08	0.00	0.00	0.07	0.03	0.01	0.02	0.05	0.04	-0.01
<b>55</b> Belief of Positive Effect of TV on Child Learning	0.07	0.08	.103*	0.06	0.02	0.00	.159**	-0.07	-0.02	-0.02	.222**	0.04	.087*
<b>56</b> Talks Often with Kids Regarding TV/Media	-0.04	.123**	0.08	-0.01	0.04	-.151**	.271**	-.161**	-.192**	0.00	.204**	-0.06	0.00
<b>57</b> Healthy Eating Modeling	.096*	-0.03	0.03	-0.01	0.00	0.02	0.06	-0.05	0.01	-0.08	.088*	0.00	0.07
<b>58</b> Restriction Pressure	.138**	.094*	0.08	-0.05	-0.04	.115**	-0.04	0.02	.170**	.144**	0.03	0.03	.105*

\*Pearson correlation coefficients are statistically significant at p&lt;0.05 (two-tailed).

\*\*Pearson correlation coefficients are statistically significant at p&lt;0.01 (two-tailed). Variables included in the final regression model are underlined.

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	14	15	16	17	18	19	20	21	22	23	24	25
46 Concern for Child's Overweight Risk	0.01	0.00	-0.02	-0.02	-0.02	-0.02	0.07	0.07	0.07	0.07	-0.02	-0.01
47 Importance of Physical Activity for Self	.283**	.376**	.401**	.402**	.402**	.402**	0.02	0.02	0.02	0.02	.201**	.226**
48 Importance of Physical Activity for Child	.127**	.269**	.288**	.290**	.289**	.289**	-0.06	-0.06	-0.06	-0.06	.176**	.130**
49 Encouragement and Facilitation of Physical Activity	.154**	.219**	.227**	.229**	.228**	.228**	-0.04	-0.04	-0.04	-0.05	.128**	.106*
50 Importance of Modeling Physical Activity	.193**	.311**	.326**	.327**	.327**	.327**	0.01	0.01	0.01	0.01	.215**	.210**
51 Mother and Child Co-Physical Activity Behavior Frequency	.108*	.366**	.373**	.370**	.372**	.372**	.136**	.136**	.136**	.135**	.213**	.229**
52 Maternal Modeling of Physical Activity Behavior Frequency	.149**	.343**	.370**	.368**	.369**	.369**	0.02	0.02	0.02	0.02	.161**	.192**
53 Maternal Modeling of Media Use Behavior Frequency	0.03	-0.03	-0.01	-0.01	-0.01	-0.01	-.183**	-.183**	-.183**	-.185**	-0.04	-0.07
54 Belief of Positive Effect of TV on Child Learning	0.03	0.08	0.06	0.07	0.06	0.06	.089*	.089*	.089*	.089*	0.07	0.06
55 Talks Often with Kids Regarding TV/Media	.119**	.319**	.318**	.327**	.322**	.324**	.135**	.135**	.135**	.136**	.226**	.234**
56 Healthy Eating Modeling	.148**	.382**	.385**	.390**	.387**	.388**	-.112**	-.112**	-.112**	-.112**	.204**	.197**
57 Restriction	0.04	0.07	0.08	0.07	0.08	0.08	0.01	0.01	0.01	0.02	-0.05	0.05
58 Pressure	.104*	0.01	-0.02	-0.02	-0.02	-0.02	0.07	0.07	0.07	0.07	-0.02	-0.01

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

	<b>Characteristics</b>	<b>26</b>	<b>27</b>	<b>28</b>	<b>29</b>	<b>30</b>	<b>31</b>	<b>32</b>	<b>33</b>	<b>34</b>	<b>35</b>	<b>36</b>	<b>37</b>
<b>46</b>	Concern for Child's Overweight Risk	0.00	0.07	.124**	0.03	-0.04	0.06	0.05	0.07	.208**	.329**	.160**	-0.08
<b>47</b>	Importance of Physical Activity for Self	.246**	-.170**	-0.03	0.08	0.04	-0.05	-0.03	-0.05	-.186**	-.211**	.297**	.129**
<b>48</b>	Importance of Physical Activity for Child	.165**	-.142**	-.133**	-0.02	-0.02	-.116**	-.107*	-.126**	-.191**	-.150**	.208**	.144**
<b>49</b>	Encouragement and Facilitation of Physical Activity	.131**	-.130**	-.150**	-0.05	0.01	-.110*	-.099*	-.123**	-.188**	-.194**	.164**	.211**
<b>50</b>	Importance of Modeling Physical Activity	.186**	-.158**	-0.07	-0.02	-0.02	-.108*	-.096*	-.110*	-.179**	-.212**	.242**	.174**
<b>51</b>	Mother and Child Co-Physical Activity	.188**	-0.03	.084*	.115**	.096*	0.08	.088*	0.08	-.122**	-.124**	0.08	0.08
<b>52</b>	Behavior Frequency Maternal Modeling of Physical Activity	.204**	-.132**	-0.03	0.07	0.03	-0.04	-0.03	-0.05	-.138**	-.194**	.091*	.094*
<b>53</b>	Behavior Frequency Maternal Modeling of Media Use	-0.05	-.166**	-.205**	-0.06	-.088*	-.186**	-.181**	-.199**	-0.04	-.106*	0.03	0.00
<b>54</b>	Belief of Positive Effect of TV on Child Learning	.105*	.101*	0.08	0.08	0.04	.110*	.104*	.112**	0.01	-0.02	-0.04	0.07
<b>55</b>	Talks Often with Kids Regarding TV/Media	.284**	-0.03	.103*	.154**	0.05	0.08	.084*	0.08	-0.04	-0.07	.116**	0.07
<b>56</b>	Healthy Eating Modeling	.241**	-.323**	-.154**	-0.01	-0.05	-.219**	-.195**	-.225**	-.221**	-.227**	.306**	.203**
<b>57</b>	Restriction	0.06	-0.07	-0.04	0.04	0.06	-0.01	0.00	-0.01	-0.06	-0.06	.099*	-0.05
<b>58</b>	Pressure	0.08	0.04	.099*	.158**	.160**	.155**	.164**	.151**	.241**	.229**	.115**	-.273**

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	38	39	40	41	42	43	44	45	46	47	48	49
<b>46</b> Concern for Child's Overweight Risk	-.174**	0.04	-.151**	-.191**	-0.04	.368**	.361**	-0.01	1.00	-.098*	-0.08	-.161**
<b>47</b> Importance of Physical Activity for Self	.276**	.247**	.187**	.238**	.192**	-.094*	-0.07	-0.02	-.098*	1.00	.503**	.430**
<b>48</b> Importance of Physical Activity for Child	.201**	.194**	.188**	.196**	.187**	-0.05	-0.02	-0.01	-0.08	.503**	1.00	.647**
<b>49</b> Encouragement and Facilitation of Physical Activity	.259**	.210**	.277**	.247**	.228**	-.098*	-0.05	0.02	-.161**	.430**	.647**	1.00
<b>50</b> Importance of Modeling Physical Activity	.254**	.207**	.266**	.213**	.170**	-.089*	-0.05	-0.06	-.149**	.634**	.502**	.588**
<b>51</b> Mother and Child Co-Physical Activity Behavior Frequency	.171**	.204**	.121**	0.08	.174**	0.00	0.02	0.04	-0.04	.321**	.334**	.289**
<b>52</b> Maternal Modeling of Physical Activity Behavior Frequency	.205**	.203**	.086*	.111**	.193**	-.098*	-0.04	-0.01	-.097*	.442**	.392**	.346**
<b>53</b> Maternal Modeling of Media Use Behavior Frequency	0.03	0.02	-0.07	0.08	0.05	-.157**	-.119**	-0.05	-0.07	.120**	.130**	.132**
<b>54</b> Belief of Positive Effect of TV on Child Learning	0.05	.113**	.104*	0.00	0.05	.113**	0.01	.129**	-0.03	0.04	0.02	.096*
<b>55</b> Talks Often with Kids Regarding TV/Media	0.04	.234**	.144**	0.06	.101*	0.07	0.04	0.06	0.01	.264**	.224**	.260**
<b>56</b> Healthy Eating Modeling	.227**	.280**	.157**	.190**	.192**	-0.07	-0.04	-0.01	-.132**	.468**	.373**	.396**
<b>57</b> Restriction	0.05	0.08	.088*	0.05	0.02	-0.03	-0.02	0.01	0.01	.139**	.087*	.167**
<b>58</b> Pressure	-.188**	-0.02	-0.03	-.117**	-0.05	0.05	0.05	.195**	.154**	0.00	-.093*	-.105*

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).



**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

	Characteristics	50	51	52	53	54	55	56	57	58	59	60	61
46	Concern for Child's Overweight Risk	-.149**	-0.04	-.097*	-0.07	-0.03	0.01	-.132**	0.01	.154**	-0.04	-0.06	.084*
47	Importance of Physical Activity for Self	.634**	.321**	.442**	.120**	0.04	.264**	.468**	.139**	0.00	.307**	.168**	.150**
48	Importance of Physical Activity for Child	.502**	.334**	.392**	.130**	0.02	.224**	.373**	.087*	-.093*	.252**	0.04	0.02
49	Encouragement and Facilitation of Physical Activity	.588**	.289**	.346**	.132**	.096*	.260**	.396**	.167**	-.105*	.281**	0.03	0.01
50	Importance of Modeling Physical Activity	1.00	.270**	.355**	.108*	0.04	.265**	.442**	.141**	-.097*	.278**	0.05	0.06
51	Mother and Child Co-Physical Activity	.270**	1.00	.701**	-.099*	0.05	.205**	.213**	0.03	-.085*	.111**	0.02	0.05
52	Behavior Frequency Maternal Modeling of Physical Activity	.355**	.701**	1.00	.511**	-0.08	.183**	.352**	0.01	-0.07	.157**	0.01	-0.01
53	Behavior Frequency Maternal Modeling of Media Use	.108*	-.099*	.511**	1.00	-.211**	-0.05	.240**	-0.05	-0.03	0.05	-0.08	-.111**
54	Belief of Positive Effect of TV on Child Learning	0.04	0.05	-0.08	-.211**	1.00	.263**	0.02	0.01	0.00	0.01	.121**	.168**
55	Talks Often with Kids Regarding TV/Media	.265**	.205**	.183**	-0.05	.263**	1.00	.224**	.104*	0.07	.237**	.147**	.157**
56	Healthy Eating Modeling	.442**	.213**	.352**	.240**	0.02	.224**	1.00	.186**	-0.08	.382**	0.07	-0.02
57	Restriction	.141**	0.03	0.01	-0.05	0.01	.104*	.186**	1.00	0.07	.496**	.198**	.196**
58	Pressure	-.097*	-.085*	-0.07	-0.03	0.00	0.07	-0.08	0.07	1.00	0.07	.189**	.280**

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	62	63	64	65	66	67	68	69	70	71	72	73
46 Concern for Child's Overweight Risk	0.08	-.109*	-.224**	-.197**	.100*	.106*	-.135**	.092*	-0.04	-.196**	-.211**	.130**
47 Importance of Physical Activity for Self	0.07	.182**	.157**	.132**	.084*	-.142**	.184**	.157**	.287**	.166**	-0.01	-.218**
48 Importance of Physical Activity for Child	0.06	.265**	.182**	.092*	0.00	-.158**	.186**	0.06	.280**	.169**	.085*	-.199**
49 Encouragement and Facilitation of Physical Activity	.086*	.294**	.322**	.231**	-0.06	-.180**	.219**	-0.02	.325**	.281**	.153**	-.310**
50 Importance of Modeling Physical Activity	0.08	.197**	.226**	.152**	0.04	-.159**	.218**	0.05	.298**	.209**	0.08	-.235**
51 Mother and Child Co-Physical Activity Behavior Frequency	0.06	.231**	.093*	0.08	0.07	0.05	.132**	.133**	.192**	.130**	0.03	-.154**
52 Maternal Modeling of Physical Activity Behavior Frequency	0.03	.236**	.140**	0.07	0.01	-.180**	.304**	.113**	.239**	.151**	0.06	-.179**
53 Maternal Modeling of Media Use Behavior Frequency	-0.06	0.03	0.04	0.02	-.177**	-.296**	.226**	-0.08	.111**	0.02	.090*	-.085*
54 Belief of Positive Effect of TV on Child Learning	.131**	.104*	0.00	0.04	.120**	.145**	-0.04	0.03	-0.07	.094*	0.00	-.137**
55 Talks Often with Kids Regarding TV/Media	.097*	.094*	0.03	0.03	.159**	0.03	0.04	.183**	.207**	-0.01	-.173**	-.112**
56 Healthy Eating Modeling	0.07	.192**	.208**	.167**	-0.06	-.204**	.273**	0.03	.409**	.193**	.099*	-.321**
57 Restriction	.169**	0.01	0.06	0.04	0.05	0.06	-0.02	0.04	.133**	0.05	-0.07	-0.07
58 Pressure	.283**	-0.05	-.293**	-.343**	.312**	.161**	-0.08	.286**	-.113**	-.241**	-.464**	.173**

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

	<b>Characteristics</b>	<b>74</b>	<b>75</b>	<b>76</b>	<b>77</b>	<b>78</b>	<b>79</b>	<b>80</b>	<b>81</b>	<b>82</b>	<b>83</b>	<b>84</b>	<b>85</b>
<b>46</b>	Concern for Child's Overweight Risk	.162**	0.00	-.107*	-0.05	-0.02	0.01	0.01	0.02	-0.01	-0.03	0.02	-0.01
<b>47</b>	Importance of Physical Activity for Self	-.088*	.247**	.135**	.276**	.244**	-0.01	0.03	.114**	.123**	.200**	.147**	0.07
<b>48</b>	Importance of Physical Activity for Child	-0.08	.342**	.186**	.363**	.255**	-0.06	-0.07	0.03	0.04	0.07	0.06	0.03
<b>49</b>	Encouragement and Facilitation of Physical Activity	-.158**	.351**	.314**	.404**	.295**	-0.05	-0.05	-0.04	0.00	0.00	0.02	-0.02
<b>50</b>	Importance of Modeling Physical Activity	-.106*	.276**	.221**	.256**	.291**	0.01	0.04	.089*	.102*	.129**	.123**	0.03
<b>51</b>	Mother and Child Co-Physical Activity	-0.04	.302**	.246**	.286**	.154**	0.04	.085*	0.04	0.06	0.01	0.00	-0.01
<b>52</b>	Behavior Frequency Maternal Modeling of Physical Activity	-0.03	.255**	.188**	.314**	.202**	-0.02	-0.05	0.00	0.04	0.03	-0.02	-0.03
<b>53</b>	Behavior Frequency Maternal Modeling of Media Use	0.00	-0.05	0.04	0.08	0.06	-.118**	-.232**	-.151**	-.085*	-0.06	-.104*	-.121**
<b>54</b>	Belief of Positive Effect of TV on Child Learning	-0.02	.123**	.121**	.100*	.119**	0.05	.134**	.114**	.133**	.091*	.123**	.131**
<b>55</b>	Talks Often with Kids Regarding TV/Media	0.00	.220**	.121**	.198**	.145**	0.03	.147**	.161**	.199**	.228**	.198**	0.08
<b>56</b>	Healthy Eating Modeling	-.161**	.185**	.172**	.228**	.249**	-0.06	-.110**	0.03	0.03	.093*	0.04	0.00
<b>57</b>	Restriction	-0.05	.118**	0.04	0.04	0.04	-0.01	0.05	0.06	-0.01	0.01	0.06	0.03
<b>58</b>	Pressure	.232**	-0.06	-.120**	-.146**	0.03	-0.07	.153**	0.05	.107*	.087*	.113**	.104*

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

	Characteristics	86	87	88	89	90	91	92	93	94	95	96	97
46	Concern for Child's Overweight Risk	.102*	.091*	0.03	.111**	0.04	-0.08	-0.02	-0.03	-0.03	-0.03	-0.03	.128**
47	Importance of Physical Activity for Self	-.105*	-.174**	-0.03	-0.01	.144**	.114**	.307**	.335**	.334**	.335**	.335**	.089*
48	Importance of Physical Activity for Child	-.167**	-.195**	-.154**	-0.01	.162**	.153**	.302**	.314**	.314**	.314**	.314**	-0.05
49	Encouragement and Facilitation of Physical Activity	-.235**	-.241**	-.199**	-0.08	.252**	.167**	.268**	.291**	.291**	.291**	.291**	-0.07
50	Importance of Modeling Physical Activity	-.203**	-.234**	-.138**	-0.07	.229**	.145**	.294**	.316**	.316**	.316**	.316**	-0.04
51	Mother and Child Co-Physical Activity Behavior Frequency	-0.05	-0.06	-0.04	-0.02	0.08	0.07	.254**	.276**	.273**	.275**	.274**	0.08
52	Maternal Modeling of Physical Activity Behavior Frequency	-.149**	-.211**	-.120**	0.02	.139**	0.07	.251**	.262**	.260**	.261**	.261**	-0.04
53	Maternal Modeling of Media Use Behavior Frequency	-.176**	-.231**	-.165**	0.02	.155**	-0.02	0.00	-0.01	0.00	-0.01	0.00	-.211**
54	Belief of Positive Effect of TV on Child Learning	0.08	0.08	0.05	0.04	-0.07	.248**	0.08	0.08	0.08	0.08	0.08	.130**
55	Talks Often with Kids Regarding TV/Media	-.087*	-.087*	-.131**	0.03	.211**	.094*	.136**	.150**	.154**	.152**	.153**	.107*
56	Healthy Eating Modeling	-.207**	-.268**	-.140**	-0.04	.318**	.243**	.304**	.306**	.307**	.306**	.306**	-.148**
57	Restriction	-0.05	-0.01	-0.05	-0.06	0.07	0.08	0.01	0.01	0.01	0.01	0.01	-0.05
58	Pressure	0.03	-0.01	0.06	0.02	0.04	0.01	-.112**	-.114**	-.112**	-.113**	-.113**	.189**

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	98	99	100	101	102	103	104	105	106	107	108	109
46 Concern for Child's Overweight Risk	.120**	.113**	.120**	.122**	-0.02	0.01	0.00	-0.05	-0.03	0.00	.094*	0.08
47 Importance of Physical Activity for Self	.111**	.134**	.122**	.110**	.231**	0.05	.204**	0.01	.092*	.236**	-.106*	0.01
48 Importance of Physical Activity for Child	-0.03	-0.01	-0.02	-0.03	.205**	0.00	.164**	.142**	.157**	.169**	-.089*	-0.06
49 Encouragement and Facilitation of Physical Activity	-0.07	-0.05	-0.06	-0.07	.224**	0.07	.154**	.198**	.125**	.129**	-.097*	-0.08
50 Importance of Modeling Physical Activity	-0.02	0.00	-0.01	-0.03	.265**	0.04	.198**	.115**	.134**	.218**	-.111**	-.087*
51 Mother and Child Co-Physical Activity Behavior Frequency	.090*	.103*	.096*	.089*	.203**	0.01	.171**	0.06	.098*	.185**	0.00	0.04
52 Maternal Modeling of Physical Activity Behavior Frequency	-0.03	-0.01	-0.02	-0.03	.134**	-0.05	.117**	0.01	0.05	.197**	-.155**	-0.08
53 Maternal Modeling of Media Use Behavior Frequency	-.210**	-.203**	-.208**	-.211**	-0.07	-.144**	-.093*	-0.02	-0.05	-0.04	-.265**	-.225**
54 Belief of Positive Effect of TV on Child Learning	.135**	.146**	.145**	.139**	.110**	0.08	.124**	0.04	0.06	.099*	.145**	.111**
55 Talks Often with Kids Regarding TV/Media	.118**	.136**	.131**	.119**	.145**	0.08	.173**	-0.03	0.02	.171**	0.02	0.06
56 Healthy Eating Modeling	-.121**	-0.07	-.093*	-.122**	.163**	-.108*	.098*	.110*	.090*	.221**	-.254**	-.175**
57 Restriction	-0.04	-0.02	-0.02	-0.04	-0.02	-0.03	0.01	-0.03	-0.03	0.02	-0.03	-0.08
58 Pressure	.186**	.178**	.184**	.188**	-.091*	.099*	-0.02	-.135**	-0.07	-0.01	0.07	0.05

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

	<b>Characteristics</b>	<b>110</b>	<b>111</b>	<b>112</b>	<b>113</b>	<b>114</b>	<b>115</b>	<b>116</b>	<b>117</b>	<b>118</b>	<b>119</b>	<b>120</b>
<b>46</b>	Concern for Child's Overweight Risk	0.05	-0.03	0.05	0.04	0.04	.090*	0.01	0.06	.192**	.084*	0.05
<b>47</b>	Importance of Physical Activity for Self	.173**	.126**	0.06	0.07	.167**	0.07	.204**	0.01	-.343**	-0.06	-0.04
<b>48</b>	Importance of Physical Activity for Child	0.04	0.00	-0.01	0.01	0.06	-.085*	.144**	-0.06	-.165**	-0.02	-0.01
<b>49</b>	Encouragement and Facilitation of Physical Activity	0.00	0.03	-0.01	0.01	0.04	-.088*	.132**	-0.08	-.121**	0.02	-0.01
<b>50</b>	Importance of Modeling Physical Activity	0.08	.092*	0.02	0.03	.195**	0.06	.196**	0.02	-.187**	-0.04	0.00
<b>51</b>	Mother and Child Co-Physical Activity	.137**	.104*	.100*	.109*	.114**	-0.01	.139**	0.03	-0.07	-0.01	-0.03
<b>52</b>	Behavior Frequency Maternal Modeling	.093*	0.05	-0.03	-0.02	0.07	-.109*	.175**	-0.06	-.200**	-0.06	-0.06
<b>53</b>	of Physical Activity Behavior Frequency Maternal Modeling	-.115**	-.117**	-.240**	-.228**	-.101*	-.239**	0.01	-.184**	-.165**	-0.07	-0.05
<b>54</b>	of Media Use Behavior Frequency Belief of Positive	.096*	0.02	.128**	.120**	.106*	.094*	0.07	0.03	-0.06	0.07	0.00
<b>55</b>	Effect of TV on Child Learning	.243**	0.08	.111**	.111**	.126**	0.08	.103*	0.05	-.135**	0.01	-.090*
<b>56</b>	Talks Often with Kids Regarding TV/Media	-0.01	0.00	-.126**	-.102*	.127**	-.093*	.127**	-.137**	-.225**	-0.03	0.04
<b>57</b>	Healthy Eating Modeling	0.00	-0.01	-0.04	-0.04	0.01	-0.04	-0.01	-0.02	-0.08	0.01	.096*
<b>58</b>	Restriction	.223**	.183**	.140**	.136**	0.03	.168**	-0.05	.093*	0.03	0.03	-0.01
	Pressure											

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550)**

Characteristics	1	2	3	4	5	6	7	8	9	10	11	12	13
<b>59</b> Food Access and Decisions	.131**	0.04	0.07	0.01	0.05	0.03	.191**	-.151**	-0.06	-.122**	.219**	0.01	.091*
<b>60</b> Food Waste Acceptance	.205**	-0.06	.106*	-0.01	-0.06	.096*	.215**	-0.07	0.07	-.089*	.168**	.111**	0.08
<b>61</b> Instrumental Feeding	.145**	0.01	.133**	-0.08	0.03	.086*	.143**	-.108*	0.07	-0.03	.128**	0.06	.109*
<b>62</b> Non-Food Rewards	.090*	0.04	0.08	-0.08	0.04	0.06	0.06	-0.03	.124**	-0.03	0.07	0.04	.103*
<b>63</b> Family Meal Frequency	-.091*	-0.05	-.158**	0.02	0.05	-.091*	.152**	-.086*	-.168**	0.00	.177**	0.00	.085*
<b>64</b> Importance of Family Meals	-.084*	-0.08	-.150**	0.01	0.06	-.167**	.153**	-.116**	-.247**	-0.06	.087*	-0.06	-0.04
<b>65</b> Positive Family Meal Atmosphere	-0.03	-0.08	-0.08	-.096*	.087*	-.175**	0.05	-.112**	-.243**	-0.07	0.05	0.01	0.00
<b>66</b> Fast Food Eaten at Family Meals	.274**	0.01	0.07	-0.06	0.04	.133**	0.04	-.089*	.155**	-0.08	.212**	.164**	.101*
<b>67</b> TV on During Family Meals	.127**	-.092*	0.00	-.198**	-.132**	.213**	-.150**	.173**	.265**	-0.04	0.01	.224**	0.04
<b>68</b> Family Meals Eaten at Kitchen or Dining Table	-.114**	.106*	-0.05	.241**	.105*	-.201**	.167**	-.164**	-.203**	0.05	.152**	-.183**	0.04
<b>69</b> Family Meals Eaten in the Car	.159**	0.05	0.07	-0.02	-0.01	.170**	.109*	-0.04	.191**	-0.02	.259**	.110*	.106*
<b>70</b> Family Meal Planning	0.00	0.08	0.06	0.04	.109*	-.095*	.161**	-.114**	-.148**	0.02	.196**	-0.01	0.05
<b>71</b> Time and Energy for Family Meals	-0.04	-.213**	-.198**	0.01	0.03	-.164**	.161**	-.151**	-.238**	-.161**	.106*	0.05	-0.02
<b>72</b> Family Support for Healthy Behaviors	-.140**	-0.03	-.151**	-0.01	0.03	-.226**	0.02	-0.01	-.277**	0.03	-.130**	0.02	-.101*
<b>73</b> Conflict and Cohesion	.087*	0.04	0.08	.118**	-.096*	.242**	-.202**	.206**	.337**	0.02	-0.05	-0.05	-0.05

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed). Variables included in the final regression model are underlined.

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	14	15	16	17	18	19	20	21	22	23	24	25
<b>59</b> Food Access and Decisions	.194**	.281**	.305**	.296**	.302**	.300**	0.04	0.04	0.04	0.05	.167**	.216**
<b>60</b> Food Waste Acceptance	.150**	.197**	.211**	.206**	.209**	.208**	.178**	.178**	.178**	.183**	.158**	.244**
<b>61</b> Instrumental Feeding	.151**	.163**	.173**	.160**	.168**	.165**	.221**	.221**	.221**	.223**	.106*	.148**
<b>62</b> Non-Food Rewards	.104*	.125**	.138**	.127**	.133**	.131**	.139**	.139**	.139**	.139**	.131**	.094*
<b>63</b> Family Meal Frequency	.133**	.204**	.224**	.217**	.221**	.220**	0.03	0.03	0.03	0.03	.144**	.131**
<b>64</b> Importance of Family Meals	.110**	0.06	0.07	0.06	0.06	0.06	-.124**	-.124**	-.124**	-.124**	.096*	0.07
<b>65</b> Positive Family Meal Atmosphere	.110**	0.08	0.07	0.06	0.07	0.07	-.128**	-.128**	-.128**	-.127**	0.01	0.07
<b>66</b> Fast Food Eaten at Family Meals	.148**	.299**	.320**	.317**	.319**	.319**	.391**	.391**	.391**	.396**	.107*	.217**
<b>67</b> TV on During Family Meals	-0.08	0.03	0.02	0.02	0.02	0.02	.197**	.197**	.197**	.199**	-0.02	0.05
<b>68</b> Family Meals Eaten at Kitchen or Dining Table	.129**	0.08	.118**	.124**	.121**	.122**	-0.04	-0.04	-0.04	-0.05	.127**	0.01
<b>69</b> Family Meals Eaten in the Car	.137**	.345**	.356**	.356**	.357**	.357**	.316**	.316**	.316**	.318**	.124**	.211**
<b>70</b> Family Meal Planning	.216**	.285**	.296**	.302**	.299**	.300**	0.02	0.02	0.02	0.02	.282**	.211**
<b>71</b> Time and Energy for Family Meals	.120**	.088*	.088*	0.08	.086*	.085*	-.101*	-.101*	-.101*	-.101*	.111**	0.07
<b>72</b> Family Support for Healthy Behaviors	-.132**	-.155**	-.174**	-.175**	-.175**	-.175**	-.290**	-.290**	-.290**	-.291**	-0.07	-.084*
<b>73</b> Conflict and Cohesion	-.174**	-.170**	-.175**	-.170**	-.173**	-.172**	0.08	0.08	0.08	0.08	-.139**	-0.07

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).



**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	26	27	28	29	30	31	32	33	34	35	36	37
<b>59</b> Food Access and Decisions	.274**	-.147**	0.00	.152**	.101*	0.01	0.03	0.01	-0.08	-.110**	.169**	0.02
<b>60</b> Food Waste Acceptance	.233**	0.01	.173**	.210**	.164**	.176**	.190**	.179**	0.03	-0.08	0.05	-.120**
<b>61</b> Instrumental Feeding	.212**	0.06	.145**	.234**	.216**	.219**	.232**	.214**	.149**	0.07	.107*	-.241**
<b>62</b> Non-Food Rewards	.157**	0.03	.130**	.145**	.205**	.170**	.185**	.168**	0.07	.086*	.163**	-.161**
<b>63</b> Family Meal Frequency	.105*	-0.06	-0.06	0.00	0.03	-0.04	-0.03	-0.04	-.087*	-0.08	0.05	.107*
<b>64</b> Importance of Family Meals	0.00	-.103*	-.120**	-.187**	-0.08	-.167**	-.164**	-.167**	-.246**	-.186**	0.00	.247**
<b>65</b> Positive Family Meal Atmosphere	0.02	-0.04	-0.01	-.138**	-.103*	-.103*	-.107*	-.092*	-.225**	-.252**	-.105*	.193**
<b>66</b> Fast Food Eaten at Family Meals	.321**	.191**	.383**	.292**	.267**	.382**	.391**	.396**	.098*	0.05	0.02	-.173**
<b>67</b> TV on During Family Meals	0.03	.214**	.272**	.182**	.147**	.286**	.281**	.297**	.158**	.154**	-0.05	-.102*
<b>68</b> Family Meals Eaten at Kitchen or Dining Table	0.04	-.186**	-.144**	-0.07	-0.08	-.181**	-.172**	-.185**	-.115**	-.131**	0.06	0.07
<b>69</b> Family Meals Eaten in the Car	.370**	.093*	.316**	.309**	.274**	.325**	.342**	.333**	.185**	.135**	0.08	-.183**
<b>70</b> Family Meal Planning	.149**	-.166**	-0.02	-0.02	0.05	-0.07	-0.05	-0.07	-.136**	-.095*	.138**	.157**
<b>71</b> Time and Energy for Family Meals	0.02	-0.04	-0.05	-.137**	-0.02	-0.08	-0.08	-0.08	-.263**	-.215**	-0.01	.194**
<b>72</b> Family Support for Healthy Behaviors	-.215**	-.111**	-.216**	-.303**	-.193**	-.276**	-.283**	-.277**	-.347**	-.320**	-.177**	.295**
<b>73</b> Conflict and Cohesion	-.096*	0.05	0.05	0.04	0.03	0.06	0.06	0.06	.250**	.274**	0.02	-.136**

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	38	39	40	41	42	43	44	45	46	47	48	49
<b>59</b> Food Access and Decisions	.198**	.153**	.150**	.128**	0.07	-.097*	-0.06	0.04	-0.04	.307**	.252**	.281**
<b>60</b> Food Waste Acceptance	0.08	0.01	.144**	0.01	0.03	-0.03	-0.06	.171**	-0.06	.168**	0.04	0.03
<b>61</b> Instrumental Feeding	-0.05	.093*	.144**	0.01	-0.01	-0.03	-0.02	.220**	.084*	.150**	0.02	0.01
<b>62</b> Non-Food Rewards	0.01	.134**	.166**	-0.06	-0.02	0.01	0.04	.182**	0.08	0.07	0.06	.086*
<b>63</b> Family Meal Frequency	.216**	.132**	.183**	.130**	.176**	-0.05	-0.06	0.06	-.109*	.182**	.265**	.294**
<b>64</b> Importance of Family Meals	.395**	0.07	.200**	.226**	.159**	-0.08	-0.06	-0.06	-.224**	.157**	.182**	.322**
<b>65</b> Positive Family Meal Atmosphere	.403**	.126**	.250**	.230**	.135**	-0.03	-0.05	-.122**	-.197**	.132**	.092*	.231**
<b>66</b> Fast Food Eaten at Family Meals	-0.05	.141**	.148**	-0.05	0.05	.125**	0.07	.135**	.100*	.084*	0.00	-0.06
<b>67</b> TV on During Family Meals	-.146**	0.03	0.04	-.223**	-.091*	.162**	.100*	0.03	.106*	-.142**	-.158**	-.180**
<b>68</b> Family Meals Eaten at Kitchen or Dining Table	.208**	0.07	0.05	.190**	.145**	-.142**	-.117**	0.08	-.135**	.184**	.186**	.219**
<b>69</b> Family Meals Eaten in the Car	-0.07	.159**	.158**	-.146**	0.03	.106*	0.07	.217**	.092*	.157**	0.06	-0.02
<b>70</b> Family Meal Planning	.230**	.266**	.197**	.144**	.168**	0.00	0.02	-0.05	-0.04	.287**	.280**	.325**
<b>71</b> Time and Energy for Family Meals	.435**	0.02	.224**	.286**	0.06	-.103*	-.097*	-.097*	-.196**	.166**	.169**	.281**
<b>72</b> Family Support for Healthy Behaviors	.215**	-0.05	-0.03	.185**	0.06	-.135**	-.143**	-.218**	-.211**	-0.01	.085*	.153**
<b>73</b> Conflict and Cohesion	-.353**	-.183**	-.286**	-.378**	-.156**	0.02	0.06	-0.01	.130**	-.218**	-.199**	-.310**

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	50	51	52	53	54	55	56	57	58	59	60	61
<b>59</b> Food Access and Decisions	.278**	.111**	.157**	0.05	0.01	.237**	.382**	.496**	0.07	1.00	.340**	.260**
<b>60</b> Food Waste Acceptance	0.05	0.02	0.01	-0.08	.121**	.147**	0.07	.198**	.189**	.340**	1.00	.416**
<b>61</b> Instrumental Feeding	0.06	0.05	-0.01	-.111**	.168**	.157**	-0.02	.196**	.280**	.260**	.416**	1.00
<b>62</b> Non-Food Rewards	0.08	0.06	0.03	-0.06	.131**	.097*	0.07	.169**	.283**	.262**	.361**	.577**
<b>63</b> Family Meal Frequency	.197**	.231**	.236**	0.03	.104*	.094*	.192**	0.01	-0.05	.171**	0.03	0.05
<b>64</b> Importance of Family Meals	.226**	.093*	.140**	0.04	0.00	0.03	.208**	0.06	-.293**	.154**	-0.02	-.126**
<b>65</b> Positive Family Meal Atmosphere	.152**	0.08	0.07	0.02	0.04	0.03	.167**	0.04	-.343**	0.04	-0.06	-.190**
<b>66</b> Fast Food Eaten at Family Meals	0.04	0.07	0.01	-.177**	.120**	.159**	-0.06	0.05	.312**	0.07	.233**	.280**
<b>67</b> TV on During Family Meals	-.159**	0.05	-.180**	-.296**	.145**	0.03	-.204**	0.06	.161**	-0.07	0.05	.152**
<b>68</b> Family Meals Eaten at Kitchen or Dining Table	.218**	.132**	.304**	.226**	-0.04	0.04	.273**	-0.02	-0.08	.096*	0.00	-0.07
<b>69</b> Family Meals Eaten in the Car	0.05	.133**	.113**	-0.08	0.03	.183**	0.03	0.04	.286**	.126**	.213**	.260**
<b>70</b> Family Meal Planning	.298**	.192**	.239**	.111**	-0.07	.207**	.409**	.133**	-.113**	.299**	.115**	0.04
<b>71</b> Time and Energy for Family Meals	.209**	.130**	.151**	0.02	.094*	-0.01	.193**	0.05	-.241**	.116**	0.03	-.104*
<b>72</b> Family Support for Healthy Behaviors	0.08	0.03	0.06	.090*	0.00	-.173**	.099*	-0.07	-.464**	-.128**	-.182**	-.402**
<b>73</b> Conflict and Cohesion	-.235**	-.154**	-.179**	-.085*	-.137**	-.112**	-.321**	-0.07	.173**	-.115**	0.04	0.03

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	62	63	64	65	66	67	68	69	70	71	72	73
<b>59</b> Food Access and Decisions	.262**	.171**	.154**	0.04	0.07	-0.07	.096*	.126**	.299**	.116**	-.128**	-.115**
<b>60</b> Food Waste Acceptance	.361**	0.03	-0.02	-0.06	.233**	0.05	0.00	.213**	.115**	0.03	-.182**	0.04
<b>61</b> Instrumental Feeding	.577**	0.05	-.126**	-.190**	.280**	.152**	-0.07	.260**	0.04	-.104*	-.402**	0.03
<b>62</b> Non-Food Rewards	1.00	0.02	-0.07	-.192**	.195**	.161**	-0.03	.230**	.110**	-0.06	-.357**	0.00
<b>63</b> Family Meal Frequency	0.02	1.00	.369**	.132**	0.02	-0.07	.287**	0.00	.160**	.188**	0.07	-.222**
<b>64</b> Importance of Family Meals	-0.07	.369**	1.00	.490**	-.221**	-.252**	.314**	-.213**	.267**	.634**	.363**	-.385**
<b>65</b> Positive Family Meal Atmosphere	-.192**	.132**	.490**	1.00	-.160**	-0.05	0.05	-.193**	.171**	.469**	.389**	-.484**
<b>66</b> Fast Food Eaten at Family Meals	.195**	0.02	-.221**	-.160**	1.00	.259**	-0.08	.592**	-0.01	-.175**	-.374**	0.06
<b>67</b> TV on During Family Meals	.161**	-0.07	-.252**	-0.05	.259**	1.00	-.648**	.255**	-.182**	-.140**	-.174**	.085*
<b>68</b> Family Meals Eaten at Kitchen or Dining Table	-0.03	.287**	.314**	0.05	-0.08	-.648**	1.00	-0.01	.256**	.174**	0.05	-.103*
<b>69</b> Family Meals Eaten in the Car	.230**	0.00	-.213**	-.193**	.592**	.255**	-0.01	1.00	0.04	-.173**	-.479**	.104*
<b>70</b> Family Meal Planning	.110**	.160**	.267**	.171**	-0.01	-.182**	.256**	0.04	1.00	.218**	0.04	-.253**
<b>71</b> Time and Energy for Family Meals	-0.06	.188**	.634**	.469**	-.175**	-.140**	.174**	-.173**	.218**	1.00	.354**	-.415**
<b>72</b> Family Support for Healthy Behaviors	-.357**	0.07	.363**	.389**	-.374**	-.174**	0.05	-.479**	0.04	.354**	1.00	-.254**
<b>73</b> Conflict and Cohesion	0.00	-.222**	-.385**	-.484**	0.06	.085*	-.103*	.104*	-.253**	-.415**	-.254**	1.00

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	74	75	76	77	78	79	80	81	82	83	84	85
<b>59</b> Food Access and Decisions	-0.07	.123**	0.07	.125**	.102*	0.00	.084*	0.04	0.06	.126**	.134**	0.04
<b>60</b> Food Waste Acceptance	0.04	0.05	-0.07	-0.07	.112*	-.089*	.214**	.219**	.204**	.223**	.197**	.122**
<b>61</b> Instrumental Feeding	.132**	0.07	0.02	0.01	.108*	-0.04	.217**	.195**	.197**	.136**	.158**	.202**
<b>62</b> Non-Food Rewards	.159**	.183**	0.05	0.04	.098*	-0.01	.162**	.110**	.132**	.108*	.112**	.165**
<b>63</b> Family Meal Frequency	-.141**	.213**	.151**	.156**	.125**	-0.07	-0.05	0.03	0.00	-0.01	0.00	-0.03
<b>64</b> Importance of Family Meals	-.375**	.183**	.263**	.231**	0.03	-0.05	-.159**	0.00	-0.06	-0.06	-0.07	-0.04
<b>65</b> Positive Family Meal Atmosphere	-.580**	.121**	.242**	.141**	0.05	0.02	-0.06	-0.02	-0.05	-0.03	-0.02	-0.03
<b>66</b> Fast Food Eaten at Family Meals	.115**	.091*	-0.06	-0.05	0.01	0.08	.376**	.168**	.201**	.253**	.252**	.141**
<b>67</b> TV on During Family Meals	.094*	-0.02	-0.01	-.179**	-.186**	-0.04	.292**	.112**	.118**	0.02	0.06	0.04
<b>68</b> Family Meals Eaten at Kitchen or Dining Table	-0.06	.177**	0.05	.227**	.203**	0.04	-.172**	-0.01	0.00	0.06	0.03	-0.02
<b>69</b> Family Meals Eaten in the Car	.201**	0.00	-0.01	-0.01	0.05	-0.03	.331**	.210**	.220**	.272**	.235**	.116**
<b>70</b> Family Meal Planning	-.153**	.213**	.175**	.242**	.147**	-0.01	-0.05	-0.01	0.01	.117**	.085*	-0.03
<b>71</b> Time and Energy for Family Meals	-.431**	.150**	.202**	.225**	0.06	0.04	-0.05	0.01	-0.03	-0.02	-0.03	-0.06
<b>72</b> Family Support for Healthy Behaviors	-.324**	0.02	.138**	.106*	-0.06	-0.02	-.306**	-.148**	-.229**	-.274**	-.270**	-.171**
<b>73</b> Conflict and Cohesion	.450**	-.227**	-.361**	-.250**	-.200**	0.04	.089*	0.06	0.07	0.08	0.08	0.03

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	86	87	88	89	90	91	92	93	94	95	96	97
<b>59</b> Food Access and Decisions	-.161**	-.160**	-.149**	-0.05	.239**	.242**	.106*	.113**	.106*	.110**	.109*	0.02
<b>60</b> Food Waste Acceptance	0.00	-0.01	0.02	-0.02	-0.01	.128**	0.03	0.04	0.04	0.04	0.04	.188**
<b>61</b> Instrumental Feeding	0.07	0.06	0.03	0.06	0.03	0.05	0.05	0.05	0.04	0.04	0.04	.319**
<b>62</b> Non-Food Rewards	0.06	0.03	0.04	.092*	.115**	.133**	0.08	0.07	0.06	0.07	0.06	.186**
<b>63</b> Family Meal Frequency	-.091*	-.094*	-.107*	0.00	.161**	.178**	.160**	.179**	.174**	.177**	.176**	-0.01
<b>64</b> Importance of Family Meals	-.090*	-0.08	-0.05	-0.07	0.06	0.06	.131**	.137**	.135**	.136**	.136**	-.106*
<b>65</b> Positive Family Meal Atmosphere	-0.06	-0.03	-0.05	-0.05	-0.04	0.08	.120**	.120**	.118**	.119**	.119**	-.115**
<b>66</b> Fast Food Eaten at Family Meals	.115**	0.06	.113**	.093*	-0.02	.113**	.088*	0.08	0.08	0.08	0.08	.334**
<b>67</b> TV on During Family Meals	.124**	.174**	.101*	-0.01	-.132**	0.01	-.085*	-.091*	-.093*	-.092*	-.092*	.188**
<b>68</b> Family Meals Eaten at Kitchen or Dining Table	-.126**	-.188**	-0.07	-0.01	.140**	0.01	.196**	.201**	.204**	.203**	.203**	-0.05
<b>69</b> Family Meals Eaten in the Car	0.04	-0.01	0.06	0.06	0.05	0.05	0.06	0.05	0.05	0.05	0.05	.281**
<b>70</b> Family Meal Planning	-.175**	-.219**	-.140**	-0.02	.179**	.162**	.208**	.208**	.210**	.209**	.209**	-0.03
<b>71</b> Time and Energy for Family Meals	-0.06	-0.06	-0.01	-0.08	-0.01	0.03	.139**	.143**	.140**	.142**	.141**	-0.07
<b>72</b> Family Support for Healthy Behaviors	-0.02	0.02	-0.02	-0.07	-.109*	-0.03	0.05	0.05	0.05	0.05	0.05	-.327**
<b>73</b> Conflict and Cohesion	.092*	.101*	0.05	0.06	-.108*	-.150**	-.245**	-.265**	-.262**	-.264**	-.263**	0.03

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	98	99	100	101	102	103	104	105	106	107	108	109
<b>59</b> Food Access and Decisions	0.03	0.06	0.05	0.04	0.05	-0.03	0.04	-0.01	0.03	.147**	-.095*	-0.05
<b>60</b> Food Waste Acceptance	.209**	.219**	.213**	.210**	0.07	.108*	.106*	-0.08	0.05	.192**	.091*	.177**
<b>61</b> Instrumental Feeding	.323**	.316**	.323**	.327**	0.01	.194**	.093*	0.00	0.02	.186**	.107*	.191**
<b>62</b> Non-Food Rewards	.186**	.171**	.178**	.187**	-0.01	.109*	.105*	0.08	0.06	.180**	0.06	.097*
<b>63</b> Family Meal Frequency	0.00	0.03	0.02	0.01	.120**	-0.03	0.06	.113**	0.06	0.06	-0.05	-0.04
<b>64</b> Importance of Family Meals	-.113**	-.117**	-.115**	-.113**	0.08	0.05	0.02	.175**	.145**	0.04	-0.06	-0.06
<b>65</b> Positive Family Meal Atmosphere	-.116**	-.112**	-.114**	-.116**	0.05	-0.07	0.00	0.02	0.05	0.04	0.03	0.00
<b>66</b> Fast Food Eaten at Family Meals	.354**	.371**	.366**	.356**	0.04	.170**	.115**	-.100*	0.04	.222**	.244**	.298**
<b>67</b> TV on During Family Meals	.186**	.176**	.182**	.187**	-.088*	0.02	0.03	-.106*	-0.08	0.03	.184**	.145**
<b>68</b> Family Meals Eaten at Kitchen or Dining Table	-0.06	-0.06	-0.06	-0.06	.145**	.089*	.091*	.161**	.093*	0.04	-.143**	-0.04
<b>69</b> Family Meals Eaten in the Car	.305**	.337**	.329**	.309**	0.01	.085*	0.08	-.152**	-0.04	.209**	0.08	.175**
<b>70</b> Family Meal Planning	-0.02	0.00	-0.01	-0.02	.121**	0.02	.105*	.099*	.095*	.169**	-.104*	-0.02
<b>71</b> Time and Energy for Family Meals	-0.06	-0.05	-0.05	-0.06	0.07	0.01	0.05	.135**	.135**	0.06	0.01	0.02
<b>72</b> Family Support for Healthy Behaviors	-.336**	-.334**	-.337**	-.338**	0.00	-.146**	-.091*	.146**	.096*	-.103*	-.086*	-.128**
<b>73</b> Conflict and Cohesion	0.02	0.00	0.00	0.02	-.165**	-0.04	-.107*	-.221**	-.122**	-.143**	-0.03	0.00

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

	<b>Characteristics</b>	<b>110</b>	<b>111</b>	<b>112</b>	<b>113</b>	<b>114</b>	<b>115</b>	<b>116</b>	<b>117</b>	<b>118</b>	<b>119</b>	<b>120</b>
<b>59</b>	Food Access and Decisions	.197**	.091*	0.03	0.04	-0.02	0.01	-0.08	-.119**	-.144**	-0.02	0.06
<b>60</b>	Food Waste Acceptance	.302**	.205**	.229**	.228**	.109*	.202**	0.04	.104*	-.123**	-0.03	-0.04
<b>61</b>	Instrumental Feeding	.316**	.246**	.262**	.268**	.130**	.234**	0.03	.111**	-.134**	-0.01	-0.06
<b>62</b>	Non-Food Rewards	.211**	.184**	.185**	.195**	.116**	.139**	.091*	.094*	-.087*	0.01	0.01
<b>63</b>	Family Meal Frequency	0.03	-0.02	-0.01	0.00	0.03	-0.07	0.04	-0.07	-.089*	-0.05	0.00
<b>64</b>	Importance of Family Meals	-0.07	-0.01	-0.02	-0.01	-0.04	-.138**	0.01	-.114**	-0.08	0.00	.119**
<b>65</b>	Positive Family Meal Atmosphere	-0.07	-0.07	-0.02	-0.03	0.01	-.113**	0.02	-.113**	-.092*	-0.03	0.02
<b>66</b>	Fast Food Eaten at Family Meals	.396**	.324**	.384**	.378**	.191**	.300**	0.03	.175**	-0.03	-0.03	0.02
<b>67</b>	TV on During Family Meals	.242**	.141**	.203**	.191**	0.08	.178**	0.04	.152**	.124**	0.03	-0.02
<b>68</b>	Family Meals Eaten at Kitchen or Dining Table	-.119**	-0.04	-.085*	-0.07	0.03	-0.03	0.06	-0.04	-.144**	-0.03	-0.03
<b>69</b>	Family Meals Eaten in the Car	.380**	.323**	.266**	.271**	.170**	.308**	0.05	.184**	-.085*	-0.02	-0.04
<b>70</b>	Family Meal Planning	0.05	0.07	0.01	0.03	.084*	-0.05	.096*	-0.02	-.144**	-0.07	0.02
<b>71</b>	Time and Energy for Family Meals	-0.04	0.04	0.04	0.05	-0.02	-0.07	0.04	-.091*	-0.08	-0.05	0.04
<b>72</b>	Family Support for Healthy Behaviors	-.356**	-.231**	-.215**	-.213**	-.118**	-.273**	-0.01	-.171**	-0.04	-0.06	0.02
<b>73</b>	Conflict and Cohesion	-0.05	0.01	-0.06	-0.07	-0.05	.101*	-.085*	.098*	.196**	0.05	-0.02

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).



**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	1	2	3	4	5	6	7	8	9	10	11	12	13
<b>74</b> Disorganization Verbal	0.01	0.00	0.07	.240**	-0.08	.247**	-0.06	.149**	.253**	0.03	0.00	0.00	-.104*
<b>75</b> Engagement with Children	-0.01	0.00	-0.02	0.06	.086*	-0.03	.123**	-0.08	-.113**	-0.05	.171**	0.02	0.07
<b>76</b> Engagement with Children Physical	-0.05	-0.01	0.00	-.101*	0.00	-0.06	0.03	-0.03	-0.06	0.00	0.03	-0.07	-0.02
<b>77</b> Physical Activity Availability	-.151**	0.04	0.02	.213**	.260**	-.232**	.183**	-0.07	-.112**	-.122**	.224**	0.00	0.03
<b>78</b> Physical Activity Accessibility	0.03	.172**	.131**	-0.03	.154**	-.272**	.187**	-.137**	-.213**	0.00	.168**	-0.05	0.08
<b>79</b> Number of Media Devices in the Home	0.03	0.04	0.07	.263**	.372**	-.114**	-0.01	0.00	-0.08	-.149**	0.07	.088*	0.01
<b>80</b> Number of Media Devices in Child's Bedroom	.221**	-.090*	.110**	0.03	0.04	.157**	0.01	0.01	.125**	-.224**	.171**	.120**	0.01
<b>81</b> TV Accessibility	.090*	-0.07	0.06	.150**	-0.04	.095*	0.07	0.05	.114**	-.128**	.158**	0.06	0.03
<b>82</b> Computer Accessibility	.129**	0.00	.106*	0.08	0.00	.106*	.091*	-0.06	.085*	-0.06	.160**	0.01	0.07
<b>83</b> Standing Video Game Accessibility	.131**	-0.03	.143**	.164**	0.03	.101*	.103*	-0.07	0.00	-.159**	.232**	0.08	0.02
<b>84</b> Sitting Video Game Accessibility	.118**	-0.04	.127**	.145**	0.03	.126**	0.05	-0.04	0.04	-.121**	.199**	0.07	0.03
<b>85</b> Tablet Accessibility	.136**	0.04	.100*	0.01	.110**	-0.03	0.00	-0.02	0.00	-0.05	.123**	0.01	0.03
<b>86</b> Total Hours Screentime Allowed	-0.02	-0.07	-0.04	0.03	0.02	.121**	-.156**	.128**	.101*	-.085*	-0.04	.138**	0.06
<b>87</b> Hours TV Allowed	-0.03	-.129**	-.095*	0.00	-0.03	.124**	-.153**	.123**	.150**	-0.08	-.100*	.131**	0.04
<b>88</b> Hours Computer Allowed	0.03	-.084*	-0.01	0.01	0.02	.085*	-.135**	.103*	0.06	-0.07	0.01	.086*	0.03

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	14	15	16	17	18	19	20	21	22	23	24	25	26
74 Disorganization Verbal	-.196**	-0.07	-0.06	-0.05	-0.06	-0.05	.137**	.137**	.137**	.135**	0.00	-0.05	-.087*
75 Engagement with Children Physical	.099*	.134**	.152**	.151**	.152**	.152**	0.05	0.05	0.05	0.05	0.07	.098*	0.05
76 Engagement with Children Physical Activity Availability	0.02	.159**	.150**	.147**	.149**	.148**	0.02	0.02	0.02	0.01	.144**	.091*	.086*
77 Physical Activity Accessibility	0.06	.244**	.249**	.250**	.249**	.250**	0.08	0.08	0.08	0.07	.163**	.110*	.102*
78 Physical Activity Accessibility Number of Media Devices in the Home	.227**	.142**	.172**	.176**	.174**	.175**	0.05	0.05	0.05	0.05	0.08	0.08	0.07
79 Number of Media Devices in Child's Bedroom	0.00	0.02	0.01	0.02	0.01	0.01	.114**	.114**	.114**	.115**	-0.01	0.01	0.04
80 TV Accessibility	0.07	.175**	.185**	.181**	.184**	.183**	.336**	.336**	.336**	.340**	.144**	.189**	.191**
81 Computer Accessibility	0.02	.160**	.155**	.154**	.155**	.154**	.222**	.222**	.222**	.226**	.095*	.131**	.142**
82 Standing Video Game Accessibility	0.04	.181**	.180**	.184**	.182**	.182**	.160**	.160**	.160**	.164**	.117**	.166**	.179**
83 Sitting Video Game Accessibility	0.08	.222**	.227**	.228**	.228**	.228**	.197**	.197**	.197**	.200**	.148**	.166**	.231**
84 Tablet Accessibility	0.08	.167**	.175**	.179**	.177**	.178**	.230**	.230**	.230**	.233**	.118**	.120**	.185**
85 Total Hours	0.07	0.03	0.02	0.02	0.02	0.02	.098*	.098*	.098*	.102*	0.04	0.08	0.02
86 Screentime Allowed	-.114**	-.108*	-.122**	-.125**	-.124**	-.124**	0.07	0.07	0.07	0.07	-0.06	-0.04	-.085*
87 Hours TV Allowed	-.131**	-.157**	-.177**	-.182**	-.179**	-.180**	0.06	0.06	0.06	0.06	-0.08	-0.05	-.124**
88 Hours Computer Allowed	-0.08	-0.06	-0.08	-0.08	-0.08	-0.08	0.03	0.03	0.03	0.03	-.094*	-0.03	-0.05

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	27	28	29	30	31	32	33	34	35	36	37	38	39
<b>74</b> Disorganization Verbal	0.06	0.01	.119**	0.08	.100*	.099*	.091*	.310**	.268**	.140**	-.210**	-.467**	-0.08
<b>75</b> Engagement with Children	0.01	0.04	0.07	0.05	0.06	0.06	0.06	-.145**	-.136**	.151**	.093*	.156**	.252**
<b>76</b> Engagement with Children Physical	-0.01	0.00	0.01	0.03	0.01	0.01	0.01	-.126**	-.115**	0.02	.106*	.152**	.181**
<b>77</b> Physical Activity Availability	-0.03	-0.01	0.00	0.02	-0.01	-0.01	-0.01	-.089*	-.132**	.146**	.118**	.172**	.146**
<b>78</b> Physical Activity Accessibility	-.140**	-0.03	0.02	0.05	-0.05	-0.03	-0.05	-.104*	-.128**	.118**	.103*	0.05	.202**
<b>79</b> Number of Media Devices in the Home	.084*	0.08	0.08	0.05	.108*	.105*	.109*	-0.05	-0.07	-0.02	0.02	0.07	0.07
<b>80</b> Number of Media Devices in Child's Bedroom	.200**	.352**	.248**	.251**	.360**	.366**	.373**	.085*	0.03	-0.04	-.168**	0.02	.129**
<b>81</b> TV Accessibility	0.07	.250**	.162**	.148**	.204**	.213**	.218**	0.00	0.01	0.06	-0.07	0.02	0.04
<b>82</b> Computer Accessibility	0.05	.184**	.126**	.158**	.171**	.182**	.178**	0.03	-0.01	.084*	-.150**	0.04	.116**
<b>83</b> Standing Video Game Accessibility	0.00	.194**	.211**	.178**	.183**	.199**	.189**	0.02	0.00	.122**	-.119**	0.00	.115**
<b>84</b> Sitting Video Game Accessibility	0.07	.192**	.176**	.186**	.210**	.220**	.214**	0.02	0.05	.092*	-.113**	0.00	.090*
<b>85</b> Tablet Accessibility	0.00	0.07	0.08	0.08	0.08	.084*	0.08	0.01	0.04	0.07	-.143**	0.01	.138**
<b>86</b> Total Hours Screentime Allowed	.162**	.097*	0.04	0.03	.129**	.118**	.133**	0.03	.107*	-0.06	-.096*	-.116**	-0.08
<b>87</b> Hours TV Allowed	.181**	.090*	0.00	-0.01	.107*	.091*	.113**	0.01	0.07	-.139**	-0.06	-.112**	-.121**
<b>88</b> Hours Computer Allowed	.120**	0.06	0.06	0.03	.104*	.096*	.103*	0.00	0.06	-0.01	-.131**	-.112**	-.088*

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	40	41	42	43	44	45	46	47	48	49	50	51	52
<b>74</b> Disorganization Verbal	-.245**	-.280**	-0.08	0.06	0.06	.112**	.162**	-.088*	-0.08	-.158**	-.106*	-0.04	-0.03
<b>75</b> Engagement with Children	.170**	.145**	.158**	0.07	0.08	0.01	0.00	.247**	.342**	.351**	.276**	.302**	.255**
<b>76</b> Engagement with Children Physical	.208**	0.04	0.05	0.06	0.05	0.04	-.107*	.135**	.186**	.314**	.221**	.246**	.188**
<b>77</b> Physical Activity Availability	.095*	.178**	.254**	-0.07	-0.07	-0.01	-0.05	.276**	.363**	.404**	.256**	.286**	.314**
<b>78</b> Physical Activity Accessibility	.132**	.227**	.233**	-.114**	-0.08	0.05	-0.02	.244**	.255**	.295**	.291**	.154**	.202**
<b>79</b> Number of Media Devices in the Home	.089*	.102*	0.08	-0.01	0.01	-0.03	0.01	-0.01	-0.06	-0.05	0.01	0.04	-0.02
<b>80</b> Number of Media Devices in Child's Bedroom	.141**	-0.06	0.00	.084*	.085*	.125**	0.01	0.03	-0.07	-0.05	0.04	.085*	-0.05
<b>81</b> TV Accessibility	.131**	-.098*	0.00	0.07	0.04	.139**	0.02	.114**	0.03	-0.04	.089*	0.04	0.00
<b>82</b> Computer Accessibility	.191**	-0.02	0.04	0.04	0.06	.106*	-0.01	.123**	0.04	0.00	.102*	0.06	0.04
<b>83</b> Standing Video Game Accessibility	.138**	0.04	0.05	0.01	0.04	0.08	-0.03	.200**	0.07	0.00	.129**	0.01	0.03
<b>84</b> Sitting Video Game Accessibility	.128**	0.01	0.04	0.02	0.05	0.08	0.02	.147**	0.06	0.02	.123**	0.00	-0.02
<b>85</b> Tablet Accessibility	.143**	0.05	0.08	0.02	0.05	0.06	-0.01	0.07	0.03	-0.02	0.03	-0.01	-0.03
<b>86</b> Total Hours Screentime Allowed	-.092*	-.175**	-0.07	.109*	.105*	-0.03	.102*	-.105*	-.167**	-.235**	-.203**	-0.05	-.149**
<b>87</b> Hours TV Allowed	-.099*	-.205**	-.098*	.091*	0.05	-0.02	.091*	-.174**	-.195**	-.241**	-.234**	-0.06	-.211**
<b>88</b> Hours Computer Allowed	-0.08	-.124**	-0.06	.089*	.084*	-0.03	0.03	-0.03	-.154**	-.199**	-.138**	-0.04	-.120**

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	53	54	55	56	57	58	59	60	61	62	63	64	65
<b>74</b> Disorganization Verbal	0.00	-0.02	0.00	-.161**	-0.05	.232**	-0.07	0.04	.132**	.159**	-.141**	-.375**	-.580**
<b>75</b> Engagement with Children	-0.05	.123**	.220**	.185**	.118**	-0.06	.123**	0.05	0.07	.183**	.213**	.183**	.121**
<b>76</b> Engagement with Children Physical	0.04	.121**	.121**	.172**	0.04	-.120**	0.07	-0.07	0.02	0.05	.151**	.263**	.242**
<b>77</b> Physical Activity Availability	0.08	.100*	.198**	.228**	0.04	-.146**	.125**	-0.07	0.01	0.04	.156**	.231**	.141**
<b>78</b> Physical Activity Accessibility	0.06	.119**	.145**	.249**	0.04	0.03	.102*	.112*	.108*	.098*	.125**	0.03	0.05
<b>79</b> Number of Media Devices in the Home	-.118**	0.05	0.03	-0.06	-0.01	-0.07	0.00	-.089*	-0.04	-0.01	-0.07	-0.05	0.02
<b>80</b> Number of Media Devices in Child's Bedroom	-.232**	.134**	.147**	-.110**	0.05	.153**	.084*	.214**	.217**	.162**	-0.05	-.159**	-0.06
<b>81</b> TV Accessibility	-.151**	.114**	.161**	0.03	0.06	0.05	0.04	.219**	.195**	.110**	0.03	0.00	-0.02
<b>82</b> Computer Accessibility	-.085*	.133**	.199**	0.03	-0.01	.107*	0.06	.204**	.197**	.132**	0.00	-0.06	-0.05
<b>83</b> Standing Video Game Accessibility	-0.06	.091*	.228**	.093*	0.01	.087*	.126**	.223**	.136**	.108*	-0.01	-0.06	-0.03
<b>84</b> Sitting Video Game Accessibility	-.104*	.123**	.198**	0.04	0.06	.113**	.134**	.197**	.158**	.112**	0.00	-0.07	-0.02
<b>85</b> Tablet Accessibility	-.121**	.131**	0.08	0.00	0.03	.104*	0.04	.122**	.202**	.165**	-0.03	-0.04	-0.03
<b>86</b> Total Hours Screentime Allowed	-.176**	0.08	-.087*	-.207**	-0.05	0.03	-.161**	0.00	0.07	0.06	-.091*	-.090*	-0.06
<b>87</b> Hours TV Allowed	-.231**	0.08	-.087*	-.268**	-0.01	-0.01	-.160**	-0.01	0.06	0.03	-.094*	-0.08	-0.03
<b>88</b> Hours Computer Allowed	-.165**	0.05	-.131**	-.140**	-0.05	0.06	-.149**	0.02	0.03	0.04	-.107*	-0.05	-0.05

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	66	67	68	69	70	71	72	73	74	75	76	77	78
<b>74</b> Disorganization Verbal	.115**	.094*	-0.06	.201**	-.153**	-.431**	-.324**	.450**	1.00	-0.06	-.180**	-0.05	-0.06
<b>75</b> Engagement with Children Physical	.091*	-0.02	.177**	0.00	.213**	.150**	0.02	-.227**	-0.06	1.00	.245**	.330**	.165**
<b>76</b> Engagement with Children Physical Activity Availability	-0.06	-0.01	0.05	-0.01	.175**	.202**	.138**	-.361**	-.180**	.245**	1.00	.204**	0.06
<b>77</b> Physical Activity Accessibility	-0.05	-.179**	.227**	-0.01	.242**	.225**	.106*	-.250**	-0.05	.330**	.204**	1.00	.232**
<b>78</b> Physical Activity Accessibility Number of Media Devices in the Home	0.01	-.186**	.203**	0.05	.147**	0.06	-0.06	-.200**	-0.06	.165**	0.06	.232**	1.00
<b>79</b> Number of Media Devices in Child's Bedroom	0.08	-0.04	0.04	-0.03	-0.01	0.04	-0.02	0.04	-0.03	0.01	-.084*	.174**	0.02
<b>80</b> TV Accessibility	.376**	.292**	-.172**	.331**	-0.05	-0.05	-.306**	.089*	0.03	-0.04	-.094*	-0.02	-0.01
<b>81</b> Computer Accessibility	.168**	.112**	-0.01	.210**	-0.01	0.01	-.148**	0.06	0.04	0.00	0.00	0.07	-0.04
<b>82</b> Standing Video Game Accessibility	.201**	.118**	0.00	.220**	0.01	-0.03	-.229**	0.07	.098*	0.01	-0.05	.096*	.117**
<b>83</b> Sitting Video Game Accessibility	.253**	0.02	0.06	.272**	.117**	-0.02	-.274**	0.08	0.05	-0.01	-0.06	.138**	.116**
<b>84</b> Tablet Accessibility	.252**	0.06	0.03	.235**	.085*	-0.03	-.270**	0.08	0.05	0.00	-0.07	.113**	.123**
<b>85</b> Total Hours	.141**	0.04	-0.02	.116**	-0.03	-0.06	-.171**	0.03	0.04	0.00	-0.06	0.05	.147**
<b>86</b> Screentime Allowed	.115**	.124**	-.126**	0.04	-.175**	-0.06	-0.02	.092*	0.06	-.102*	-0.04	-.117**	-.122**
<b>87</b> Hours TV Allowed	0.06	.174**	-.188**	-0.01	-.219**	-0.06	0.02	.101*	0.04	-.105*	-0.03	-.135**	-.164**
<b>88</b> Hours Computer Allowed	.113**	.101*	-0.07	0.06	-.140**	-0.01	-0.02	0.05	0.04	-.116**	-0.04	-.123**	-.111*

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	79	80	81	82	83	84	85	86	87	88	89	90	91
<b>74</b> Disorganization Verbal	-0.03	0.03	0.04	.098*	0.05	0.05	0.04	0.06	0.04	0.04	0.05	0.04	-.091*
<b>75</b> Engagement with Children	0.01	-0.04	0.00	0.01	-0.01	0.00	0.00	-.102*	-.105*	-.116**	0.00	.147**	.139**
<b>76</b> Engagement with Children Physical	-.084*	-.094*	0.00	-0.05	-0.06	-0.07	-0.06	-0.04	-0.03	-0.04	-0.01	.095*	.112**
<b>77</b> Physical Activity Availability	.174**	-0.02	0.07	.096*	.138**	.113**	0.05	-.117**	-.135**	-.123**	0.01	0.04	-0.02
<b>78</b> Physical Activity Accessibility	0.02	-0.01	-0.04	.117**	.116**	.123**	.147**	-.122**	-.164**	-.111*	0.02	.099*	0.05
<b>79</b> Number of Media Devices in the Home	1.00	.316**	.108*	0.07	.218**	.224**	.220**	.212**	.142**	.181**	.168**	-.141**	-0.02
<b>80</b> Number of Media Devices in Child's Bedroom	.316**	1.00	.301**	.367**	.383**	.420**	.257**	.106*	0.05	.100*	.098*	-.117**	-0.01
<b>81</b> TV Accessibility	.108*	.301**	1.00	.588**	.518**	.492**	.333**	.092*	0.05	0.06	.102*	-.166**	0.00
<b>82</b> Computer Accessibility	0.07	.367**	.588**	1.00	.595**	.599**	.444**	0.07	0.00	0.07	.117**	-.132**	0.00
<b>83</b> Standing Video Game Accessibility	.218**	.383**	.518**	.595**	1.00	.798**	.404**	.096*	-0.02	0.07	.192**	-0.05	0.00
<b>84</b> Sitting Video Game Accessibility	.224**	.420**	.492**	.599**	.798**	1.00	.386**	0.07	-0.04	0.04	.177**	-0.07	0.01
<b>85</b> Tablet Accessibility	.220**	.257**	.333**	.444**	.404**	.386**	1.00	.177**	0.07	.190**	.164**	-0.06	0.03
<b>86</b> Total Hours Screentime Allowed	.212**	.106*	.092*	0.07	.096*	0.07	.177**	1.00	.828**	.804**	.642**	-.157**	-0.03
<b>87</b> Hours TV Allowed	.142**	0.05	0.05	0.00	-0.02	-0.04	0.07	.828**	1.00	.537**	.270**	-.171**	-0.04
<b>88</b> Hours Computer Allowed	.181**	.100*	0.06	0.07	0.07	0.04	.190**	.804**	.537**	1.00	.291**	-.141**	-0.04

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	92	93	94	95	96	97	98	99	100	101	102	103	104
<b>74</b> Disorganization Verbal	-.159**	-.169**	-.165**	-.167**	-.166**	.099*	.088*	0.07	0.08	.087*	-0.04	.086*	0.02
<b>75</b> Engagement with Children	.190**	.211**	.210**	.210**	.210**	0.05	0.05	0.04	0.05	0.05	.159**	0.08	.114**
<b>76</b> Engagement with Children Physical	.146**	.139**	.136**	.138**	.137**	-0.01	-0.01	0.00	-0.01	-0.01	0.07	-0.02	0.03
<b>77</b> Physical Activity Availability	.298**	.326**	.326**	.326**	.326**	0.08	0.07	0.06	0.06	0.07	.232**	.142**	.274**
<b>78</b> Physical Activity Accessibility	.224**	.249**	.251**	.250**	.251**	0.05	0.05	0.05	0.05	0.05	.228**	.088*	.108*
<b>79</b> Number of Media Devices in the Home	0.07	0.05	0.05	0.05	0.05	.104*	.103*	0.08	0.08	.095*	0.04	0.08	.159**
<b>80</b> Number of Media Devices in Child's Bedroom	0.04	0.04	0.03	0.03	0.03	.287**	.297**	.287**	.290**	.298**	0.04	.137**	0.06
<b>81</b> TV Accessibility	0.07	0.06	0.06	0.06	0.06	.224**	.242**	.263**	.255**	.241**	0.02	.116**	.163**
<b>82</b> Computer Accessibility	0.05	0.04	0.04	0.04	0.04	.171**	.183**	.193**	.189**	.183**	0.07	.086*	.132**
<b>83</b> Standing Video Game Accessibility	.085*	0.07	0.07	0.07	0.07	.203**	.218**	.227**	.222**	.217**	0.06	.103*	.158**
<b>84</b> Sitting Video Game Accessibility	.092*	0.08	0.08	0.08	0.08	.213**	.220**	.222**	.223**	.220**	0.08	.128**	.127**
<b>85</b> Tablet Accessibility	0.06	0.04	0.04	0.04	0.04	.178**	.176**	.152**	.157**	.170**	0.03	.141**	0.07
<b>86</b> Total Hours Screentime Allowed	-.124**	-.132**	-.133**	-.132**	-.133**	.095*	.100*	.090*	.090*	.097*	-0.07	0.00	-0.02
<b>87</b> Hours TV Allowed	-.163**	-.168**	-.171**	-.170**	-.170**	0.06	0.06	0.05	0.05	0.06	-0.08	-0.02	-0.04
<b>88</b> Hours Computer Allowed	-0.05	-0.05	-0.05	-0.05	-0.05	.091*	.099*	.087*	.085*	.095*	0.00	0.04	0.02

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).



**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

	Characteristics	105	106	107	108	109	110	111	112	113	114	115	116	117
74	Disorganization Verbal	-0.02	-0.08	-0.08	0.03	0.06	0.03	0.03	0.04	0.03	0.03	.117**	0.03	.123**
75	Engagement with Children	.163**	.119**	0.07	0.08	0.05	0.05	0.06	.110*	.114**	0.06	-0.03	.087*	0.02
76	Engagement with Children Physical	.097*	.109*	0.08	-0.03	-0.05	0.02	0.05	0.02	0.03	0.01	-.139**	0.04	-.108*
77	Physical Activity Availability	.187**	.121**	.095*	-0.01	0.06	-0.01	0.01	0.05	0.06	.106*	-0.06	.197**	0.04
78	Physical Activity Accessibility	.161**	.132**	0.07	0.00	0.00	0.07	0.04	0.06	0.07	.126**	0.03	.151**	0.04
79	Number of Media Devices in the Home	-.095*	0.02	0.03	0.08	.152**	0.00	0.03	0.07	0.06	.117**	0.08	.093*	.178**
80	Number of Media Devices in Child's Bedroom	-0.08	0.05	.150**	.189**	.308**	.299**	.275**	.323**	.321**	.241**	.393**	.144**	.317**
81	TV Accessibility	-0.08	-0.01	.154**	.122**	.241**	.187**	.194**	.216**	.216**	.290**	.304**	.228**	.280**
82	Computer Accessibility	-.134**	-0.03	.134**	0.05	.166**	.227**	.208**	.173**	.175**	.332**	.328**	.264**	.324**
83	Standing Video Game Accessibility	-.158**	0.01	.152**	0.06	.178**	.234**	.186**	.175**	.173**	.348**	.318**	.283**	.311**
84	Sitting Video Game Accessibility	-.116**	0.02	.114**	.111**	.217**	.238**	.192**	.215**	.212**	.346**	.357**	.269**	.345**
85	Tablet Accessibility	0.02	0.05	0.04	0.07	.158**	.094*	0.07	.122**	.124**	.195**	.205**	.162**	.210**
86	Total Hours Screentime Allowed	-0.06	0.00	-.089*	.094*	.151**	-0.01	0.01	0.06	0.06	0.01	0.07	0.00	0.08
87	Hours TV Allowed	-0.07	-0.03	-.139**	.092*	.125**	-0.06	-0.04	0.02	0.01	-0.06	0.01	-0.07	0.04
88	Hours Computer Allowed	-0.04	0.03	-0.05	0.06	.119**	0.01	0.03	0.06	0.06	0.03	0.05	0.00	0.05

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

	Characteristics	118	119	120
74	Disorganization	.100*	-0.03	-0.02
75	Verbal Engagement with Children	-.100*	0.08	0.04
76	Physical Engagement with Children	-0.07	-0.01	0.01
77	Physical Activity Availability	-.117**	-0.02	-0.05
78	Physical Activity Accessibility	-.132**	0.04	-0.03
79	Number of Media Devices in the Home	0.04	0.00	0.06
80	Number of Media Devices in Child's Bedroom	0.04	0.01	0.03
81	TV Accessibility	-0.03	-0.03	0.00
82	Computer Accessibility	-0.04	0.03	-0.01
83	Standing Video Game Accessibility	-0.07	-0.03	-0.02
84	Sitting Video Game Accessibility	-0.06	-0.03	0.00
85	Tablet Accessibility	0.03	-0.02	-0.01
86	Total Hours Screen Time Allowed	.105*	-0.05	0.08
87	Hours TV Allowed	.096*	-0.04	0.06
88	Hours Computer Allowed	.099*	-0.02	0.06

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).

\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

	Characteristics	1	2	3	4	5	6	7	8	9	10	11	12	13
89	Hours all Video Games Allowed Limiting TV	-0.04	0.06	0.04	0.05	0.06	0.06	-0.06	0.06	0.00	-0.04	0.01	.094*	0.07
90	Commercials and Shows not Appropriate	-.096*	.109*	-0.03	-0.03	0.06	-0.03	.087*	-0.04	-0.03	0.08	0.00	-0.06	0.08
91	Child Permitted to only Watch Educational TV	0.06	-0.01	0.01	-.118**	0.01	0.05	.100*	-.090*	-0.05	-0.04	0.04	0.07	-0.01
92	Fruit and Vegetable Serving Availability	0.02	0.05	0.08	-0.02	.133**	-.370**	.224**	-.143**	-.129**	-0.02	.239**	0.02	.085*
93	Fiber Availability	0.01	0.05	0.07	-0.01	.139**	-.365**	.231**	-.159**	-.149**	-0.04	.264**	0.02	.103*
94	Vitamin C Availability	0.00	0.06	0.08	-0.01	.142**	-.368**	.231**	-.155**	-.149**	-0.02	.257**	0.01	.099*
95	Magnesium Availability	0.01	0.05	0.07	-0.01	.141**	-.366**	.231**	-.157**	-.149**	-0.03	.261**	0.02	.101*
96	Potassium Availability	0.00	0.06	0.07	-0.01	.141**	-.367**	.231**	-.157**	-.149**	-0.03	.260**	0.02	.101*
97	Fatty/Salty Snack Serving Availability	.194**	0.04	0.05	-0.07	0.02	-0.05	.110**	-0.03	.135**	-0.05	.160**	0.06	.094*
98	Fatty/Salty Snack Kcal Availability	.199**	0.04	0.04	-0.07	0.01	-0.04	.123**	-0.04	.128**	-0.06	.181**	0.07	.097*
99	Fatty/Salty Snack Sugar Availability	.204**	0.02	0.04	-0.07	-0.01	-0.03	.149**	-0.06	.107*	-0.07	.198**	0.08	.106*
100	Fatty/Salty Snack Saturated Fat Availability	.206**	0.03	0.04	-0.07	-0.01	-0.03	.142**	-0.06	.116**	-0.07	.189**	0.07	.106*
101	Fatty/Salty Snack Fat Availability	.202**	0.03	0.04	-0.07	0.01	-0.04	.125**	-0.04	.129**	-0.07	.181**	0.06	.100*

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

	Characteristics	14	15	16	17	18	19	20	21	22	23	24	25	26
89	Hours all Video Games Allowed	-0.04	-0.01	0.00	0.00	0.00	0.00	0.06	0.06	0.06	0.06	0.04	0.00	-0.01
90	Limiting TV Commercials and Shows not Appropriate	.090*	.123**	.142**	.142**	.142**	.142**	-.097*	-.097*	-.097*	-.100*	.099*	0.02	.091*
91	Child Permitted to only Watch Educational TV	.109*	.164**	.178**	.174**	.176**	.175**	-0.04	-0.04	-0.04	-0.04	0.04	.111**	.152**
92	Fruit and Vegetable Serving Availability	.177**	.506**	.493**	.498**	.496**	.497**	.103*	.103*	.103*	.103*	.225**	.355**	.323**
93	Fiber Availability	.194**	.491**	.515**	.516**	.516**	.516**	0.08	0.08	0.08	0.08	.226**	.333**	.290**
94	Vitamin C Availability	.194**	.489**	.508**	.512**	.510**	.511**	0.08	0.08	0.08	0.08	.228**	.330**	.287**
95	Magnesium Availability	.194**	.490**	.512**	.514**	.514**	.514**	0.08	0.08	0.08	0.08	.227**	.332**	.289**
96	Potassium Availability	.194**	.490**	.511**	.514**	.513**	.513**	0.08	0.08	0.08	0.08	.227**	.331**	.288**
97	Fatty/Salty Snack Serving Availability	.141**	.217**	.199**	.198**	.199**	.199**	.410**	.410**	.410**	.412**	.131**	.195**	.218**
98	Fatty/Salty Snack Kcal Availability	.146**	.248**	.233**	.232**	.232**	.232**	.424**	.424**	.424**	.426**	.152**	.225**	.243**
99	Fatty/Salty Snack Sugar Availability	.153**	.284**	.270**	.269**	.270**	.270**	.414**	.414**	.414**	.415**	.172**	.261**	.280**
100	Fatty/Salty Snack Saturated Fat Availability	.155**	.269**	.253**	.253**	.253**	.253**	.415**	.415**	.415**	.417**	.161**	.246**	.269**
101	Fatty/Salty Snack Fat Availability	.151**	.250**	.234**	.233**	.234**	.233**	.422**	.422**	.422**	.423**	.151**	.228**	.247**

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

	Characteristics	27	28	29	30	31	32	33	34	35	36	37	38	39
89	Hours all Video Games Allowed	0.05	0.07	0.06	0.05	0.08	0.08	.084*	0.07	.117**	0.03	-0.03	-0.03	0.04
90	Limiting TV Commercials and Shows not Appropriate	-.200**	-.202**	-0.02	-0.01	-.158**	-.145**	-.175**	0.00	0.01	.235**	0.08	-0.04	.097*
91	Child Permitted to only Watch Educational TV	-0.07	-0.05	0.06	-0.01	-0.03	-0.03	-0.04	-.092*	-.085*	0.04	.087*	.125**	.098*
92	Fruit and Vegetable Serving Availability	-0.08	0.05	-0.01	0.06	-0.01	0.01	0.00	-.203**	-.180**	0.06	.164**	.207**	.256**
93	Fiber Availability	-.092*	0.04	-0.03	0.05	-0.02	-0.01	-0.02	-.190**	-.169**	0.08	.184**	.209**	.245**
94	Vitamin C Availability	-.094*	0.03	-0.03	0.05	-0.03	-0.02	-0.02	-.192**	-.168**	.086*	.189**	.208**	.245**
95	Magnesium Availability	-.093*	0.03	-0.03	0.05	-0.03	-0.01	-0.02	-.191**	-.169**	.084*	.186**	.209**	.245**
96	Potassium Availability	-.093*	0.03	-0.03	0.05	-0.03	-0.01	-0.02	-.191**	-.168**	.085*	.187**	.208**	.245**
97	Fatty/Salty Snack Serving Availability	.198**	.374**	.207**	.258**	.354**	.362**	.371**	.135**	.159**	0.02	-.124**	0.00	.088*
98	Fatty/Salty Snack Kcal Availability	.185**	.389**	.219**	.283**	.365**	.376**	.382**	.134**	.147**	0.03	-.117**	0.01	.095*
99	Fatty/Salty Snack Sugar Availability	.157**	.391**	.224**	.299**	.359**	.375**	.376**	.125**	.123**	0.03	-.091*	0.03	.107*
100	Fatty/Salty Snack Saturated Fat Availability	.172**	.391**	.222**	.290**	.362**	.375**	.379**	.130**	.136**	0.03	-.099*	0.02	.104*
101	Fatty/Salty Snack Fat Availability	.186**	.390**	.220**	.282**	.366**	.377**	.383**	.135**	.149**	0.03	-.115**	0.01	.097*

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

	Characteristics	40	41	42	43	44	45	46	47	48	49	50	51	52
89	Hours all Video Games Allowed Limiting TV	-0.02	-0.05	0.01	0.07	.113**	-0.01	.111**	-0.01	-0.01	-0.08	-0.07	-0.02	0.02
90	Commercials and Shows not Appropriate	-0.04	0.03	.102*	-0.04	0.00	-0.03	0.04	.144**	.162**	.252**	.229**	0.08	.139**
91	Child Permitted to only Watch Educational TV	.140**	0.04	0.03	0.02	0.02	0.00	-0.08	.114**	.153**	.167**	.145**	0.07	0.07
92	Fruit and Vegetable Serving Availability	.200**	.208**	.169**	-0.08	-0.01	0.04	-0.02	.307**	.302**	.268**	.294**	.254**	.251**
93	Fiber Availability	.209**	.227**	.180**	-.085*	-0.03	0.03	-0.03	.335**	.314**	.291**	.316**	.276**	.262**
94	Vitamin C Availability	.204**	.227**	.182**	-.084*	-0.03	0.03	-0.03	.334**	.314**	.291**	.316**	.273**	.260**
95	Magnesium Availability	.207**	.227**	.181**	-.085*	-0.03	0.03	-0.03	.335**	.314**	.291**	.316**	.275**	.261**
96	Potassium Availability	.206**	.227**	.181**	-.085*	-0.03	0.03	-0.03	.335**	.314**	.291**	.316**	.274**	.261**
97	Fatty/Salty Snack Serving Availability	.096*	-0.04	0.03	0.03	0.05	.202**	.128**	.089*	-0.05	-0.07	-0.04	0.08	-0.04
98	Fatty/Salty Snack Kcal Availability	.103*	-0.03	0.03	0.04	0.05	.202**	.120**	.111**	-0.03	-0.07	-0.02	.090*	-0.03
99	Fatty/Salty Snack Sugar Availability	.118**	-0.02	0.03	0.04	0.06	.199**	.113**	.134**	-0.01	-0.05	0.00	.103*	-0.01
100	Fatty/Salty Snack Saturated Fat Availability	.116**	-0.03	0.03	0.04	0.05	.205**	.120**	.122**	-0.02	-0.06	-0.01	.096*	-0.02
101	Fatty/Salty Snack Fat Availability	.107*	-0.03	0.03	0.04	0.05	.205**	.122**	.110**	-0.03	-0.07	-0.03	.089*	-0.03

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

	Characteristics	53	54	55	56	57	58	59	60	61	62	63	64	65
89	Hours all Video Games Allowed Limiting TV	0.02	0.04	0.03	-0.04	-0.06	0.02	-0.05	-0.02	0.06	.092*	0.00	-0.07	-0.05
90	Commercials and Shows not Appropriate	.155**	-0.07	.211**	.318**	0.07	0.04	.239**	-0.01	0.03	.115**	.161**	0.06	-0.04
91	Child Permitted to only Watch Educational TV	-0.02	.248**	.094*	.243**	0.08	0.01	.242**	.128**	0.05	.133**	.178**	0.06	0.08
92	Fruit and Vegetable Serving Availability	0.00	0.08	.136**	.304**	0.01	-.112**	.106*	0.03	0.05	0.08	.160**	.131**	.120**
93	Fiber Availability	-0.01	0.08	.150**	.306**	0.01	-.114**	.113**	0.04	0.05	0.07	.179**	.137**	.120**
94	Vitamin C Availability	0.00	0.08	.154**	.307**	0.01	-.112**	.106*	0.04	0.04	0.06	.174**	.135**	.118**
95	Magnesium Availability	-0.01	0.08	.152**	.306**	0.01	-.113**	.110**	0.04	0.04	0.07	.177**	.136**	.119**
96	Potassium Availability	0.00	0.08	.153**	.306**	0.01	-.113**	.109*	0.04	0.04	0.06	.176**	.136**	.119**
97	Fatty/Salty Snack Serving Availability	-.211**	.130**	.107*	-.148**	-0.05	.189**	0.02	.188**	.319**	.186**	-0.01	-.106*	-.115**
98	Fatty/Salty Snack Kcal Availability	-.210**	.135**	.118**	-.121**	-0.04	.186**	0.03	.209**	.323**	.186**	0.00	-.113**	-.116**
99	Fatty/Salty Snack Sugar Availability	-.203**	.146**	.136**	-0.07	-0.02	.178**	0.06	.219**	.316**	.171**	0.03	-.117**	-.112**
100	Fatty/Salty Snack Saturated Fat Availability	-.208**	.145**	.131**	-.093*	-0.02	.184**	0.05	.213**	.323**	.178**	0.02	-.115**	-.114**
101	Fatty/Salty Snack Fat Availability	-.211**	.139**	.119**	-.122**	-0.04	.188**	0.04	.210**	.327**	.187**	0.01	-.113**	-.116**

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

	Characteristics	66	67	68	69	70	71	72	73	74	75	76	77	78
89	Hours all Video Games Allowed	.093*	-0.01	-0.01	0.06	-0.02	-0.08	-0.07	0.06	0.05	0.00	-0.01	0.01	0.02
90	Limiting TV Commercials and Shows not Appropriate	-0.02	-.132**	.140**	0.05	.179**	-0.01	-.109*	-.108*	0.04	.147**	.095*	0.04	.099*
91	Child Permitted to only Watch Educational TV	.113**	0.01	0.01	0.05	.162**	0.03	-0.03	-.150**	-.091*	.139**	.112**	-0.02	0.05
92	Fruit and Vegetable Serving Availability	.088*	-.085*	.196**	0.06	.208**	.139**	0.05	-.245**	-.159**	.190**	.146**	.298**	.224**
93	Fiber Availability	0.08	-.091*	.201**	0.05	.208**	.143**	0.05	-.265**	-.169**	.211**	.139**	.326**	.249**
94	Vitamin C Availability	0.08	-.093*	.204**	0.05	.210**	.140**	0.05	-.262**	-.165**	.210**	.136**	.326**	.251**
95	Magnesium Availability	0.08	-.092*	.203**	0.05	.209**	.142**	0.05	-.264**	-.167**	.210**	.138**	.326**	.250**
96	Potassium Availability	0.08	-.092*	.203**	0.05	.209**	.141**	0.05	-.263**	-.166**	.210**	.137**	.326**	.251**
97	Fatty/Salty Snack Serving Availability	.334**	.188**	-0.05	.281**	-0.03	-0.07	-.327**	0.03	.099*	0.05	-0.01	0.08	0.05
98	Fatty/Salty Snack Kcal Availability	.354**	.186**	-0.06	.305**	-0.02	-0.06	-.336**	0.02	.088*	0.05	-0.01	0.07	0.05
99	Fatty/Salty Snack Sugar Availability	.371**	.176**	-0.06	.337**	0.00	-0.05	-.334**	0.00	0.07	0.04	0.00	0.06	0.05
100	Fatty/Salty Snack Saturated Fat Availability	.366**	.182**	-0.06	.329**	-0.01	-0.05	-.337**	0.00	0.08	0.05	-0.01	0.06	0.05
101	Fatty/Salty Snack Fat Availability	.356**	.187**	-0.06	.309**	-0.02	-0.06	-.338**	0.02	.087*	0.05	-0.01	0.07	0.05

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).



**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

	Characteristics	79	80	81	82	83	84	85	86	87	88	89	90	91
<b>89</b>	Hours all Video Games Allowed	.168**	.098*	.102*	.117**	.192**	.177**	.164**	.642**	.270**	.291**	1.00	-0.03	0.00
<b>90</b>	Limiting TV Commercials and Shows not Appropriate	-.141**	-.117**	-.166**	-.132**	-0.05	-0.07	-0.06	-.157**	-.171**	-.141**	-0.03	1.00	.293**
<b>91</b>	Child Permitted to only Watch Educational TV	-0.02	-0.01	0.00	0.00	0.00	0.01	0.03	-0.03	-0.04	-0.04	0.00	.293**	1.00
<b>92</b>	Fruit and Vegetable Serving Availability	0.07	0.04	0.07	0.05	.085*	.092*	0.06	-.124**	-.163**	-0.05	-0.05	.104*	.159**
<b>93</b>	Fiber Availability	0.05	0.04	0.06	0.04	0.07	0.08	0.04	-.132**	-.168**	-0.05	-0.07	.121**	.156**
<b>94</b>	Vitamin C Availability	0.05	0.03	0.06	0.04	0.07	0.08	0.04	-.133**	-.171**	-0.05	-0.07	.120**	.153**
<b>95</b>	Magnesium Availability	0.05	0.03	0.06	0.04	0.07	0.08	0.04	-.132**	-.170**	-0.05	-0.07	.121**	.155**
<b>96</b>	Potassium Availability	0.05	0.03	0.06	0.04	0.07	0.08	0.04	-.133**	-.170**	-0.05	-0.07	.121**	.155**
<b>97</b>	Fatty/Salty Snack Serving Availability	.104*	.287**	.224**	.171**	.203**	.213**	.178**	.095*	0.06	.091*	0.07	-0.06	0.00
<b>98</b>	Fatty/Salty Snack Kcal Availability	.103*	.297**	.242**	.183**	.218**	.220**	.176**	.100*	0.06	.099*	0.07	-0.05	0.02
<b>99</b>	Fatty/Salty Snack Sugar Availability	0.08	.287**	.263**	.193**	.227**	.222**	.152**	.090*	0.05	.087*	0.08	-0.03	0.05
<b>100</b>	Fatty/Salty Snack Saturated Fat Availability	0.08	.290**	.255**	.189**	.222**	.223**	.157**	.090*	0.05	.085*	0.08	-0.04	0.04
<b>101</b>	Fatty/Salty Snack Fat Availability	.095*	.298**	.241**	.183**	.217**	.220**	.170**	.097*	0.06	.095*	0.07	-0.05	0.02

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

	Characteristics	92	93	94	95	96	97	98	99	100	101	102	103	104
89	Hours all Video Games Allowed Limiting TV	-0.05	-0.07	-0.07	-0.07	-0.07	0.07	0.07	0.08	0.08	0.07	-.092*	0.00	-0.02
90	Commercials and Shows not Appropriate	.104*	.121**	.120**	.121**	.121**	-0.06	-0.05	-0.03	-0.04	-0.05	0.05	-.096*	-0.05
91	Child Permitted to only Watch Educational TV	.159**	.156**	.153**	.155**	.155**	0.00	0.02	0.05	0.04	0.02	0.03	-0.05	0.05
92	Fruit and Vegetable Serving Availability	1.00	.965**	.966**	.966**	.966**	.327**	.333**	.320**	.324**	.330**	.469**	.188**	.366**
93	Fiber Availability	.965**	1.00	.999**	1.000*	1.000*	.310**	.319**	.312**	.313**	.316**	.592**	.188**	.399**
94	Vitamin C Availability	.966**	.999**	1.00	1.000*	1.000*	.308**	.318**	.311**	.312**	.315**	.595**	.188**	.400**
95	Magnesium Availability	.966**	1.000*	1.000*	1.000*	1.000*	.309**	.318**	.311**	.313**	.316**	.593**	.188**	.400**
96	Potassium Availability	.966**	1.000*	1.000*	1.000*	1.00	.309**	.318**	.311**	.312**	.315**	.594**	.188**	.400**
97	Fatty/Salty Snack Serving Availability	.327**	.310**	.308**	.309**	.309**	1.00	.988**	.922**	.955**	.987**	.189**	.364**	.275**
98	Fatty/Salty Snack Kcal Availability	.333**	.319**	.318**	.318**	.318**	.988**	1.00	.964**	.981**	.999**	.196**	.344**	.282**
99	Fatty/Salty Snack Sugar Availability	.320**	.312**	.311**	.311**	.311**	.922**	.964**	1.00	.994**	.970**	.188**	.302**	.274**
100	Fatty/Salty Snack Saturated Fat Availability	.324**	.313**	.312**	.313**	.312**	.955**	.981**	.994**	1.00	.987**	.188**	.325**	.276**
101	Fatty/Salty Snack Fat Availability	.330**	.316**	.315**	.316**	.315**	.987**	.999**	.970**	.987**	1.00	.192**	.345**	.280**

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

	Characteristics	105	106	107	108	109	110	111	112	113	114	115	116	117
89	Hours all Video Games Allowed	-0.02	0.01	0.00	0.06	.100*	0.05	0.05	0.07	0.07	.088*	.100*	.108*	.100*
90	Limiting TV Commercials and Shows not Appropriate	.133**	0.02	0.04	-.175**	-.201**	0.02	-0.07	-.121**	-.107*	0.01	-.118**	-0.02	-.130**
91	Child Permitted to only Watch Educational TV	0.00	.110**	.161**	0.03	-0.05	.097*	0.06	0.06	0.06	.095*	0.00	-0.01	-.097*
92	Fruit and Vegetable Serving Availability	.407**	.570**	.582**	.138**	.225**	.197**	.254**	.361**	.385**	.200**	.088*	.118**	0.00
93	Fiber Availability	.409**	.533**	.531**	.129**	.192**	.188**	.238**	.338**	.361**	.196**	0.07	.128**	-0.01
94	Vitamin C Availability	.409**	.531**	.529**	.126**	.190**	.182**	.234**	.333**	.357**	.194**	0.07	.125**	0.00
95	Magnesium Availability	.409**	.532**	.531**	.128**	.191**	.185**	.237**	.336**	.359**	.195**	0.07	.127**	0.00
96	Potassium Availability	.409**	.532**	.530**	.127**	.191**	.184**	.236**	.335**	.358**	.195**	0.07	.126**	0.00
97	Fatty/Salty Snack Serving Availability	0.04	.216**	.286**	.378**	.458**	.417**	.445**	.560**	.558**	.118**	.381**	-0.01	.261**
98	Fatty/Salty Snack Kcal Availability	0.02	.213**	.301**	.365**	.461**	.429**	.452**	.559**	.559**	.126**	.376**	-0.01	.251**
99	Fatty/Salty Snack Sugar Availability	0.00	.193**	.319**	.337**	.440**	.443**	.455**	.543**	.543**	.131**	.355**	-0.01	.231**
100	Saturated Fat Availability	0.01	.201**	.316**	.356**	.451**	.446**	.462**	.558**	.558**	.129**	.369**	-0.01	.243**
101	Fatty/Salty Snack Fat Availability	0.02	.213**	.306**	.369**	.463**	.437**	.457**	.565**	.564**	.126**	.380**	-0.01	.253**

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

	Characteristics	118	119	120
<b>89</b>	Hours all Video Games Allowed	0.04	-0.06	0.07
	Limiting TV			
<b>90</b>	Commercials and Shows not	-0.05	0.01	-0.01
	Appropriate			
<b>91</b>	Child Permitted to only Watch Educational TV	-.113**	-0.03	0.07
	Fruit and			
<b>92</b>	Vegetable Serving Availability	-.194**	0.02	-0.04
	Fiber			
<b>93</b>	Availability	-.193**	0.01	-0.02
	Vitamin C			
<b>94</b>	Availability	-.190**	0.02	-0.02
	Magnesium			
<b>95</b>	Availability	-.192**	0.01	-0.02
	Potassium			
<b>96</b>	Availability	-.192**	0.02	-0.02
	Fatty/Salty Snack			
<b>97</b>	Serving Availability	-0.04	0.05	-0.07
	Fatty/Salty Snack			
<b>98</b>	Kcal Availability	-0.05	0.04	-0.07
	Fatty/Salty Snack			
<b>99</b>	Sugar Availability	-0.06	0.02	-0.08
	Fatty/Salty Snack			
<b>100</b>	Saturated Fat Availability	-0.06	0.02	-0.08
	Fatty/Salty Snack			
<b>101</b>	Fat Availability	-0.05	0.04	-0.07

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).

\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	1	2	3	4	5	6	7	8	9	10	11	12	13
<b>102</b> Plain Cereal Serving Availability	-0.01	0.01	0.02	0.02	.102*	-.157**	.113**	-0.06	-0.06	0.01	.158**	0.02	.085*
<b>103</b> Sweet Cereal Serving Availability	0.07	-0.06	0.02	0.01	0.03	-0.08	0.03	-0.03	0.04	-0.06	0.07	0.03	0.04
<b>104</b> Granola Serving Availability	-0.04	0.02	.097*	0.04	.124**	-.250**	.134**	-0.04	-0.03	-0.01	.195**	0.08	0.07
<b>105</b> Milk Serving Availability	-0.07	0.02	-0.07	0.02	.087*	-.214**	0.03	0.00	-.132**	0.04	-0.04	0.03	0.01
<b>106</b> Fruit Juice Serving Availability	0.04	-0.06	0.00	0.00	0.04	-.201**	0.07	-0.05	-.098*	-.103*	0.06	0.02	0.01
<b>107</b> Vegetable Juice Serving Availability	.161**	-0.05	.145**	-0.01	0.01	-.123**	.186**	-.159**	-0.04	-.125**	.231**	0.02	0.06
<b>108</b> Soft Drink Serving Availability	0.03	-.122**	-0.04	-0.07	-0.03	0.01	-0.07	0.03	.116**	-.113**	-0.02	.122**	0.06
<b>109</b> Sugar-Sweetened Beverage Serving Availability	.138**	-.100*	0.03	0.04	0.00	0.04	0.02	-0.02	.085*	-.161**	0.06	.121**	0.06
<b>110</b> Energy Drink Serving Availability	.186**	-0.04	0.01	-0.08	-0.02	0.08	.148**	-.120**	.130**	-.143**	.202**	0.05	.164**
<b>111</b> Sugar-Sweetened Coffee Drink Serving Availability	.200**	-0.02	0.00	-0.03	0.02	-0.04	.122**	-.092*	.134**	-0.08	.177**	0.01	.135**
<b>112</b> Sugar-Sweetened Beverage Serving Availability	.160**	-.096*	-0.01	-0.04	0.01	-0.03	0.07	-0.06	.124**	-.153**	.124**	.102*	.132**

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	14	15	16	17	18	19	20	21	22	23	24	25	26
<b>102</b> Plain Cereal Serving Availability	.105*	.296**	.337**	.345**	.341**	.342**	.099*	.099*	.099*	.098*	.200**	.199**	.124**
<b>103</b> Sweet Cereal Serving Availability	0.08	0.03	0.02	0.02	0.02	0.02	.222**	.222**	.222**	.223**	0.03	0.07	0.04
<b>104</b> Granola Serving Availability	0.07	.210**	.214**	.217**	.216**	.216**	0.07	0.07	0.07	0.07	.108*	.133**	.152**
<b>105</b> Milk Serving Availability	0.04	0.02	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00	.171**	0.05	-0.08
<b>106</b> Fruit Juice Serving Availability	.104*	.264**	.249**	.246**	.248**	.248**	.109*	.109*	.109*	.110*	.147**	.364**	.145**
<b>107</b> Vegetable Juice Serving Availability	.150**	.531**	.514**	.513**	.514**	.514**	.167**	.167**	.167**	.170**	.265**	.393**	.622**
<b>108</b> Soft Drink Serving Availability	0.00	-0.01	-0.03	-0.03	-0.03	-0.03	.256**	.256**	.256**	.255**	-0.04	0.06	0.03
<b>109</b> Sugar-Sweetened Beverage Serving Availability	0.07	.163**	.135**	.133**	.134**	.134**	.350**	.350**	.350**	.351**	.096*	.219**	.149**
<b>110</b> Energy Drink Serving Availability	.157**	.352**	.355**	.349**	.353**	.352**	.308**	.308**	.308**	.311**	.171**	.294**	.394**
<b>111</b> Sugar-Sweetened Coffee Drink Serving Availability	.162**	.287**	.285**	.280**	.283**	.282**	.292**	.292**	.292**	.295**	.145**	.323**	.232**
<b>112</b> Sugar-Sweetened Beverage Sugar Availability	.131**	.258**	.243**	.237**	.241**	.239**	.385**	.385**	.385**	.387**	.139**	.310**	.240**

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	27	28	29	30	31	32	33	34	35	36	37	38	39
<b>102</b> Plain Cereal Serving Availability	-0.04	0.05	-0.01	0.03	0.00	0.01	0.01	-0.07	-0.06	.110**	.109*	.097*	.147**
<b>103</b> Sweet Cereal Serving Availability	.170**	.186**	0.08	.121**	.202**	.199**	.210**	0.01	-0.02	-0.07	-.084*	0.06	0.04
<b>104</b> Granola Serving Availability	0.01	.103*	0.06	.101*	.088*	.097*	.093*	-0.06	-0.07	0.04	0.02	.107*	0.08
<b>105</b> Milk Serving Availability	-0.05	-.092*	-.118**	-0.06	-.108*	-.109*	-.110**	-.182**	-.142**	-0.04	.135**	0.08	0.08
<b>106</b> Fruit Juice Serving Availability	0.04	.101*	-0.03	.106*	0.08	.084*	0.08	-.163**	-.181**	-0.02	.112**	.162**	0.08
<b>107</b> Vegetable Juice Serving Availability	-0.04	.174**	.106*	.104*	.096*	.111**	.108*	-.085*	-.142**	0.02	0.05	.162**	.155**
<b>108</b> Soft Drink Serving Availability	.592**	.286**	.093*	.161**	.455**	.417**	.459**	0.01	0.04	-.136**	-.088*	0.01	-0.03
<b>109</b> Sugar-Sweetened Beverage Serving Availability	.293**	.521**	.156**	.223**	.407**	.407**	.442**	-0.03	-0.01	-.147**	-0.07	0.04	.114**
<b>110</b> Energy Drink Serving Availability	.144**	.296**	.488**	.284**	.404**	.415**	.401**	.146**	0.05	0.01	-.114**	0.03	0.06
<b>111</b> Sugar-Sweetened Coffee Drink Serving Availability	.106*	.342**	.213**	.524**	.408**	.444**	.409**	0.04	0.04	-0.03	-0.08	.086*	.089*
<b>112</b> Sugar-Sweetened Beverage Sugar Availability	.384**	.441**	.259**	.387**	.530**	.531**	.540**	0.01	0.01	-.106*	-0.08	0.08	0.08

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	40	41	42	43	44	45	46	47	48	49	50	51	52
<b>102</b> Plain Cereal Serving Availability	.127**	.158**	.156**	0.01	0.02	0.01	-0.02	.231**	.205**	.224**	.265**	.203**	.134**
<b>103</b> Sweet Cereal Serving Availability	.084*	0.05	0.08	-0.07	-0.01	.167**	0.01	0.05	0.00	0.07	0.04	0.01	-0.05
<b>104</b> Granola Serving Availability	.173**	.096*	0.07	-0.03	-0.01	0.07	0.00	.204**	.164**	.154**	.198**	.171**	.117**
<b>105</b> Milk Serving Availability	0.03	.193**	.098*	-.087*	-0.05	0.06	-0.05	0.01	.142**	.198**	.115**	0.06	0.01
<b>106</b> Fruit Juice Serving Availability	.111**	.166**	0.07	-0.06	0.00	0.02	-0.03	.092*	.157**	.125**	.134**	.098*	0.05
<b>107</b> Vegetable Juice Serving Availability	.208**	.102*	0.04	0.01	0.05	.086*	0.00	.236**	.169**	.129**	.218**	.185**	.197**
<b>108</b> Soft Drink Serving Availability	0.07	-0.04	-0.03	0.04	0.01	0.08	.094*	-.106*	-.089*	-.097*	-.111**	0.00	-.155**
<b>109</b> Sugar-Sweetened Beverage Serving Availability	.141**	-0.01	-0.02	0.02	0.04	0.08	0.08	0.01	-0.06	-0.08	-.087*	0.04	-0.08
<b>110</b> Energy Drink Serving Availability	.184**	-0.01	-0.07	.086*	0.06	.204**	0.05	.173**	0.04	0.00	0.08	.137**	.093*
<b>111</b> Sugar-Sweetened Coffee Drink Serving Availability	.196**	-0.01	0.01	0.01	0.05	.192**	-0.03	.126**	0.00	0.03	.092*	.104*	0.05
<b>112</b> Sugar-Sweetened Beverage Sugar Availability	.196**	0.01	-0.01	0.03	0.04	.182**	0.05	0.06	-0.01	-0.01	0.02	.100*	-0.03

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).



**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	53	54	55	56	57	58	59	60	61	62	63	64	65
<b>102</b> Plain Cereal Serving Availability	-0.07	.110**	.145**	.163**	-0.02	-.091*	0.05	0.07	0.01	-0.01	.120**	0.08	0.05
<b>103</b> Sweet Cereal Serving Availability	-.144**	0.08	0.08	-.108*	-0.03	.099*	-0.03	.108*	.194**	.109*	-0.03	0.05	-0.07
<b>104</b> Granola Serving Availability	-.093*	.124**	.173**	.098*	0.01	-0.02	0.04	.106*	.093*	.105*	0.06	0.02	0.00
<b>105</b> Milk Serving Availability	-0.02	0.04	-0.03	.110*	-0.03	-.135**	-0.01	-0.08	0.00	0.08	.113**	.175**	0.02
<b>106</b> Fruit Juice Serving Availability	-0.05	0.06	0.02	.090*	-0.03	-0.07	0.03	0.05	0.02	0.06	0.06	.145**	0.05
<b>107</b> Vegetable Juice Serving Availability	-0.04	.099*	.171**	.221**	0.02	-0.01	.147**	.192**	.186**	.180**	0.06	0.04	0.04
<b>108</b> Soft Drink Serving Availability	-.265**	.145**	0.02	-.254**	-0.03	0.07	-.095*	.091*	.107*	0.06	-0.05	-0.06	0.03
<b>109</b> Sugar-Sweetened Beverage Serving Availability	-.225**	.111**	0.06	-.175**	-0.08	0.05	-0.05	.177**	.191**	.097*	-0.04	-0.06	0.00
<b>110</b> Energy Drink Serving Availability	-.115**	.096*	.243**	-0.01	0.00	.223**	.197**	.302**	.316**	.211**	0.03	-0.07	-0.07
<b>111</b> Sugar-Sweetened Coffee Drink Serving Availability	-.117**	0.02	0.08	0.00	-0.01	.183**	.091*	.205**	.246**	.184**	-0.02	-0.01	-0.07
<b>112</b> Sugar-Sweetened Beverage Sugar Availability	-.240**	.128**	.111**	-.126**	-0.04	.140**	0.03	.229**	.262**	.185**	-0.01	-0.02	-0.02

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	66	67	68	69	70	71	72	73	74	75	76	77	78
<b>102</b> Plain Cereal Serving Availability	0.04	-.088*	.145**	0.01	.121**	0.07	0.00	-.165**	-0.04	.159**	0.07	.232**	.228**
<b>103</b> Sweet Cereal Serving Availability	.170**	0.02	.089*	.085*	0.02	0.01	-.146**	-0.04	.086*	0.08	-0.02	.142**	.088*
<b>104</b> Granola Serving Availability	.115**	0.03	.091*	0.08	.105*	0.05	-.091*	-.107*	0.02	.114**	0.03	.274**	.108*
<b>105</b> Milk Serving Availability	-.100*	-.106*	.161**	-.152**	.099*	.135**	.146**	-.221**	-0.02	.163**	.097*	.187**	.161**
<b>106</b> Fruit Juice Serving Availability	0.04	-0.08	.093*	-0.04	.095*	.135**	.096*	-.122**	-0.08	.119**	.109*	.121**	.132**
<b>107</b> Vegetable Juice Serving Availability	.222**	0.03	0.04	.209**	.169**	0.06	-.103*	-.143**	-0.08	0.07	0.08	.095*	0.07
<b>108</b> Soft Drink Serving Availability	.244**	.184**	-.143**	0.08	-.104*	0.01	-.086*	-0.03	0.03	0.08	-0.03	-0.01	0.00
<b>109</b> Sugar-Sweetened Beverage Serving Availability	.298**	.145**	-0.04	.175**	-0.02	0.02	-.128**	0.00	0.06	0.05	-0.05	0.06	0.00
<b>110</b> Energy Drink Serving Availability	.396**	.242**	-.119**	.380**	0.05	-0.04	-.356**	-0.05	0.03	0.05	0.02	-0.01	0.07
<b>111</b> Sugar-Sweetened Coffee Drink Serving Availability	.324**	.141**	-0.04	.323**	0.07	0.04	-.231**	0.01	0.03	0.06	0.05	0.01	0.04
<b>112</b> Sugar-Sweetened Beverage Sugar Availability	.384**	.203**	-.085*	.266**	0.01	0.04	-.215**	-0.06	0.04	.110*	0.02	0.05	0.06

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	79	80	81	82	83	84	85	86	87	88	89	90	91
<b>102</b> Plain Cereal Serving Availability	0.04	0.04	0.02	0.07	0.06	0.08	0.03	-0.07	-0.08	0.00	-.092*	0.05	0.03
<b>103</b> Sweet Cereal Serving Availability	0.08	.137**	.116**	.086*	.103*	.128**	.141**	0.00	-0.02	0.04	0.00	-.096*	-0.05
<b>104</b> Granola Serving Availability	.159**	0.06	.163**	.132**	.158**	.127**	0.07	-0.02	-0.04	0.02	-0.02	-0.05	0.05
<b>105</b> Milk Serving Availability	-.095*	-0.08	-0.08	-.134**	-.158**	-.116**	0.02	-0.06	-0.07	-0.04	-0.02	.133**	0.00
<b>106</b> Fruit Juice Serving Availability	0.02	0.05	-0.01	-0.03	0.01	0.02	0.05	0.00	-0.03	0.03	0.01	0.02	.110**
<b>107</b> Vegetable Juice Serving Availability	0.03	.150**	.154**	.134**	.152**	.114**	0.04	-.089*	-.139**	-0.05	0.00	0.04	.161**
<b>108</b> Soft Drink Serving Availability	0.08	.189**	.122**	0.05	0.06	.111**	0.07	.094*	.092*	0.06	0.06	-.175**	0.03
<b>109</b> Sugar-Sweetened Beverage Serving Availability	.152**	.308**	.241**	.166**	.178**	.217**	.158**	.151**	.125**	.119**	.100*	-.201**	-0.05
<b>110</b> Energy Drink Serving Availability	0.00	.299**	.187**	.227**	.234**	.238**	.094*	-0.01	-0.06	0.01	0.05	0.02	.097*
<b>111</b> Sugar-Sweetened Coffee Drink Serving Availability	0.03	.275**	.194**	.208**	.186**	.192**	0.07	0.01	-0.04	0.03	0.05	-0.07	0.06
<b>112</b> Sugar-Sweetened Beverage Sugar Availability	0.07	.323**	.216**	.173**	.175**	.215**	.122**	0.06	0.02	0.06	0.07	-.121**	0.06

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

	Characteristics	92	93	94	95	96	97	98	99	100	101	102	103	104
<b>102</b>	Plain Cereal Serving Availability	.469**	.592**	.595**	.593**	.594**	.189**	.196**	.188**	.188**	.192**	1.00	.233**	.432**
<b>103</b>	Sweet Cereal Serving Availability	.188**	.188**	.188**	.188**	.188**	.364**	.344**	.302**	.325**	.345**	.233**	1.00	.380**
<b>104</b>	Granola Serving Availability	.366**	.399**	.400**	.400**	.400**	.275**	.282**	.274**	.276**	.280**	.432**	.380**	1.00
<b>105</b>	Milk Serving Availability	.407**	.409**	.409**	.409**	.409**	0.04	0.02	0.00	0.01	0.02	.320**	.289**	.195**
<b>106</b>	Fruit Juice Serving Availability	.570**	.533**	.531**	.532**	.532**	.216**	.213**	.193**	.201**	.213**	.312**	.272**	.230**
<b>107</b>	Vegetable Juice Serving Availability	.582**	.531**	.529**	.531**	.530**	.286**	.301**	.319**	.316**	.306**	.245**	.172**	.256**
<b>108</b>	Soft Drink Serving Availability	.138**	.129**	.126**	.128**	.127**	.378**	.365**	.337**	.356**	.369**	.112**	.395**	.198**
<b>109</b>	Sugar-Sweetened Beverage Serving Availability	.225**	.192**	.190**	.191**	.191**	.458**	.461**	.440**	.451**	.463**	.162**	.403**	.208**
<b>110</b>	Energy Drink Serving Availability	.197**	.188**	.182**	.185**	.184**	.417**	.429**	.443**	.446**	.437**	0.08	.173**	.153**
<b>111</b>	Sugar-Sweetened Coffee Drink Serving Availability	.254**	.238**	.234**	.237**	.236**	.445**	.452**	.455**	.462**	.457**	.118**	.248**	.193**
<b>112</b>	Sugar-Sweetened Beverage Sugar Availability	.361**	.338**	.333**	.336**	.335**	.560**	.559**	.543**	.558**	.565**	.218**	.454**	.288**

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	105	106	107	108	109	110	111	112	113	114	115	116	117
<b>102</b> Plain Cereal Serving Availability	.320**	.312**	.245**	.112**	.162**	0.08	.118**	.218**	.232**	.105*	0.04	.135**	0.08
<b>103</b> Sweet Cereal Serving Availability	.289**	.272**	.172**	.395**	.403**	.173**	.248**	.454**	.454**	.109*	.173**	.084*	.134**
<b>104</b> Granola Serving Availability	.195**	.230**	.256**	.198**	.208**	.153**	.193**	.288**	.293**	.212**	0.08	.244**	.090*
<b>105</b> Milk Serving Availability	1.00	.535**	.125**	.155**	.155**	-.096*	0.02	.256**	.299**	0.01	-0.07	.109*	-0.04
<b>106</b> Fruit Juice Serving Availability	.535**	1.00	.325**	.267**	.300**	0.07	.213**	.442**	.457**	.125**	0.07	.134**	0.02
<b>107</b> Vegetable Juice Serving Availability	.125**	.325**	1.00	.131**	.263**	.361**	.320**	.377**	.393**	.242**	.206**	.117**	0.08
<b>108</b> Soft Drink Serving Availability	.155**	.267**	.131**	1.00	.537**	.275**	.299**	.765**	.710**	0.05	.157**	0.02	.110*
<b>109</b> Sugar-Sweetened Beverage Serving Availability	.155**	.300**	.263**	.537**	1.00	.342**	.369**	.731**	.728**	.115**	.267**	.092*	.212**
<b>110</b> Energy Drink Serving Availability	-.096*	0.07	.361**	.275**	.342**	1.00	.560**	.649**	.648**	.146**	.291**	0.05	.183**
<b>111</b> Sugar-Sweetened Coffee Drink Serving Availability	0.02	.213**	.320**	.299**	.369**	.560**	1.00	.742**	.776**	.116**	.284**	0.01	.178**
<b>112</b> Sugar-Sweetened Beverage Sugar Availability	.256**	.442**	.377**	.765**	.731**	.649**	.742**	1.00	.995**	.140**	.301**	0.08	.205**

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

	Characteristics	118	119	120
	Plain Cereal			
102	Serving	-0.06	0.03	0.05
	Availability			
	Sweet Cereal			
103	Serving	-0.04	0.03	0.00
	Availability			
104	Granola Serving	-.113**	-0.01	-0.08
	Availability			
105	Milk Serving	-0.04	0.01	0.01
	Availability			
	Fruit Juice			
106	Serving	-0.08	-0.03	-0.03
	Availability			
	Vegetable Juice			
107	Serving	-.207**	-0.01	-0.08
	Availability			
	Soft Drink			
108	Serving	0.03	0.02	0.01
	Availability			
	Sugar-Sweetened			
109	Beverage	-0.04	0.02	-0.03
	Serving			
	Availability			
	Energy Drink			
110	Serving	-.115**	0.02	-.098*
	Availability			
	Sugar-Sweetened			
111	Coffee Drink	-.129**	0.02	0.00
	Serving			
	Availability			
	Sugar-Sweetened			
112	Beverage Sugar	-.086*	0.02	-0.03
	Availability			

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).

\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	1	2	3	4	5	6	7	8	9	10	11	12	13
<b>113</b> Sugar-Sweetened Beverage Calorie Availability	.165**	-.086*	-0.01	-0.04	0.01	-0.04	.084*	-0.07	.116**	-.147**	.132**	.096*	.134**
<b>114</b> Child Food Access Policy-Nutrient Dense Foods	0.01	0.04	.096*	0.07	0.07	0.03	.131**	-0.01	0.01	-.119**	.195**	0.05	0.06
<b>115</b> Child Food Access Policy-Low Nutrient Dense Foods	.133**	-0.03	0.03	0.05	0.01	.095*	0.04	-0.02	.110**	-0.08	.133**	0.07	0.07
<b>116</b> Child Food Accessibility-Nutrient Dense Foods	-0.07	-0.06	0.06	.091*	0.06	0.00	.090*	0.00	-0.04	-.131**	.207**	0.06	0.02
<b>117</b> Child Food Accessibility-Low Nutrient Dense Foods	.086*	-0.06	0.03	0.03	0.07	.106*	0.00	.094*	.125**	-0.06	0.08	0.02	.093*
<b>118</b> Body Dissatisfaction	-0.02	-0.05	-0.08	0.01	-0.05	.214**	-.482**	.341**	.260**	-0.02	-.169**	0.05	-0.07
<b>119</b> Has a Primary Family Member who is Overweight or Obese	-0.05	0.08	0.07	-.110**	0.02	-0.01	-0.05	-0.01	0.04	.101*	-0.03	-0.04	0.07
<b>120</b> Has a Primary Family Member with Diabetes	0.05	-0.05	0.05	-0.02	.085*	0.04	-.113**	.097*	0.04	-0.05	-0.04	0.03	-0.05

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	14	15	16	17	18	19	20	21	22	23	24	25	26
<b>113</b> Sugar-Sweetened Beverage Calorie Availability Child Food	.142**	.276**	.261**	.255**	.259**	.258**	.383**	.383**	.383**	.385**	.160**	.326**	.246**
<b>114</b> Access Policy-Nutrient Dense Foods Child Food	0.08	.274**	.286**	.285**	.286**	.286**	.159**	.159**	.159**	.161**	.153**	.206**	.227**
<b>115</b> Access Policy-Low Nutrient Dense Foods Child Food	.107*	.171**	.168**	.169**	.168**	.169**	.304**	.304**	.304**	.307**	.176**	.189**	.183**
<b>116</b> Accessibility-Nutrient Dense Foods Child Food	0.06	.209**	.212**	.209**	.211**	.210**	.113**	.113**	.113**	.112**	.178**	.217**	0.06
<b>117</b> Accessibility-Low Nutrient Dense Foods	0.07	0.08	0.06	0.06	0.06	0.06	.237**	.237**	.237**	.239**	.113**	.120**	0.07
<b>118</b> Body Dissatisfaction	-.255**	-.178**	-.194**	-.190**	-.192**	-.192**	0.02	0.02	0.02	0.02	-.085*	-.103*	-.192**
<b>119</b> Has a Primary Family Member who is Overweight or Obese	0.00	-0.06	-.086*	-0.08	-0.08	-0.08	0.01	0.01	0.01	0.01	0.01	-0.03	-0.01
<b>120</b> Has a Primary Family Member with Diabetes	-0.05	-0.02	-0.02	-0.02	-0.02	-0.02	-0.03	-0.03	-0.03	-0.03	0.00	-0.04	-0.05

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).



**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

	Characteristics	27	28	29	30	31	32	33	34	35	36	37	38	39
113	Sugar-Sweetened Beverage Calorie Availability	.340**	.438**	.254**	.401**	.511**	.518**	.522**	0.00	0.00	-.100*	-0.07	.087*	.092*
114	Child Food Access Policy-Nutrient Dense Foods	0.05	.162**	.137**	.092*	.141**	.147**	.149**	0.04	0.02	.105*	0.04	0.02	.159**
115	Child Food Access Policy-Low Nutrient Dense Foods	.198**	.341**	.240**	.222**	.341**	.345**	.355**	.098*	.112**	0.03	-.086*	-0.05	0.08
116	Child Food Accessibility-Nutrient Dense Foods	0.04	.143**	0.08	0.04	.092*	.094*	.103*	0.02	-0.01	0.06	0.01	0.06	0.07
117	Child Food Accessibility-Low Nutrient Dense Foods	.129**	.244**	.142**	.145**	.224**	.227**	.236**	.137**	.152**	0.02	-.087*	-0.05	0.03
118	Body Dissatisfaction	0.08	0.00	-0.04	-0.07	0.00	-0.01	0.00	.191**	.366**	.120**	-0.03	-.208**	-.118**
119	Has a Primary Family Member who is Overweight or Obese	-0.01	0.00	0.04	0.01	0.01	0.01	0.01	0.04	0.08	0.03	-0.05	-0.04	-0.03
120	Has a Primary Family Member with Diabetes	0.01	-0.01	-0.07	-0.06	-0.04	-0.04	-0.03	-0.08	0.01	0.03	0.07	0.03	0.03

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

	Characteristics	40	41	42	43	44	45	46	47	48	49	50	51	52
113	Sugar-Sweetened Beverage Calorie Availability	.204**	0.03	0.00	0.02	0.04	.190**	0.04	0.07	0.01	0.01	0.03	.109*	-0.02
114	Child Food Access Policy-Nutrient Dense Foods	.138**	-0.01	0.04	0.03	0.06	0.07	0.04	.167**	0.06	0.04	.195**	.114**	0.07
115	Child Food Access Policy-Low Nutrient Dense Foods	.097*	-0.04	-0.01	0.07	0.08	.123**	.090*	0.07	-.085*	-.088*	0.06	-0.01	-.109*
116	Child Food Accessibility-Nutrient Dense Foods	.093*	0.03	.087*	-0.01	0.03	0.02	0.01	.204**	.144**	.132**	.196**	.139**	.175**
117	Child Food Accessibility-Low Nutrient Dense Foods	0.05	-.085*	0.04	0.07	.111**	.095*	0.06	0.01	-0.06	-0.08	0.02	0.03	-0.06
118	Body Dissatisfaction	-.224**	-.204**	-.129**	.253**	.262**	-.136**	.192**	-.343**	-.165**	-.121**	-.187**	-0.07	-.200**
119	Has a Primary Family Member who is Overweight or Obese	-0.02	0.00	-0.02	.108*	.089*	-0.01	.084*	-0.06	-0.02	0.02	-0.04	-0.01	-0.06
120	Has a Primary Family Member with Diabetes	-0.05	-0.02	-0.05	.102*	0.07	-.138**	0.05	-0.04	-0.01	-0.01	0.00	-0.03	-0.06

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

	Characteristics	53	54	55	56	57	58	59	60	61	62	63	64	65
113	Sugar-Sweetened Beverage Calorie Availability	-.228**	.120**	.111**	-.102*	-0.04	.136**	0.04	.228**	.268**	.195**	0.00	-0.01	-0.03
114	Child Food Access Policy-Nutrient Dense Foods	-.101*	.106*	.126**	.127**	0.01	0.03	-0.02	.109*	.130**	.116**	0.03	-0.04	0.01
115	Child Food Access Policy-Low Nutrient Dense Foods	-.239**	.094*	0.08	-.093*	-0.04	.168**	0.01	.202**	.234**	.139**	-0.07	-.138**	-.113**
116	Child Food Accessibility-Nutrient Dense Foods	0.01	0.07	.103*	.127**	-0.01	-0.05	-0.08	0.04	0.03	.091*	0.04	0.01	0.02
117	Child Food Accessibility-Low Nutrient Dense Foods	-.184**	0.03	0.05	-.137**	-0.02	.093*	-.119**	.104*	.111**	.094*	-0.07	-.114**	-.113**
118	Body Dissatisfaction	-.165**	-0.06	-.135**	-.225**	-0.08	0.03	-.144**	-.123**	-.134**	-.087*	-.089*	-0.08	-.092*
119	Has a Primary Family Member who is Overweight or Obese	-0.07	0.07	0.01	-0.03	0.01	0.03	-0.02	-0.03	-0.01	0.01	-0.05	0.00	-0.03
120	Has a Primary Family Member with Diabetes	-0.05	0.00	-.090*	0.04	.096*	-0.01	0.06	-0.04	-0.06	0.01	0.00	.119**	0.02

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

	Characteristics	66	67	68	69	70	71	72	73	74	75	76	77	78
113	Sugar-Sweetened Beverage Availability	.378**	.191**	-0.07	.271**	0.03	0.05	-.213**	-0.07	0.03	.114**	0.03	0.06	0.07
114	Child Food Access Policy-Nutrient Dense Foods	.191**	0.08	0.03	.170**	.084*	-0.02	-.118**	-0.05	0.03	0.06	0.01	.106*	.126**
115	Child Food Access Policy-Low Nutrient Dense Foods	.300**	.178**	-0.03	.308**	-0.05	-0.07	-.273**	.101*	.117**	-0.03	-.139**	-0.06	0.03
116	Child Food Accessibility-Nutrient Dense Foods	0.03	0.04	0.06	0.05	.096*	0.04	-0.01	-.085*	0.03	.087*	0.04	.197**	.151**
117	Child Food Accessibility-Low Nutrient Dense Foods	.175**	.152**	-0.04	.184**	-0.02	-.091*	-.171**	.098*	.123**	0.02	-.108*	0.04	0.04
118	Body Dissatisfaction	-0.03	.124**	-.144**	-.085*	.144*	-0.08	-0.04	.196**	.100*	-.100*	-0.07	-.117**	-.132**
119	Has a Primary Family Member who is Overweight or Obese	-0.03	0.03	-0.03	-0.02	-0.07	-0.05	-0.06	0.05	-0.03	0.08	-0.01	-0.02	0.04
120	Has a Primary Family Member with Diabetes	0.02	-0.02	-0.03	-0.04	0.02	0.04	0.02	-0.02	-0.02	0.04	0.01	-0.05	-0.03

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

	Characteristics	79	80	81	82	83	84	85	86	87	88	89	90	91
113	Sugar-Sweetened Beverage Calorie Availability	0.06	.321**	.216**	.175**	.173**	.212**	.124**	0.06	0.01	0.06	0.07	-.107*	0.06
114	Child Food Access Policy-Nutrient Dense Foods	.117**	.241**	.290**	.332**	.348**	.346**	.195**	0.01	-0.06	0.03	.088*	0.01	.095*
115	Child Food Access Policy-Low Nutrient Dense Foods	0.08	.393**	.304**	.328**	.318**	.357**	.205**	0.07	0.01	0.05	.100*	-.118**	0.00
116	Child Food Accessibility-Nutrient Dense Foods	.093*	.144**	.228**	.264**	.283**	.269**	.162**	0.00	-0.07	0.00	.108*	-0.02	-0.01
117	Child Food Accessibility-Low Nutrient Dense Foods	.178**	.317**	.280**	.324**	.311**	.345**	.210**	0.08	0.04	0.05	.100*	-.130**	-.097*
118	Body Dissatisfaction	0.04	0.04	-0.03	-0.04	-0.07	-0.06	0.03	.105*	.096*	.099*	0.04	-0.05	-.113**
119	Has a Primary Family Member who is Overweight or Obese	0.00	0.01	-0.03	0.03	-0.03	-0.03	-0.02	-0.05	-0.04	-0.02	-0.06	0.01	-0.03
120	Has a Primary Family Member with Diabetes	0.06	0.03	0.00	-0.01	-0.02	0.00	-0.01	0.08	0.06	0.06	0.07	-0.01	0.07

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

Characteristics	92	93	94	95	96	97	98	99	100	101	102	103	104
<b>113</b> Sugar-Sweetened Beverage Calorie Availability	.385**	.361**	.357**	.359**	.358**	.558**	.559**	.543**	.558**	.564**	.232**	.454**	.293**
<b>114</b> Child Food Access Policy-Nutrient Dense Foods	.200**	.196**	.194**	.195**	.195**	.118**	.126**	.131**	.129**	.126**	.105*	.109*	.212**
<b>115</b> Child Food Access Policy-Low Nutrient Dense Foods	.088*	0.07	0.07	0.07	0.07	.381**	.376**	.355**	.369**	.380**	0.04	.173**	0.08
<b>116</b> Child Food Accessibility-Nutrient Dense Foods	.118**	.128**	.125**	.127**	.126**	-0.01	-0.01	-0.01	-0.01	-0.01	.135**	.084*	.244**
<b>117</b> Child Food Accessibility-Low Nutrient Dense Foods	0.00	-0.01	0.00	0.00	0.00	.261**	.251**	.231**	.243**	.253**	0.08	.134**	.090*
<b>118</b> Body Dissatisfaction	-.194**	-.193**	-.190**	-.192**	-.192**	-0.04	-0.05	-0.06	-0.06	-0.05	-0.06	-0.04	-.113**
<b>119</b> Has a Primary Family Member who is Overweight or Obese	0.02	0.01	0.02	0.01	0.02	0.05	0.04	0.02	0.02	0.04	0.03	0.03	-0.01
<b>120</b> Has a Primary Family Member with Diabetes	-0.04	-0.02	-0.02	-0.02	-0.02	-0.07	-0.07	-0.08	-0.08	-0.07	0.05	0.00	-0.08

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

	Characteristics	105	106	107	108	109	110	111	112	113	114	115	116	117
113	Sugar-Sweetened Beverage Calorie Availability Child Food	.299**	.457**	.393**	.710**	.728**	.648**	.776**	.995**	1.00	.144**	.302**	0.08	.206**
114	Access Policy-Nutrient Dense Foods Child Food	0.01	.125**	.242**	0.05	.115**	.146**	.116**	.140**	.144**	1.00	.526**	.605**	.326**
115	Access Policy-Low Nutrient Dense Foods Child Food	-0.07	0.07	.206**	.157**	.267**	.291**	.284**	.301**	.302**	.526**	1.00	.260**	.547**
116	Accessibility-Nutrient Dense Foods Child Food	.109*	.134**	.117**	0.02	.092*	0.05	0.01	0.08	0.08	.605**	.260**	1.00	.446**
117	Accessibility-Low Nutrient Dense Foods	-0.04	0.02	0.08	.110*	.212**	.183**	.178**	.205**	.206**	.326**	.547**	.446**	1.00
118	Body Dissatisfaction	-0.04	-0.08	-.207**	0.03	-0.04	-.115**	-.129**	-.086*	-.098*	-0.04	0.03	-0.03	0.08
119	Has a Primary Family Member who is Overweight or Obese	0.01	-0.03	-0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.07	-0.05	0.01
120	Has a Primary Family Member with Diabetes	0.01	-0.03	-0.08	0.01	-0.03	-.098*	0.00	-0.03	-0.03	-0.03	-0.03	-0.04	-0.02

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).

**Table 73: Bivariate Correlations Among Predictors of Maternal Obesity (n=550) Cont'd.**

	Characteristics	118	119	120
	Sugar-Sweetened			
113	Beverage Calorie Availability	-.098*	0.02	-0.03
	Child Food			
114	Access Policy-Nutrient Dense Foods	-0.04	0.01	-0.03
	Child Food			
115	Access Policy-Low Nutrient Dense Foods	0.03	0.07	-0.03
	Child Food			
116	Accessibility-Nutrient Dense Foods	-0.03	-0.05	-0.04
	Child Food			
117	Accessibility-Low Nutrient Dense Foods	0.08	0.01	-0.02
	Child Food			
118	Body Dissatisfaction	1.00	0.04	.145**
	Has a Primary Family Member			
119	who is Overweight or Obese	0.04	1.00	-0.05
	Has a Primary Family Member			
120	with Diabetes	.145**	-0.05	1.00

\*Pearson correlation coefficients are statistically significant at  $p < 0.05$  (two-tailed).

\*\*Pearson correlation coefficients are statistically significant at  $p < 0.01$  (two-tailed).



regression. Table 72 details the correlations and the final variables entered into the prediction model are underlined. The following list describes how one item was selected from groups of items that were multicollinear. In cases where items were collinear, the item that differed significantly among maternal weight status categories (Research Question 2) were selected over items that were not.

- Depression severity, number of days of poor health, and stress management were highly correlated; stress management differed more between weight status categories and thus included in the regression model.
- The 5 variables measured by the Block Fruit/Veg/fiber questionnaire were all highly correlated, thus a single measure (i.e., fruit and vegetable servings) indicative of the overall purpose of this scale was selected.
- The multiple measures on the Block Dietary Fat Screener also were highly correlated. Total grams of fat was selected as the measure most representative of this screener and thus was entered into the regression from the Block Dietary Fat Screener.
- Similarly, the multiple measures on the Beverage Intake scale (i.e., milk, fruit juice, vegetable juice, soft drinks, juice drinks, sweetened coffee drinks, and energy drinks) were highly intercorrelated. Servings of Sugar-Sweetened Beverage Intake was used in the regression model.
- Importance of Physical Activity for Self, Importance of Physical Activity for Child, Encouragement and Facilitation of Physical Activity, Importance of Modeling Physical Activity, and Modeling of Physical Activity variables were highly intercorrelated and also highly correlated with maternal physical activity (i.e., IPAQ score). Maternal IPAQ score was selected for inclusion in the regression model.

- Maternal Disinhibited Eating and Emotional Eating were highly correlated; Emotional Eating differed significantly among maternal weight categories (research question 2), thus it was included in the regression model.
- Similarly, Maternal Perception of Weight Teasing in the Past and the Effect of Weight Teasing were highly correlated; Maternal Perception of Weight Teasing was included in the model because it differed significantly among maternal weight status categories.
- Use of Instrumental Feeding and Non-Food Rewards for child feeding were highly correlated; and Instrumental Feeding was included as there was a trend toward it being significantly different across maternal BMI categories.
- With regard to accessibility of media devices, Accessibility of Computers and Accessibility of Video Games Played Standing Up were highly intercorrelated, but Accessibility of Tablets, Accessibility of TV, and Accessibility of Sitting Video Games were not and were included in the model.
- The four measurements assessing child food access policies were intercorrelated; none of these variables were representative of this group of items, but Child Food Access Policy-Low Nutrient Dense Foods had the lowest intercorrelation, thus was included in the model.
- Hours of TV Allowed, Hours of Computer Time Allowed, and Hours of Video Games Allowed, as well as the Number of Media Devices in the Home and Number of Media Devices in Child's Bedroom were highly correlated. Total Hours of Screentime Allowed by mothers (i.e., sum of Hours of TV, Hours of Computer, and Hour of Video Games Allowed) was selected to be included in the model.
- Family mealtime variables highly correlated were excluded (i.e., Importance of Family Meals, Positive Family Meal Atmosphere, Fast Food Eaten at Family Meals, Family Meals Eaten at Kitchen Table); Family Meal Frequency, Family Meal Planning, and having a TV on

During Family Meals were not intercorrelated with each other, with other family mealtime variables, or other variables included in the regression model.

- The home food environment variables highly intercorrelated with each other and with food intake measures. No food environment questions were included in the model, and instead fruit and vegetable servings, total grams of fat, and sugar-sweetened beverage servings were used (as noted previously).

A score that summed Maternal Modeling of Physical Activity (6 items) and Modeling of Screen Time Behavior (2 items) Scales was created for inclusion in the regression model rather than keeping these variables separate because these two measures were highly intercorrelated, and there were no other variables assessing modeling physical activity. The scales were summed to equally weigh the individual scales. Of the original 120 maternal variables examined, 54 maternal independent variables that were not highly intercorrelated were entered into the prediction model. The dependent variable (maternal weight status) was dichotomized (obese/not obese).

Binomial logistic regression revealed that 54 independent variables explained 60.5 percent of the variance of maternal obesity (Table 73). Nagelkerke r-square is indicative of model fit and preferred over Cox and Snell r-square, which cannot achieve a value of 1.<sup>639-641</sup> The final model was carefully examined to ensure no multicollinearity by again running Pearson correlations for all independent variables included in the final regression model. The characteristics significantly associated with increased obesity risk are: African American race, lower education, higher number of children, general health rating, more weight teasing history, more concern about her child's overweight risk, less conflict in the home, and more body dissatisfaction. These 8 independent variables predicted 53 percent of maternal risk for obesity (Table 74).

**Table 74: Binomial Logistic Regression Findings for Maternal Obesity (n=550)**

<b>Dependent Variable: Maternal Obesity</b>					
<b>R</b>					
Cox & Snell R Square	0.428				
Nagelkerke R Square	0.606				
	<b>DF*</b>	<b>Chi-square</b>	<b>Significance</b>		
<b>Regression Model</b>	58	289.396	<0.001		
<b>Variables in Model</b>	<b>B</b>	<b>SE<sup>#</sup></b>	<b>Wald</b>	<b>Exp(B)</b>	<b>Significance</b>
Race (African American)	1.345	.527	6.500	3.837	.011
Education	-.459	.229	4.027	.632	.045
Maternal Employment	.069	.198	.121	1.071	.728
Number of Children	.525	.164	10.285	1.691	.001
Family Affluence Score	-.482	.302	2.547	.618	.111
Food Security Risk Score	-.133	.094	1.986	.876	.159
General Health Rating	-1.107	.221	25.183	.330	.000
Age at Birth of First Child	.013	.032	.166	1.013	.684
Physical Activity (IPAQ Score)	.013	.017	.531	1.013	.466
Screentime Hours	.038	.031	1.526	1.039	.217
Sleep Hours	-.030	.085	.129	.970	.720
Sleep Quality	-.174	.194	.804	.840	.370
Fruit and Vegetable Servings	.040	.078	.270	1.041	.603
Total Fat	.002	.008	.100	1.002	.752
Sugar-Sweetened Beverage Servings	-.158	.221	.513	.854	.474
Emotional Eating	-.043	.205	.044	.958	.834
Dietary Restraint	-.135	.255	.280	.874	.597
Adventurous Eating	-.042	.242	.030	.959	.863
Self Effectiveness	.058	.226	.065	1.059	.799
Need for Cognition	-.031	.176	.031	.969	.860
Parenting Self-Efficacy	.077	.202	.145	1.080	.704
Stress Management	.394	.233	2.860	1.483	.091
Stress Management Self-Efficacy	.111	.168	.439	1.117	.508
Perception of Weight Teasing History	.669	.144	21.473	1.953	.000
Chubby Kids are Healthy	.416	.224	3.459	1.516	.063
Concern for Child's Overweight Risk	.444	.158	7.906	1.559	.005
Belief TV is Positive on Learning	.408	.240	2.891	1.503	.089
Talks often with child about TV/Media	-.305	.178	2.948	.737	.086
Healthy Eating Modeling	.112	.300	.140	1.119	.708
Restriction	-.218	.193	1.272	.804	.259
Pressure	-.181	.180	1.008	.835	.315
Food Access and Decisions	.159	.387	.167	1.172	.682
Food Waste Acceptance	-.287	.190	2.292	.750	.130
Instrumental Feeding	.142	.209	.465	1.153	.495
Family Meal Frequency	.033	.031	1.151	1.034	.283
TV on During Family Meals	.091	.070	1.672	1.095	.196
Family Meal Planning	-.186	.205	.824	.830	.364
Family Support for Healthy Behaviors	-.168	.266	.398	.846	.528
Conflict and Cohesion	.577	.275	4.419	1.781	.036
Disorganization	-.417	.222	3.532	.659	.060
Verbal Engagement with Children	.178	.177	1.010	1.194	.315

\*DF=Degrees of Freedom #Standard Error

**Table 74: Binomial Logistic Regression Findings for Maternal Obesity (n=550) Cont'd.**

<b>Dependent Variable: Maternal Obesity</b>					
<b>Variables in Model</b>	<b>B</b>	<b>SE<sup>#</sup></b>	<b>Wald</b>	<b>Exp(B)</b>	<b>Significance</b>
Physical Engagement with Children	.365	.335	1.188	1.441	.276
Physical Activity Availability	-.299	.273	1.207	.741	.272
Physical Activity Accessibility	.049	.153	.105	1.051	.746
Healthy Modeling of Screentime and Physical Activity	.003	.057	.002	1.003	.963
Limit TV Commercials and Shows not Appropriate	-.015	.200	.006	.985	.940
Child Permitted to Watch Educational TV only	.045	.157	.084	1.047	.773
TV Accessibility	.010	.128	.006	1.010	.936
Sitting Video Game Accessibility	.008	.126	.004	1.008	.952
Tablet Accessibility	-.004	.119	.001	.996	.974
Total Hours Screentime Allowed	.009	.012	.637	1.009	.425
Child Food Access Policy- Low Nutrient Dense Foods	-.076	.106	.516	.927	.472
Body Dissatisfaction	1.152	.175	43.187	3.165	.000
Family Member with Diabetes	.495	.336	2.177	1.641	.140
Family Member Overweight or Obese	.706	.553	1.629	2.027	.202

**Table 75: Significantly Predictive Variables-Binomial Logistic Regression Findings for Maternal Obesity (n=550)**

<b>Dependent Variable: Maternal Obesity</b>					
<b>R</b>					
Cox & Snell R Square	0.370				
Nagelkerke R Square	0.526				
	<b>DF*</b>	<b>Chi-square</b>		<b>Significance</b>	
<b>Regression Model</b>	15	243.269		<0.001	
<b>Variables in Model</b>	<b>B</b>	<b>SE<sup>#</sup></b>	<b>Wald</b>	<b>Exp(B)</b>	<b>Significance</b>
Race (African American)	1.154	.408	7.981	3.170	.005
Education	-.441	.173	6.524	.643	.011
Number of Children	.310	.124	6.213	1.364	.013
General Health Rating	-.909	.172	27.808	.403	.000
Perception of Weight Teasing History	.541	.116	21.977	1.719	.000
Concern for Child's Overweight Risk	.258	.125	4.219	1.294	.040
Conflict and Cohesion	.050	.175	.080	1.051	.777
Body Dissatisfaction	.969	.135	51.362	2.635	.000

\*DF=Degrees of Freedom #Standard Error

Stepwise and hierarchical linear regression also were conducted to confirm results of the binomial logistic regression. Both other regression methods indicated that the independent variables statistically significantly predictive of obesity in mothers in the binomial logistic regression also were significant predictors using other methods.

#### **MATERNAL OBESITY RISK AND WEIGHT-RELATED CHARACTERISTICS**

To create a maternal obesity risk score for non-obese study participants ( $n=386$ ), the 8 significant predictive variables for obesity were assigned a value as follows. The median of all variables, except African American race, was calculated. For each variable, if a participant's score was below the median, it was assigned 0 points and, if above the median, it was assigned 1 point. Being African-American was awarded 1 point whereas other races scored 0 points on this variable. Thus, all variables were scored either as 1 point (more risk for obesity) or 0 points (protective for obesity risk). One-way t-tests confirmed that the median splits were significantly different among 7 variables (African American race was already a dichotomous variable). Data were transformed to account for directionality of the variable in the regression model (see Table 77). A summative obesity risk score (possible range 0-8) was calculated. The summed scores were divided into tertiles of risk.

#### **Maternal Intrapersonal Characteristics and Obesity Risk Tertile**

Obesity risk scores ranged from 0 to 7. The mean obesity risk score was  $5.15 \pm 1.64SD$ . As shown in Table 78, the mean obesity risk score were significantly different between all pairs of tertiles. An examination by BMI indicates that all pairs of tertiles differed significantly, with BMI increasing with risk.

**Maternal Demographics and Health.** Mothers in the highest obesity risk tertile tended to have significantly lower Family Affluence, higher Food Security Risk, gave birth to their first child at a younger age, more days of "not good" health, and higher Depression Severity than other tertiles. See Table 79.

**Table 77: Coding and Data Transformation for Obesity Risk Score**

Variable	Variable Interpretation	exp(B)		Median Split Analysis		0 and 1 transformation	
Race-Black	Dichotomous	3.17	Black is higher risk	2=black	2=higher risk	0=not black	1=black
Education	High score is more education	0.643	Less Ed is higher risk	2=more education	2=lower risk	0=high education	1=low ed
Number of Kids	Continuous	1.364	More kids is higher risk	2=more kids	2=higher risk	0=fewer kids	1=more kids
General Health	High score is better health	0.403	Better health is lower risk	2=higher good health	2=lower risk	0=better health	1=worse health
Perception of Weight Teasing	High score is more teasing	1.719	More teasing is more risk	2=more wt teasing	2=higher risk	0=less teasing	1=more teasing
Weight Concern	High score is more Concern	1.294	More concern is more risk	2=more concern	2=higher risk	0=less concern	1=more concern
Conflict	High Score is more Conflict	1.051	More conflict is more risk	2=more conflict	2=higher risk	0=less conflict	1=more conflict
Body Dissatisfaction	High Score is more Dissatisfaction	2.635	More Dissatisfaction is more risk.	2=more dissatisfaction	2=more risk	0=less dissatisfaction	1=more dissatisfaction



**Table 78: Maternal Obesity Risk Tertiles and BMI (n=386)**

<b>Characteristic</b>	<b>Low Obesity Risk Tertile N=142</b>			<b>Moderate Obesity Risk Tertile N=84</b>			<b>High Obesity Risk Tertile N=146</b>			<b>p-value*</b>
	<b>Mean</b>	<b>SD</b>	<b>Range</b>	<b>Mean</b>	<b>SD</b>	<b>Range</b>	<b>Mean</b>	<b>SD</b>	<b>Range</b>	
<b>Obesity Risk Score</b>	1.5 <sup>AB</sup>	0.66	0-2	3 <sup>AC</sup>	0	3-3	4.51 <sup>BC</sup>	0.71	4-7	<0.001
<b>Body Mass Index (BMI)</b>	22.31 <sup>AB</sup>	2.77	16.44-29.86	23.44 <sup>AC</sup>	3.20	16.73-29.53	24.58 <sup>BC</sup>	3.18	17.72-29.95	<0.001

<sup>#</sup> ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

**Table 79: Demographics and Health Status of Mothers of Preschool Children, Split by Maternal Obesity Risk Tertile (N=386)**

Health Characteristic	Low Obesity Risk Tertile N=142			Moderate Obesity Risk Tertile N=84			High Obesity Risk Tertile N=146			p-value <sup>#</sup>
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Family Affluence Score<sup>a</sup></b>	2.79 <sup>A</sup>	0.425	1-3	2.64 <sup>B</sup>	0.51	1-2	2.35 <sup>AB</sup>	0.53	1-3	<0.001
<b>Food Security Risk Score<sup>b</sup></b>	1.27 <sup>A</sup>	1.67	0-6	1.56 <sup>B</sup>	1.67	0-6	2.37 <sup>AB</sup>	1.86	0-6	<0.001
<b>Age at Birth of First Child</b>	26.02 <sup>A</sup>	4.98	15-38	24.89	5.25	15-37	23.56 <sup>A</sup>	5.17	15-42	<0.001
<b>Number of Days in Past 30 Days of “Not Good” Mental or Physical Health (Health Related Quality of Life)<sup>c</sup></b>	1.68 <sup>A</sup>	2.77	0-15	2.83	4.75	0-24.5	3.11 <sup>A</sup>	4.58	0-28	0.009
<b>Depression Severity Score<sup>d</sup></b>	0.50 <sup>AB</sup>	0.91	0-6	1.04 <sup>A</sup>	1.50	0-6	1.20 <sup>B</sup>	1.49	0-6	<0.001

<sup>#</sup> ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Family Affluence category is based on the Family Affluence Scale.<sup>569,570</sup>

<sup>b</sup> Risk for food insecurity increases as scores increase.

<sup>c</sup> Higher scores indicate better general health; possible score range 1 to 5.

<sup>d</sup> Higher scores indicate greater depression severity; possible score range 0 to 6.

**Table 80: Maternal Physical Activity, Screen time, and Sleep Split by Maternal Obesity Risk Tertile (n=386)**

Characteristic	Low Obesity Risk Tertile N=142			Moderate Obesity Risk Tertile N=84			High Obesity Risk Tertile N=146			p-value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>IPAQ Score<sup>a</sup></b>	15.69	8.98	0-36	15.06	10.09	0-42	16.62	10.62	0-42	0.466
<b>Hours of Screen time per day</b>	5.94	5.25	0.5-23.75	6.14	5.16	0-23.5	6.10	4.49	1-23.25	0.950
<b>Hours of Sleep</b>	7.41	1.16	3.25-11.25	7.22	1.71	2.25-18.25	7.00	2.40	1-23	0.170
<b>Sleep Quality</b>	3.67 <sup>A</sup>	0.83	1-5	3.36 <sup>B</sup>	0.87	1-5	3.10 <sup>AB</sup>	0.82	1-5	<0.001

<sup>a</sup> Enhanced version of IPAQ (International Physical Activity Questionnaire) categorical scoring: physical activity = (# days of vigorous activities per week x 3) + (# days of moderate activities x 2) + (# days of walking 10 minutes at a time) . Scores could range from 0 to 49; low/sedentary score = 0 to <20, medium score = 20 to <30, and high score ≥30.<sup>605</sup> Possible score range= 0 to 42.

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

**Maternal Physical Activity and Sleep.** Table 79 shows that physical activity and screentime did not differ significantly across obesity risk tertiles. Hours of sleep decreased as obesity risk increased, however differences were not significant (Table 80). Mother with the highest obesity risk had significantly worse sleep quality than other mothers.

**Maternal Eating Behaviors.** No significant differences were found among maternal obesity risk tertiles and intake of fruits and vegetables, fiber, vitamin C, magnesium, or potassium (Table 81). Mothers in the lowest obesity risk tertile consumed significantly less total and saturated fat, percent of energy from fat, and dietary cholesterol per day than mothers with moderate obesity risk but did not differ from those in the highest obesity risk tertile. Although not significant, mothers in the highest risk group tended to consume less milk per day. Grams of sugar and kilocalories from sugar sweetened beverages increased with obesity risk tertile, with those in the highest tertile receiving significantly more sugar and kilocalories from these beverages than those in the lowest tertile.

No significant differences were found between obesity risk tertiles and mothers' use of Dietary Restraint (Table 82). However, low obesity risk mothers were significantly less likely to engage in Disinhibited Eating or Emotional Eating than high obesity risk mothers. High obesity risk tertile mothers scored significantly lower on Adventurous Eating than moderate or low obesity risk mothers.

**Maternal Psychographic Characteristics.** Differences among obesity risk tertiles and mothers' Self-Effectiveness, Need for Cognition, and Stress Management Self-Efficacy scores all approached significance ( $P < 0.08$ ) with scores declining as obesity risk increased (Table 83). Mothers in the high obesity risk tertile had significantly lower Parenting Self-Efficacy and Stress Management scores than mothers in the low obesity risk tertile. There were no significant differences across tertiles on Weight Teasing Effect for those mothers who were teased about their weight as a child ( $N=53$ )

**Maternal Perceptions about Child Overweight.** Mothers with high obesity risk were significantly more likely to

**Table 81: Maternal Dietary Intake, Split by Maternal Obesity Risk Tertile (N=386)**

Characteristic	Low Obesity Risk Tertile N=142			Moderate Obesity Risk Tertile N=84			High Obesity Risk Tertile N=146			p-value <sup>a</sup>
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Fruit and Vegetable Servings</b>	5.15	2.76	0-13.28	5.50	2.91	0.33-14.39	0.33	14.39	0-14.39	0.677
Dietary Fiber Intake (grams/day)	19.13	7.63	4.16-41.5	19.76	7.99	4.8-45.64	4.80	45.64	2.52-45.8	0.839
Vitamin C Intake (mg/day)	159.61	64.89	38.2-347.2	164.68	68.95	40-385.45	40.00	385.45	15.85-385.9	0.839
Magnesium Intake (mg/day)	378.28	114.45	158.1-712.1	387.52	120.60	164.9-776.6	164.90	776.60	127-778.3	0.839
Potassium Intake (mg/day)	3652.59	1131.09	1496.2-6942.6	3742.97	1195.24	1551.4-759	1551.40	7590.00	1161.2-7603.8	0.839
<b>Meat/Snacks</b>										
Total fat Intake (gm/day)	99.37 <sup>A</sup>	20.45	53.5-163.9	108.24 <sup>A</sup>	21.40	63.1-156.7	105.70	26.78	46.3-207.1	0.014
Saturated fat Intake (gm/day)	26.24 <sup>A</sup>	7.50	9.42-49.9	29.49 <sup>A</sup>	7.85	12.94-47.26	28.56	9.82	6.78-65.74	0.014
Percent of kcal from fat Intake /day	35.97 <sup>A</sup>	5.11	24.5-52.1	38.19 <sup>A</sup>	5.35	26.9-50.3	37.55	6.69	22.7-62.9	0.014
Dietary cholesterol Intake (mg/day)	246.22 <sup>A</sup>	66.50	96.55-455.35	275.41 <sup>A</sup>	69.44	131.35-431.95	267.09	87.27	73.15-595.75	0.013

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Highest possible response choice was more than 1 time each day; lowest response choice was less than 1 time per week.

**Table 81: Maternal Dietary Intake, Split by Maternal Obesity Risk Tertile (N=386) Cont'd.**

	Low Obesity Risk Tertile N=142			Moderate Obesity Risk Tertile N=84			High Obesity Risk Tertile N=146			p-value*
Characteristic	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Beverages</b>										
Milk to Drink (servings/day)	0.57	0.44	0-more than 1	0.63	0.43	0-more than 1	0.51	0.45	0-more than 1	0.132
Real 100% Fruit Juice (servings/day)	0.43	0.39	0-more than 1	0.53	0.39	0-more than 1	0.47	0.40	0-more than 1	0.185
Vegetable Juice (servings/day)	0.16	0.31	0-more than 1	0.19	0.33	0-more than 1	0.20	0.34	0-more than 1	0.595
Soft Drinks and Soda/Pop (servings/day)	0.28 <sup>A</sup>	0.40	0-more than 1	0.36	0.39	0-more than 1	0.41 <sup>A</sup>	0.42	0-more than 1	0.032
Fruit Drinks or Other Sugar-Sweetened Beverages (servings/day)	0.15 <sup>A</sup>	0.25	0-more than 1	0.21	0.28	0-more than 1	0.28 <sup>A</sup>	0.36	0-more than 1	0.001
Energy Drinks (servings/day)	0.05 <sup>A</sup>	0.17	0-more than 1	0.10	0.24	0-more than 1	0.14 <sup>A</sup>	0.28	0-more than 1	0.007
Sugar-Sweetened Specialty Coffee Drinks (servings/day)	0.17	0.29	0-more than 1	0.19	0.31	0-1	0.21	0.31	0-more than 1	0.507
<b>Sugar-Sweetened Beverage Intake (soft drinks, fruit drinks, energy drinks, sweet coffee drinks)</b>										
Sugar (gm/day)	17.42 <sup>A</sup>	20.78	0-115.34	22.65	24.31	0-101.99	27.37 <sup>A</sup>	26.53	0-123.01	0.002
Kcal/day	83.36 <sup>A</sup>	101.12	0-566.66	107.81	118.97	0-508.45	130.56 <sup>A</sup>	130.01	0-607.8	0.003
Servings/day	0.65 <sup>A</sup>	0.77	0-4.14	0.85	0.90	0-3.86	1.04 <sup>A</sup>	1.00	0-4.57	0.001

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Highest possible response choice was more than 1 time each day; lowest response choice was less than 1 time per week.

**Table 82: Mean Maternal Eating Behaviors Scale Scores, Split by Maternal Obesity Risk Tertile (N=386)**

Characteristic	Low Obesity Risk Tertile N=142			Moderate Obesity Risk Tertile N=84			High Obesity Risk Tertile N=146			p-value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
Disinhibited Eating <sup>a</sup>	1.76 <sup>A</sup>	0.67	1-3.67	1.84	0.72	1-4	2.06 <sup>A</sup>	0.80	1-4	0.002
Maternal Emotional Eating <sup>b</sup>	1.78 <sup>A</sup>	0.74	1-3.67	1.88	0.86	1-4	2.08 <sup>A</sup>	0.86	1-4	0.006
Dietary Restraint <sup>c</sup>	2.44	0.75	1-4	2.34	0.79	1-4	2.46	0.75	1-4	0.453
Maternal Adventurous-ness Eating <sup>d</sup>	3.24 <sup>A</sup>	0.59	2-4	3.27 <sup>B</sup>	0.63	1-4	3.04 <sup>AB</sup>	0.74	1-4	0.009

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Disinhibited eating scale had 3 4-point (mostly false to mostly true) Likert-type items with a Cronbach-alpha of 0.81.

<sup>b</sup> Maternal emotional eating scale had 3 4-point (mostly false to mostly true) Likert-type items with a Cronbach-alpha of 0.75.

<sup>c</sup> Dietary restraint scale had 4 4-point (mostly false to mostly true) Likert-type items with a Cronbach-alpha of 0.74.

<sup>d</sup> Eating adventurousness scale had 2 4-point (mostly false to mostly true) Likert-type items with a Cronbach-alpha of 0.72.

**Table 83: Maternal Psychographic Characteristics Scale Scores, Split by Maternal Obesity Risk Tertile (N=386)**

Characteristic	Low Obesity Risk Tertile N=142			Moderate Obesity Risk Tertile N=84			High Obesity Risk Tertile N=146			p-value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
Self-Effectiveness <sup>a</sup>	3.83	0.74	2-5	3.79	0.84	1-5	3.62	0.84	1.5-5	0.066
Need for Cognition <sup>b</sup>	3.65	0.92	1-5	3.48	0.99	1-5	3.39	1.01	1-5	0.067
Parenting Self-Efficacy <sup>c</sup>	4.24 <sup>A</sup>	0.67	2-5	4.19	0.80	1-5	4.03 <sup>A</sup>	0.82	2-5	0.043
Stress Management <sup>d</sup>	4.21 <sup>A</sup>	0.49	1.5-4.5	4.03	0.79	1.5-4.5	3.81 <sup>A</sup>	0.80	1.5-4.5	<0.001
Stress Management Self-Efficacy <sup>e</sup>	2.82	1.07	1-4	2.70	1.00	1-4	2.56	0.99	1-4	0.076
Weight Teasing Effect <sup>f</sup>	3.83	0.28	3.33-4	3.21	0.73	2-4	3.21	0.*90	0.67-4	0.097

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Self-effectiveness scale had 4 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.69. Higher scores indicate more self-effectiveness in personal areas.

<sup>b</sup> Need for cognition had 1 5-point (SA to SD) Likert-type item. Higher score indicates a higher need for cognition.

<sup>c</sup> Parenting self-efficacy had 1 5-point (SA to SD) Likert-type item. Higher score indicates more parenting self-efficacy.

<sup>d</sup> Stress management scale had 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.84. Higher score indicates more control and better management of stress.

<sup>e</sup> Stress management self-efficacy had 1 5-point (SA to SD) Likert-type item. Higher score indicates more self-efficacy managing stress.

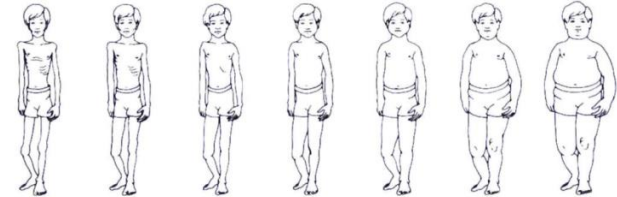
<sup>f</sup> N=53 mothers who reported they were teased at least sometimes; 3 5-point Likert-type items. Higher score indicate higher degree of being upset if teased about weight.



**Table 84: Maternal Perceptions about Child Overweight, Split by Maternal Obesity Risk Tertile (N=386)**

Characteristic	Low Obesity Risk Tertile N=142			Moderate Obesity Risk Tertile N=84			High Obesity Risk Tertile N=146			p-value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
Chubby Kids are Healthy <sup>a</sup>	2.49 <sup>A</sup>	0.64	1-4.33	2.72	0.75	1-5	2.87 <sup>A</sup>	0.72	1-5	<0.001
<b>Picture of Child first child who is ...</b>										
Underweight <sup>b</sup>	2.01	0.72	1-3	2.00	0.76	1-3	1.95	0.80	1-6	0.805
Overweight <sup>b</sup>	5.76	0.73	5-7	5.75	0.79	4-7	5.94	0.76	4-7	0.063

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.  
<sup>a</sup> A higher score indicates that a mother believes more strongly that an overweight child is healthier; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.65.  
<sup>b</sup> Body Image Perceptions based on Scores that correspond to the shapes below. The image on the far left is #1, the image on the far right is #7.



**Table 85: Maternal Modeling Frequency, and Mean Importance and Encouragement/Facilitation of Physical Activity and Media, Split by Maternal Obesity Risk Tertile (N=386)**

Characteristic	Low Obesity Risk Tertile N=142			Moderate Obesity Risk Tertile N=84			High Obesity Risk Tertile N=146			p-value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
Importance of Physical Activity for self <sup>a</sup>	3.78	0.83	1.67-5	3.67	0.99	1-5	3.56	0.93	1-5	0.099
Importance of Physical Activity for child <sup>b</sup>	3.94	0.74	1.5-5	3.98	0.82	1-5	3.72	0.92	1-5	0.023
Importance of Modeling Physical Activity <sup>c</sup>	4.34 <sup>A</sup>	0.78	1-5	4.32	0.74	1-5	4.09 <sup>A</sup>	0.77	2-5	0.012
Mother and Child Co-Physical Activity Behavior Frequency (days a week in the last month)	3.62	1.72	0-7	3.85	1.93	0-7	3.56	1.97	0-7	0.511
Maternal Modeling of Physical Activity Behavior Frequency (days a week in the last month)	3.40	1.22	0.33-6.17	3.05	1.08	0.5-5.83	3.10	1.21	0-6.33	0.048
Maternal Modeling of Media Use Behavior Frequency (days a week in the last month)	3.68 <sup>AB</sup>	2.21	0-7	2.47 <sup>A</sup>	2.11	0-7	2.80 <sup>B</sup>	2.08	0-7	<0.001

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Higher score indicates mother places greater importance on physical activity for self; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.82.

<sup>b</sup> Higher score indicates mother places greater importance of physical activity for her child; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.68.

<sup>c</sup> Higher score indicates greater encouragement/facilitation of physical activity by the mother for her child; scale includes 5 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.88.

<sup>d</sup> Higher score on all scales indicates greater importance mother places on modeling positive physical activity behaviors to her child; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.79.

think that Chubby Kids are Healthy. There were no differences between maternal obesity risk tertiles and Perception of Visual Representations of Children as Underweight or Overweight. See Table 84.

**Maternal Modeling Frequency, and Mean Importance and Encouragement/Facilitation of Physical Activity and Media Use.** No significant differences were found among obesity risk tertile and the Importance of Physical Activity for Self or Mother and Child Co-Physical Activity (Table 85). Although post-hoc analyses were not significant, mothers in the highest obesity risk tertile scored lower on the Importance of Physical Activity for Child scale and lower on the Maternal Modeling of Physical Activity scales. Low obesity risk mothers tended to score significantly higher on the Encouragement and Facilitation of Physical Activity, Importance of Modeling Physical Activity Behaviors, and Maternal Modeling Media Use Behaviors scales than higher risk mothers.

**Maternal Beliefs and Practices Regarding Screen Time.** No significant associations were found between mother obesity risk tertiles and mothers' Belief in Positive Effects of TV on Child Learning (Table 86). Similarly, no significant differences occurred across obesity risk tertiles and the Talks Often with Kids Regarding TV and Media scale.

**Maternal Feeding Practices.** Mothers in the high obesity risk tertile reported significantly less Modeling of Healthy Eating Behaviors to their children and less acceptance of Food Waste than low risk mothers (Table 87). No significant differences, however, were noted between obesity risk tertile and maternal use of Restriction and Pressuring feeding practices, nor control over children's Food Access and Decisions about food, Instrumental Feeding, and Use of Non-Food Rewards.

#### **Maternal Interpersonal Factors and Maternal Weight Status**

**Family Meals.** Mothers with low obesity risk reported significantly more positive Family Meal Atmospheres, Planning of Family Meals, and Time and Energy for Family Meals than mothers with high obesity risk. Low obesity risk mothers also reported significantly fewer family meals

**Table 86: Mean Maternal Beliefs and Practices Regarding Screentime in Families with Preschool Children, Split by Maternal Obesity Risk Tertile (N=386)**

Characteristic	Low Obesity Risk Tertile N=142			Moderate Obesity Risk Tertile N=84			High Obesity Risk Tertile N=146			p-value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
Belief of Positive Effect of TV on Child Learning <sup>a</sup>	3.86	0.72	1-5	4.02	0.80	2-5	3.80	0.76	1-5	0.086
Talks Often with Kids Regarding TV/Media <sup>b</sup>	3.28	0.94	1-5	3.37	1.02	1-5	3.28	0.95	1-5	0.754

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Higher score indicates a mother more strongly agrees that TV has a positive effect on children's learning/helps them do better in school; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.50.

<sup>b</sup> Higher score indicates a mother more often speaks with her children about TV advertisements, shows, video games, or movies; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.85.

**Table 87: Mean Maternal Feeding Practices, Split by Maternal Obesity Risk Tertile (N=386)**

Characteristic	Low Obesity Risk Tertile N=142			Moderate Obesity Risk Tertile N=84			High Obesity Risk Tertile N=146			p-value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
Healthy Eating Modeling <sup>a</sup>	3.73 <sup>A</sup>	0.73	1.25-5	3.59	0.58	2.25-5	3.48 <sup>A</sup>	0.71	1.25-5	0.009
Restriction <sup>b</sup>	3.84	0.86	2-5	3.89	0.87	1-5	3.87	0.84	1-5	0.913
Pressure to Eat <sup>c</sup>	2.12	0.90	1-5	2.20	0.98	1-5	2.21	0.99	1-5	0.697
Food Waste Non-Acceptance <sup>d</sup>	2.84 <sup>A</sup>	0.91	1-5	3.11	0.97	1-5	3.39 <sup>A</sup>	0.87	1-5	<0.001
Food Access and Decisions <sup>e</sup>	3.35	0.48	2-4.43	3.44	0.52	1.86-4.43	3.36	0.53	2-5	0.417
Instrumental Feeding <sup>f</sup> (Use of Food for Reward)	2.56	0.83	1-4.67	2.69	1.04	1-5	2.77	0.93	1-5	0.154
Use of Non-food for Reward <sup>g</sup>	2.90	0.87	1-5	2.87	1.00	1-5	2.96	0.97	1-5	0.736

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Higher scores indicate mother more strongly agrees that she models eating of healthy foods to her preschool children; scale includes 4 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.56.

<sup>b</sup> Higher scores indicate a mother uses more restriction of her preschool child's eating; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.63.

<sup>c</sup> Higher scores indicate a mother uses pressure on her preschool child to eat; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.69.

<sup>d</sup> Higher scores indicate a mother does not like when food is waste; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.61.

<sup>e</sup> Higher scores indicate a mother more strongly agrees that she controls her preschool children's access to and decisions about foods; scale includes 7 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.65.

<sup>f</sup> Higher scores indicate a mother more frequently uses food rewards for eating and behaving; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.73.

<sup>g</sup> Higher scores indicate a mother more frequently uses non-food rewards for eating and behaving; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.65.

**Table 88: Family Meals Behaviors, Importance, Atmosphere, Locations, and Maternal Time and Energy for Family Meals, Split by Maternal Obesity Risk Tertile (N=386)**

Characteristic	Low Obesity Risk Tertile N=142			Moderate Obesity Risk Tertile N=84			High Obesity Risk Tertile N=146			p- value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Frequency of Family Meals (days/week)</b>	14.22	4.73	0-21	13.05	4.88	2-21	13.62	4.97	0-21	0.218
<b>Importance of Family Meals<sup>a</sup></b>	4.61	0.52	2.67-5	4.54	0.65	2-5	4.46	0.69	2-5	0.110
<b>Family Meal Atmosphere<sup>b</sup></b>	4.27 <sup>A</sup>	0.71	2-5	4.15	0.80	1-5	3.98 <sup>A</sup>	0.94	1-5	0.011
<b>Location Where Family Meals Eaten</b>										
Fast Food Restaurants (days/week)	0.76	0.94	0-6	1.02	1.13	0-7	1.01	1.35	0-7	0.122
In Front of TV (days/week)	2.84 <sup>A</sup>	0.91	1-5	3.06 <sup>B</sup>	1.02	0-5	3.40 <sup>AB</sup>	0.89	1-6	<0.001
At Kitchen or Dining Room Table (days/week)	5.18	2.31	0-7	4.54	2.46	0-7	4.78	2.45	0-7	0.138
In the Car (days/week)	0.36	0.98	0-7	0.42	1.27	0-7	0.57	1.34	0-7	0.288
<b>Family Meal Planning<sup>c</sup></b>	3.63 <sup>A</sup>	0.86	1-5	3.50	0.88	1-5	3.31 <sup>A</sup>	0.86	1-5	0.007
<b>Time and Energy for Family Meals<sup>d</sup></b>	4.46 <sup>A</sup>	0.72	2-5	4.42	0.75	2-5	4.19 <sup>A</sup>	0.98	1-5	0.016

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Higher score indicates more importance placed on family meals; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.70.

<sup>b</sup> Higher score indicates more positive family meal atmosphere; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.70.

<sup>c</sup> Higher score indicates more meal planning ; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.70.

<sup>d</sup> Higher score indicates more time and energy for family meals; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.78.

**Table 89: Family and Household Interactions and Organization, Split by Maternal Obesity Risk Tertile (N=386)**

Characteristic	Low Obesity Risk Tertile N=142			Moderate Obesity Risk Tertile N=84			High Obesity Risk Tertile N=146			p-value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Disorganization<sup>a</sup></b>	2.41	0.93	1-4.67	2.33	0.92	1-5	2.55	0.9	1-5	0.176
<b>Family Support for Healthy Behaviors<sup>b</sup></b>	4.59 <sup>A</sup>	0.49	2.57-5	4.41	0.75	1.5-5	4.27 <sup>A</sup>	0.89	1-5	0.001
<b>Verbal Engagement with Children<sup>c</sup></b>	4.25	0.87	1-5	4.18	0.98	1-5	4.10	0.94	1-5	0.366
<b>Physical Engagement with Children<sup>d</sup></b>	4.79	0.45	3-5	4.76	0.61	1-5	4.68	0.53	2-5	0.213

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Higher score indicates more chaos, disorganization, and hurriedness in the home; scale includes 3 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.76.

<sup>b</sup> Higher score indicates more support; scale includes 4 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.81.

<sup>c</sup> Higher score indicates more verbal engagement with children while doing chores around the house; scale includes 2 5-point (SA to SD) Likert-type item.

<sup>d</sup> Higher score indicates more physical interaction with children; scale includes 1 5-point (SA to SD) Likert-type item.

eaten in front of a TV than mothers with moderate and high obesity risk. There were no significant differences between maternal obesity risk and the Frequency of Family Meals per week, Importance of Family Meals score, number of days/week meals were eaten at fast food restaurants, at a kitchen/dining room table, or in the car (Table 88).

**Family and Household Interactions.** Mothers in the high obesity risk tertile reported significantly less Family Support for Healthy Behaviors than mothers with low risk (Table 89).

#### **Maternal Interpersonal Factors and Maternal Weight Status**

**Family Meals.** Mothers with low obesity risk reported significantly more positive Family Meal Atmospheres, Planning of Family Meals, and Time and Energy for Family Meals than mothers with high obesity risk. Low obesity risk mothers also reported significantly fewer family meals eaten in front of a TV than mothers with moderate and high obesity risk. There were no significant differences between maternal obesity risk and the Frequency of Family Meals per week, Importance of Family Meals score, number of days/week meals were eaten at fast food restaurants, at a kitchen/dining room table, or in the car (Table 88).

**Family and Household Interactions.** Mothers in the high obesity risk tertile reported significantly less Family Support for Healthy Behaviors than mothers with low risk (Table 89). No differences were noted, however, among maternal obesity risk tertile and engaging with children verbally or physically and household Disorganization.

#### **Maternal Environmental Factors and Weight Status**

##### **Home and Neighborhood Physical Activity Environment: Availability and Accessibility.**

Mothers with the highest obesity risk had significantly lower scores for Physical Activity Availability and Physical Activity Accessibility in their homes, yards, and neighborhoods than low obesity risk mothers. See Table 90.

**Home Media Environment: Availability, Accessibility, and Policies about Screen time.** No significant differences were noted between obesity risk tertile and the Number of Media Devices Available in the Home. Mothers with low obesity risk, however, reported significantly fewer



**Table 90: Mean Home and Neighborhood Physical Activity Environment Scores for Households with Young Children, Split by Maternal Obesity Risk Tertile (N=386)**

Characteristic	Low Obesity Risk Tertile N=142			Moderate Obesity Risk Tertile N=84			High Obesity Risk Tertile N=146			p-value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Physical Activity Availability</b>	3.92 <sup>A</sup>	0.61	1.33-4.92	3.87	0.63	1.83-4.92	3.74 <sup>A</sup>	0.67	1.17-4.92	0.049
<b>Physical Activity Accessibility<sup>#</sup></b>	4.36 <sup>A</sup>	0.85	1-5	4.33 <sup>B</sup>	0.84	1-5	4.01 <sup>AB</sup>	1.12	1-5	0.005

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>#</sup>N=366, removed answers of “not sure”

**Table 91: Mean Home Media Equipment Environment in Households with Preschool Children, Split by Maternal Obesity Risk Tertile (N=386)**

Characteristic	Low Obesity Risk Tertile N=142			Moderate Obesity Risk Tertile N=84			High Obesity Risk Tertile N=146			p-value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Media Equipment<sup>a</sup></b>										
<b>Availability</b>										
Number of Media Devices in the Home	11.56	4.03	5-28	11.89	4.42	3-32	10.96	3.88	4-23	0.185
Number of Media Devices in Child's Bedroom	0.96 <sup>AB</sup>	1.46	0-6	1.52 <sup>A</sup>	1.72	0-7	1.58 <sup>B</sup>	1.78	0-7	0.004
<b>Media Equipment Accessibility<sup>b</sup></b>										
TV, DVD, Watch Shows or Movies	2.92 <sup>A</sup>	1.42	1-5	3.35	1.44	1-5	3.39 <sup>A</sup>	1.40	1-5	0.012
Computers and Laptops	2.33	1.36	1-5	2.63	1.36	1-5	2.67	1.43	1-5	0.086
Video games that are played standing up and require lots of moving	2.27	1.32	1-5	2.49	1.44	1-5	2.43	1.37	1-5	0.448
Video games played sitting down	2.21	1.31	1-5	2.40	1.42	1-5	2.55	1.46	1-5	0.120
Tablets, Smart phones, or Electronic educational devices (like LeapPad)	3.38	1.50	1-5	3.51	1.35	1-5	3.35	1.47	1-5	0.700

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Equipment included TV, DVD player, computer/laptop, smart phone/tablet/LeapPad, video game devices placed sitting down, video game devices played standing up and require lots of moving (like Wii Fit, Xbox Kinect), and Internet access.

<sup>b</sup> Higher score indicates mother more strongly agrees that item is easy for her preschool kids to turn on and play with with little or no help; media equipment accessibility scale includes 5 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.84

<sup>c</sup> Note that mothers did not limit on screen time were coded as 1440 (24 hours).

<sup>d</sup> Higher score indicates a mother tries to limit TV commercials and movies/shows to those made for children; activity accessibility scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.50.

<sup>e</sup> Higher score indicates a mother more strongly agrees that she only lets her preschool children watch educational TV programs; includes 1 5-point (SA to SD) Likert-type item.

**Table 91: Mean Home Media Equipment Environment in Households with Preschool Children, Split by Maternal Obesity Risk Tertile (N=386) Cont'd.**

Characteristic	Low Obesity Risk Tertile N=142			Moderate Obesity Risk Tertile N=84			High Obesity Risk Tertile N=146			p-value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Hours of Screen Time Child Allowed Per Day<sup>c</sup></b>	6.69	10.77	0-72	6.38	8.20	1-49	7.95	10.54	0.5-72	0.406
TV/Movie Time	3.37	5.05	0-24	3.16	4.19	0-24	4.09	5.30	0-24	0.285
Computer Time	1.82	4.11	0-24	2.08	4.35	0-24	2.33	4.73	0-24	0.616
Video Game Time	1.50	4.59	0-24	1.14	3.13	0-24	1.53	4.25	0-24	0.757
<b>Limiting TV Commercials and Shows Not Appropriate<sup>d</sup></b>	3.85	0.82	2-5	3.67	1.01	1-5	3.61	0.87	1-5	0.061
<b>Is this Children Permitted to Watch Ed TV Only<sup>e</sup></b>	3.68 <sup>A</sup>	1.00	2-5	3.63	1.08	1-5	3.39 <sup>A</sup>	1.07	1-5	0.038

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Equipment included TV, DVD player, computer/laptop, smart phone/tablet/LeapPad, video game devices placed sitting down, video game devices played standing up and require lots of moving (like Wii Fit, Xbox Kinect), and Internet access.

<sup>b</sup> Higher score indicates mother more strongly agrees that item is easy for her preschool kids to turn on and play with with little or no help; media equipment accessibility scale includes 5 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.84

<sup>c</sup> Note that mothers did not limit on screen time were coded as 1440 (24 hours).

<sup>d</sup> Higher score indicates a mother tries to limit TV commercials and movies/shows to those made for children; activity accessibility scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.50.

<sup>e</sup> Higher score indicates a mother more strongly agrees that she only lets her preschool children watch educational TV programs; includes 1 5-point (SA to SD) Likert-type item.

Media Devices in Child's Bedroom than moderate and high risk mothers. Mothers with low obesity risk reported that media equipment for watching TV, DVDs, shows, and movies was less accessible to their children compared to high obesity risk mothers (Table 91). There were no significant differences, however, between maternal obesity risk tertile and Accessibility of other Media Equipment (computers, laptops, tablets, etc.).

No significant differences were noted between maternal obesity risk tertile and the Total Hours Mothers Allowed Children to Watch TV, or play with Computers and Video Games. Differences among maternal obesity risk and limiting TV programming children were permitted to watch to that only appropriate for children approached significance. Mothers with low obesity risk were significantly more likely to only allow their children to watch educational TV only (Table 91).

**Household Food Availability, Accessibility, and Policies.** Mothers with high obesity risk reported significantly less Availability of Fruit and Vegetable Servings than moderate risk mothers. Concomitantly, high obesity risk mothers had less dietary fiber, vitamin C, magnesium, and potassium available in their households than low and moderate risk mothers.

Mothers in the low obesity risk tertile had the fewest servings of fatty, salty, and sweet snacks in their home, with the difference being significant between them and mothers with moderate obesity risk. No significant differences were noted between maternal obesity risk tertile and the nutrients available from those snack foods, although total fat approached significance (Table 92). There were no significant differences between maternal obesity risk tertile and availability of breakfast foods in the home, yet low obesity risk mothers tended to have more plain or fiber cereals and fewer sweet cereals servings than mothers in higher obesity risk tertiles.

An examination of beverages available in the home revealed few significant differences (Table 92). Significantly more milk servings were available in homes of low obesity risk mothers, and although not significant, low obesity risk mothers also tended to have fewer soft

**Table 92: Household Availability of Foods and Food Components, Split by Maternal Obesity Risk Tertile (N=386)**

Characteristic	Low Obesity Risk Tertile N=142			Moderate Obesity Risk Tertile N=84			High Obesity Risk Tertile N=146			p-value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Fruit and Vegetables Servings (per day)</b>	1.53	0.63	0.31-2.85	1.57 <sup>A</sup>	0.63	0-2.85	1.37 <sup>A</sup>	0.66	0.26-2.85	0.026
Dietary Fiber (grams/day)	5.42	1.84	1.77-9.16	5.50	1.78	1.64-8.65	4.92	1.96	1.35-9.37	0.021
Vitamin C (mg/day)	45.86 <sup>A</sup>	15.75	13.84-77.69	46.47	15.42	12.83-74.35	41.45 <sup>A</sup>	16.75	10.75-78.27	0.019
Magnesium (mg/day)	94.57	27.69	39-150.71	95.68	26.98	37.1-143.8	86.89	29.48	33.06-152.9	0.020
Potassium (mg/day)	922.91	274.01	370.57-1477.89	933.78	267.37	352.2-1412.91	846.61	291.55	313.49-1495.63	0.020
<b>Fat, Salty, and Sweet Snack Servings (Chips, Doughnuts, Ice Cream, Candy) per day</b>	1.08 <sup>A</sup>	0.98	0-4.57	1.44 <sup>A</sup>	1.14	0-4.57	1.25	1.07	0-4.57	0.055
Energy (kcal/day)	288.16	265.42	0-1268.27	380.52	314.35	0-1268.27	334.59	301.99	0-1268.27	0.075
Sugar (gm/day)	19.53	19.99	0-94.67	25.49	23.90	0-94.67	23.03	23.99	0-94.67	0.152
Saturated fat gm/day)	6.58	6.48	0-31.06	8.68	7.70	0-31.06	7.71	7.63	0-31.06	0.109
Total fat (gm/day)	13.48	12.65	0-60.87	17.98	15.02	0-60.87	15.71	14.51	0-60.87	0.069
<b>Breakfast Food Servings per day</b>										
Plain or fiber cereal	0.81	0.39	0-more than 1	0.79	0.37	0-more than 1	0.77	0.38	0-more than 1	0.576
Sweet cereal	0.63	0.42	0-more than 1	0.69	0.41	0-more than 1	0.70	0.37	0-more than 1	0.320
Breakfast, granola, or protein bar	0.66	0.40	0-more than 1	0.62	0.39	0-more than 1	0.59	0.39	0-more than 1	0.276

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Highest possible response choice was more than 1 time each day; lowest response choice was less than 1 time per week.

<sup>b</sup> Scores indicate the number of nutrient dense or nutrient poor foods that a mother allows her child to get for a snack without her help.

<sup>c</sup> Score indicates the number of nutrient dense or nutrient-poor foods that a mother keeps in places that are easy for her child to see and reach.

**Table 92: Household Availability of Foods and Food Components, Split by Maternal Obesity Risk Tertile (N=386) Cont'd.**

	Low Obesity Risk Tertile N=142			Moderate Obesity Risk Tertile N=84			High Obesity Risk Tertile N=146			p- value*
Characteristic	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Beverage Servings per day</b>										
Milk	0.97	0.28	0-more than 1	0.93	0.30	0-more than 1	0.88	0.31	0-more than 1	0.043
100% fruit juice	0.79	0.38	0-more than 1	0.77	0.37	0-more than 1	0.72	0.36	0-more than 1	0.307
Vegetable juice	0.28	0.38	0-more than 1	0.38	0.42	0-more than 1	0.30	0.38	0-more than 1	0.171
Soft drink (not diet)	0.34	0.42	0-more than 1	0.44	0.41	0-more than 1	0.41	0.39	0-more than 1	0.141
Other sugar-sweetened drink (e.g., fruit drinks)	0.29	0.38	0-more than 1	0.37	0.39	0-more than 1	0.36	0.37	0-more than 1	0.178
Energy drink	0.07 <sup>A</sup>	0.22	0-more than 1	0.15	0.30	0-more than 1	0.14 <sup>A</sup>	0.27	0-more than 1	0.030
Sugar-sweetened specialty coffee drink	0.20	0.35	0-more than 1	0.26	0.39	0-more than 1	0.22	0.33	0-more than 1	0.471
Sugar (gm/day)	40.02	30.04	0-145.21	48.36	31.81	0-145.21	44.50	28.55	1.61-145.21	0.126
Energy (gm/day)	219.05	149.94	0-745.91	258.20	159.66	0-745.91	237.63	142.01	11.89-745.91	0.167
<b>Child Food Access Policy<sup>b</sup></b>										
Mean Number of Nutrient Dense Foods Available	1.56	1.43	0-4	1.33	1.43	0-4	1.67	1.50	0-4	0.232
Mean Number of Low Nutrient Density Foods Available	0.67 <sup>A</sup>	1.24	0-6	0.87	1.40	0-6	1.12 <sup>A</sup>	1.68	0-7	0.032
<b>Child Food Accessibility<sup>c</sup></b>										
Nutrient Dense Foods	2.15 <sup>A</sup>	1.38	0-4	1.67 <sup>AB</sup>	1.49	0-4	2.16 <sup>B</sup>	1.42	0-4	0.022
Low Nutrient Density Foods	1.02	1.26	0-7	1.15	1.63	0-7	1.31	1.60	0-7	0.239

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Highest possible response choice was more than 1 time each day; lowest response choice was less than 1 time per week.

<sup>b</sup> Scores indicate the number of nutrient dense or nutrient poor foods that a mother allows her child to get for a snack without her help.

<sup>c</sup> Score indicates the number of nutrient dense or nutrient-poor foods that a mother keeps in places that are easy for her child to see and reach.

drinks and other sugar-sweetened beverage servings available in the home. Mothers in the low obesity risk tertile reported significantly fewer energy drink servings available in the home per day compared to high risk mothers.

Mothers with high obesity risk reported had significantly more servings of Low Nutrient Dense Foods (i.e., junk foods), but no differences in Nutrient Dense Foods servings available occurred. Mothers in the moderate obesity risk tertile reported significantly fewer Nutrient Dense Snack Foods in places easy for their children to see and reach than low and high obesity risk mothers. There were no difference in Low Nutrient Dense Food Accessibility, but a trend indicated that it was lower for low obesity risk mothers.

#### **Child Intrapersonal Factors and Maternal Weight Status**

Maternal obesity risk tertiles were compared to child intrapersonal characteristics. Only data from children with plausible heights and weights and non-obese mothers was included (N=339).

**Child Weight and Health.** No difference was noted between child BMI percentile for age and maternal obesity risk tertile. Mothers in the high obesity risk tertile reported their children's health was significantly worse than low obesity risk mothers, and the numbers of days their child had not good health was significantly higher than both low and moderate obesity risk mothers (Table 93).

**Child Physical Activity.** No significant differences were seen between maternal obesity risk tertile and Child IPAQ Score and Child Screentime, yet Child Physical Activity Tendency Scores dropped as obesity risk increased and were significantly different between low and high risk mothers.

**Child Sleep.** Total hours of Child Sleep was highest among low obesity risk mothers compared to high obesity risk mothers. Child Sleep Quality was significantly lower in the high obesity risk tertile mothers compared to both other tertiles (Table 93).

**Table 93: Child Physical Activity Level and Screen time, Split by Maternal Obesity Risk Tertile (N=386)**

	Low Obesity Risk Tertile N=132			Moderate Obesity Risk Tertile N=79			High Obesity Risk Tertile N=128			p-value *
Child Physical Activity	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
Child BMI Percentile for Age	62.17	34.35	0.01-100	61.37	36.60	0-100	66.29	34.58	0-100	0.524
Child General Health	4.69 <sup>A</sup>	0.64	1-5	4.65	0.56	3-5	4.44 <sup>A</sup>	0.65	2-5	0.004
Number of Days Child Health Not Good	2.24 <sup>A</sup>	3.17	1-31	2.37 <sup>B</sup>	3.34	1-27	3.94 <sup>AB</sup>	5.28	1-29	0.002
Child IPAQ Score <sup>a</sup>	27.92	10.68	4-42	24.76	11.85	0-42	25.92	11.40	0-42	0.177
Child Physical Activity Tendency Score <sup>b</sup>	4.17 <sup>A</sup>	0.63	2.25-5	4.04	0.71	2.25-5	3.85 <sup>A</sup>	0.66	2-5	0.001
Child Screen time (hours per day)	3.73	3.45	0-15.5	4.65	4.08	0-20.25	4.56	4.12	0-22	0.130
Total Child Sleep (hours)	10.90 <sup>A</sup>	1.88	3-19	10.37	2.35	2-20.5	10.20 <sup>A</sup>	2.30	2-22	0.019
Child Sleep Quality <sup>c</sup>	4.59 <sup>A</sup>	0.60	2-5	4.56 <sup>B</sup>	0.67	2-5	4.23 <sup>AB</sup>	0.75	2-5	<0.001

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>a</sup> Scoring based on enhanced version of IPAQ (International Physical Activity Questionnaire) categorical scoring: physical activity = (# days of vigorous activities per week x 3) + (# days of moderate activities x 2) + (# days of walking 10 minutes at a time) . Scores could range from 0 to 49; low/sedentary score = 0 to <20, medium score = 20 to <30, and high score ≥30.<sup>605</sup>

<sup>b</sup> This scale score indicates how likely a child is to be physically active and is comprised of 4 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.68; a higher score indicates a child is more likely to be physically active.

<sup>c</sup> A higher score of sleep quality indicates better sleep quality



**Table 93: Child Physical Activity Level and Screen time, Split by Maternal Obesity Risk Tertile (N=386) Cont'd.**

Child Physical Activity	Low Obesity Risk Tertile N=132			Moderate Obesity Risk Tertile N=79			High Obesity Risk Tertile N=128			p-value*
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	
<b>Child Beverage Intake</b>										
Milk to Drink (servings/day)	0.93	0.34	0-more than 1	0.86	0.36	0-more than 1	0.89	0.35	0-more than 1	0.417
Real 100% Fruit Juice (servings/day)	0.72	0.40	0-more than 1	0.64	0.38	0-more than 1	0.68	0.39	0-more than 1	0.385
Vegetable Juice (servings/day)	0.22	0.37	0-more than 1	0.13	0.27	0-more than 1	0.16	0.31	0-more than 1	0.138
Soft Drinks and Soda/Pop (servings/day)	0.08	0.17	0-more than 1	0.09	0.20	0-0.86	0.12	0.23	0-more than 1	0.143
Fruit Drinks or Other Sugar-Sweetened Beverages (servings/day)	0.16	0.29	0-more than 1	0.25	0.33	0-more than 1	0.25	0.31	0-more than 1	0.041
<b>Sugar-Sweetened Beverage (SSB) Intake per day (soft drinks and fruit drinks)</b>	0.24 <sup>A</sup>	0.41	0-2.14	0.34	0.44	0-1.86	0.37 <sup>A</sup>	0.49	0-2.29	0.046
Sugar (gm/day)	5.17 <sup>A</sup>	9.05	0-50.13	7.15	9.79	0-43.36	8.15 <sup>A</sup>	11.17	0-54.38	0.055
Kcal/day	24.55 <sup>A</sup>	42.42	0-226.71	34.53	45.81	0-196.29	38.49 <sup>A</sup>	51.08	0-243.43	0.049
<b>Child Eating Styles</b>										
Child Eating Neophobia <sup>d</sup>	2.90	1.12	1-5	3.13	1.10	1-5	3.13	0.94	1.25-5	0.154
Child Emotional Eating <sup>e</sup>	1.59 <sup>A</sup>	0.70	1-5	1.58 <sup>B</sup>	0.69	1-3	1.93 <sup>AB</sup>	0.80	1-5	<0.001
Child Eating Self-Regulation <sup>f</sup>	3.53	0.93	1-5	3.67	0.89	1-5	3.43	0.95	1-5	0.183

\* ANOVA test; means in the same row followed by the same capital letter are significantly different by Tukey post-hoc analyses.

<sup>d</sup> Higher score indicates a mother more strongly agrees that her child has wariness of trying and eating new foods; scale includes 4 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.88.

<sup>e</sup> Higher scores indicate a mother more strongly agrees that her child's eating is regulated by his or her emotional state; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.81.

<sup>f</sup> Higher scores indicate that a mother more strongly agrees that her child is better able to follow inner signals of satiety and self-regulate his or her intake of food; scale includes 2 5-point (SA to SD) Likert-type items with a Cronbach-alpha of 0.63.

**Child Beverage Intake.** There were no significant difference between maternal obesity risk tertile and her child's intake of milk, real 100% fruit juice, vegetable juice, or soft drinks (Table 93). Although not significant in post hoc analyses, mothers in the low obesity risk tertile tended to have children who consumed fewer fruit drinks or other sugar-sweetened beverages. Lowobesity risk tertile mothers reported their children consumed significantly fewer servings and grams of sugar and kilocalories from sugar-sweetened beverages.

**Child Eating Styles.** No significant associations were found between maternal obesity risk tertile and child Eating Neophobia and Eating Self-Regulation. Maternal obesity risk tertiles differed for child Emotional Eating, with high obesity risk mothers having children with significantly higher scores (Table 93).

## CHAPTER 5

### DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

This chapter discusses the survey development, findings from the three research questions, as well as study limitations, strengths, and conclusions. It closes with recommendations for future research.

The goal of this study was to comprehensively examine the weight-related interpersonal, intrapersonal, and environmental characteristics of mothers and the preschool aged children and their relationship to obesity and obesity risk. The cross-sectional survey data collected from a large, demographically diverse sample of mothers of preschool-age children was used to 1) describe the weight-related characteristics of the home environments (i.e., maternal demographic, psychographic, behavioral, and physical environment characteristics) of preschool children, 2) describe how weight-related characteristics of home environments differ with the weight status of mothers, and 3A) examine intrapersonal, interpersonal, and home environment characteristics associated with maternal obese vs. non-obese weight status; 3B) determine the obesity risk of non-obese mothers using on a score derived from the characteristics elucidated in Question 3A; and 3C) describe differences in non-obese mothers' intrapersonal, interpersonal, and home environmental characteristics based on their obesity risk score tertile.

The **H**ome **O**besogenicity **M**easure of **E**nvironment**S** (HOMES) survey was created to answer these research questions. A socioecological framework guided the choice of constructs to be assessed given the importance of individual and environmental characteristics in obesity and related health outcomes. A systematic method<sup>597</sup> was used to examine the potential scales for application to the study population (i.e., mothers and young children of varying races/ethnicities and educational attainment). Use of reliable and valid scales is vital to ensure the most accurate responses. For example, a review of 36 studies assessing parenting practices and childhood overweight and obesity noted that discrepancies among study results may be explained by

differences in conceptualization of the constructs.<sup>642</sup> In this survey, previously validated and refined tools were used when possible, and all had high internal consistency with the sample here. The HOMES development followed a carefully planned process. Development had these steps: 1) systematic literature review to identify a broad array of associated constructs and existing instruments; 2) instrument comparison and categorization to identify overlap, gaps, and appropriateness for audience; 3) instrument analysis by 3 experts in health promotion to determine completeness of construct array, appropriateness to study purpose, content validity, and needed refinements; 4) published psychometric data was reviewed to evaluate instrument reliability and needed refinements, and factor analysis data examination was utilized to identify strategies for shortening instruments to decrease response burden while preserving instrument integrity; 5) extensively refined instruments and *de novo* items were appraised by 5 experts in health promotion and/or psychometrics for content validity vis-à-vis purported construct measured, participant burden, overall utility, and appropriateness for the study sample and purpose; 6) iterative cognitive testing and refinement of substantially modified or *de novo* items to ascertain accurate interpretation by and acceptability to target audience; 7) online survey construction using best practices to retain participant concentration level, minimize participant burden, and promote accurate, rapid completion; 8) pilot-test survey with a convenience sample (n=48) of mothers of preschool children to establish completion time and evaluate participant satisfaction with survey experience; and 9) survey refinement to improve flow and functioning.

## RESEARCH QUESTION 1 SUMMARY

**What are the weight-related characteristics of the home environments (i.e., maternal demographic, psychographic, behavioral, and physical environment characteristics) of preschool children?**

### Summary

This study examined a comprehensive array of weight-related intrapersonal, interpersonal, and home environmental characteristics of mothers and their preschool aged children. The sample was a demographically diverse group of mothers of preschool aged children in the US. Maternal BMI was slightly less than the general population (30% vs. 36.5% obese), and mothers reported low levels of physical activity, adequate sleep duration, inadequate fruit and vegetable intake, and high fat intake. Mothers were confident in their parenting skills, stress management abilities, and had little concern about their children's risk for becoming overweight. Mothers believed that physical activity was important for them and their children, facilitated children's physical activity behaviors, and frequently modeled healthy physical activity to their children. They restricted sweet and salty snacks while not pressuring children to eat nutrient-dense foods.

The children that mothers described in the survey were between 2 and 5 years old. Similar to existing literature, children had high levels of physical activity.<sup>643,644</sup> Children tended to not meet total sleep duration recommendations for their age, but had good sleep quality. Few consumed sugar-sweetened soft drinks and fruit drinks. Children had moderate scores of eating neophobia and ability to self-regulate intake.

Household interpersonal characteristics indicated that families tended to "get along" well, and had only moderate levels of disorganization. Families shared meals 7 or more times weekly. The home environment was generally supportive of physical activity and children's access to sedentary behavior equipment (i.e., media devices) was limited. The home food environment did

not include adequate servings of fruits and vegetables, yet provided adequate availability of breakfast foods and milk to drink.

### **Maternal Characteristics**

The proportion of white to non-white mothers participating in the study was similar to national figures, however the proportion who were Latino/Hispanic was lower (4.6% vs. 17.4% nationally).<sup>645</sup> Compared to national statistics, the sample was somewhat more educated with only 17% having a high school or less education vs. 42% nationally.<sup>646</sup> The geographic region of their residences mirrored the population distribution in the U.S.<sup>647</sup> A higher proportion of mothers did not work for pay than national labor averages for mothers of children under 6 years old<sup>621</sup> (i.e., 55% vs. 42%) perhaps because participants were part of a survey panel and may represent women who work only intermittently (such as completing online surveys) to supplement income. Family affluence scores were similar to a nationally representative sample of data reported by adolescents (i.e., 5.6 vs 5.7, possible range 0-9, high score indicates more affluence).<sup>569</sup>

Women in this study tended to be healthy overall, which is similar to national samples of adults 18 to 44. For instance, nationwide, about 85 percent of adults rated their general health as good or excellent whereas 88 percent reported good or excellent health in this study.<sup>648</sup> Slightly more than three out of four participants were non-smokers, which is slightly less than national averages (85% of women are nonsmokers<sup>649</sup>). The proportion of participants who had at least 14 recent mentally unhealthy days was somewhat lower than national samples (11% vs 15%).

Mothers reported being normal weights throughout their growing years and now accurately described themselves as being overweight. Slightly less than one in four participants recalling being weight teased during childhood, which is congruent with the proportion of the population who experience teasing and bullying for weight-related reasons.<sup>370,650,651</sup> BMIs indicated that 30% were obese, which is somewhat lower than the general female adult population (36.5% obese of U.S. female's aged 20 years or older<sup>635</sup>); this difference likely is

because national figures include a much broader age range than that of the sample. That is, mothers in this sample were age 18 to 45 whereas national data for women age 20 and older, and BMI tends to increase with age.<sup>652</sup> Research indicates that in general, adults' self-reported heights and weights closely mirror measured heights and weights, yet obese women tend to underreport their weights, which could be another reason for the lower prevalence reported in this study.<sup>581-584,653</sup> Mean waist circumferences did not indicate mothers were, as a group, at increased risk for metabolic disorders and mortality.

Participants' weight-related behaviors were in need of improvement. Like most adults in the U.S., mothers reported low or sedentary levels of physical activity and exceeded screen time recommendations.<sup>654</sup> Two-thirds reported insufficient sleep duration and few reported having very good sleep quality, which is comparable to national figures.<sup>655</sup>

With regard to diet, mothers met recommendations for fruits and vegetables, vitamin C, magnesium, potassium, and cholesterol but exceeded recommendations for total fat, saturated fat, and percent calories from total fat. Fiber intake fell short of recommendations. Both milk and sugar-sweetened beverages intakes were low. Except for fruit and vegetable intake, mothers' diets were similar to typical US dietary intake.<sup>656</sup> Participants' eating behaviors were similar to previous reports,<sup>360,609</sup> that is, mothers were fairly neutral with regard to being emotional eaters, disinhibited (uncontrolled) eaters, and restraint eaters. However, they tended toward being adventurous eaters, similar to other studies.<sup>609</sup>

Psychographic scale results indicate that mothers' perceived themselves as being able to cope with stressors in their lives in that their self-effectiveness, parenting self-efficacy, and stress management skills were all above scale midpoints. Participants were somewhat less confident in their ability to manage stress (i.e., less confident in their ability to control and manage difficult situations in their life). Mothers rated their ability to manage stress higher than their stress management self-efficacy, indicating that they thought they did a good job of managing stress but were less confident in this ability. This finding is contrary to the social cognitive theory which

posits that self-efficacy, or confidence in ability to perform a behavior is an important precursor to actually engaging in a behavior.<sup>657</sup>

Perceived control is considered an important coping resource for performance of health behaviors.<sup>433</sup> A component of perceived control is problem-solving ability.<sup>433</sup> Mothers only somewhat agreed that they enjoyed engaging in problem solving which could have implications for their willingness to invest the mental effort needed to change patterns and environments to support better health.<sup>658</sup>

Parent modeling of weight-related behaviors have important impacts on child behaviors. For instance, physical activity and encouragement of and participation with children in physical activity are positively associated with child physical activity level.<sup>100</sup> Similarly, maternal modeling of healthy eating behaviors can be an important predictor of children's food intake.<sup>247,659</sup> Mothers in this sample, reported valuing and encouraging physical activity, yet engaged in physical activity with their children on only about half the days in a week and spent even fewer days modeling physical activity and limiting screentime to their children. Mothers also were fairly neutral about whether they modeled healthy eating behaviors.

Maternal feeding practices can have profound effects on children's diets and weights. For instance, children of parents who restrict children's eating tend have higher body weights and higher calorie intake.<sup>659</sup> Children who are pressured to eat consume fewer milk, fruit, and vegetable servings.<sup>85,266</sup> When children are offered rewards for eating, they have an increased preference for reward foods (e.g., sweets).<sup>86</sup> Participants' feeding practices indicated areas of improvement in that they to restrict children's food. Mothers had healthy behaviors regarding their not pressuring children to eat, rewarding them for eating, and were not concerned about food waste (i.e., did not encourage children to "clean their plates").

### **Child Characteristics**

Participants reported on one of their preschool-age children. Children's average age was 3.5 years and 52% were female. Nearly all were biological children of participants and most



were white (67%). Half of children under age 5 in the United States are minority (i.e., not single-race white and not Hispanic), indicating that this sample over-represents white children.<sup>660</sup>

The vast majority of children had good or excellent health and experienced few or no days of “not good” good mental and physical health during the past month, similar to other reports of children generally having good health and quality of life.<sup>661,662</sup>

Children had normal birth weights and lengths. For children with biologically plausible BMI-for-sex and age data (n=496), the prevalence of overweight and obesity is considerably higher than the national prevalence rate<sup>1</sup> (45% vs 23%). This difference should be interpreted with caution, however because numerous studies have reported inaccuracies in parent reports of child height and weight and the national prevalence was obtained through measured data (NHANES). In an attempt to enhance the accuracy of parental reports of children’s heights and weights, mothers in this study were encouraged to actually measure child height and weight before reporting it. Indicator questions, including how tall a child was in relation to a door knob (which usually are at a standard distance from the floor), also were used to assist researchers in determining plausibility of reported heights and weights. Mean child weights did not differ between those whose mothers indicated they measured them and those who did not; however, children were significantly shorter if their height was estimated than when mothers actually measured it—inaccurate (shorter) heights can result in inflated BMIs. The body shape chosen for children tended to fall between normal and slightly overweight which may indicate mothers are aware of their child’s weight as the 64<sup>th</sup> BMI percentile for age was the sample mean. Mothers tended to not be concerned about their child’s overweight risk. Importantly, they realized that chubbiness in kids was not an indicator of good health. Like parents in other studies,<sup>663</sup> participants accurately identified body shapes of underweight and overweight children.

Children as young as 3 years old may be teased because of their weight.<sup>379</sup> Among children in the study reported here, few mothers indicated their children were teased, and of those, only 4 reported the child’s body shape or weight was the reason. Among the 4 children, 3

were actually categorized as obese. This was likely teased due to one child being low weight (her mother selected a low weight silhouette) and mothers of the other 3 children selected a heavier child silhouette. Weight teasing when young has been shown to result in disordered eating later in life,<sup>664</sup> hence healthy habits and body image are important to develop in these children.

The physical activity, sleep, and dietary behaviors of children in this study indicate these may put them at an increased risk for obesity. For example, children's physical activity levels did not meet recommendations despite mothers indicating their children liked to be physically active.<sup>644,665,666</sup> Overall, children's physical activity level tended to be moderate or low with only 18% being vigorously or moderately physically activity every day. This finding differs greatly from reports of similarly aged children where nearly all were moderately to vigorously physically active for at least 1 daily.<sup>643</sup>

The American Academy of Pediatrics recommends that children between 2 and 5 engage in 2 or less hours of all screen time activity per day.<sup>667</sup> In this sample, only about half met this guideline; however this is lower than rates reported by others.<sup>666</sup>

Children ages 3 to 5 years need 11 to 13 hours of sleep each night,<sup>668</sup> however, national data indicate many are only getting about 10.4 hours.<sup>655</sup> Children ages 2-5 in the HOMES survey slept about 10.46 hours per night, similar to national averages. Only half met night time sleep recommendation for their age. Despite not meeting night-time sleep requirements, the vast majority of children had good or very good sleep quality, which is related to fewer neurobehavioral and behavioral problems.

Children's dietary intake data indicated several areas in need of improvement. For example, they consumed less than 1 serving of milk per day, far less than recommended. A representative study of over 1100 preschool children found that children drank 12oz of milk each day,<sup>669</sup> higher than the one 8 oz intake of participants' children. On the positive side, children's 100% juice aligned with recommendations from the American Academy of Pediatrics in that children consumed no more than ½ cup of juice per day.<sup>670</sup> Children also consumed extremely

limited amounts of sugar-sweetened beverage. Compared to preschool children in the U.S., juice intake was similar (3.2oz vs 4.7oz 100% juice), and soda consumption was lower (1oz vs 3oz soda).<sup>669</sup>

Mothers reported that their children had neutral scores of food neophobia and were not emotional eaters (only 13 children scored 4 or greater on the Child Emotional Eating Scale), which is similar to children aged 7-9 years.<sup>671</sup> A survey of 5-year old girls found that 27% of them were emotional over eaters.<sup>672</sup> Two surveys of caregivers report that about 44% of children were above a cutoff to be considered food neophobic, which is higher than the 29% of mothers in this study who agreed or strongly agreed that their child was food neophobic.<sup>610,673</sup> In this sample, only 11 percent of mothers strongly agreed or agreed that their children could not self-regulate eating, which is a positive finding as inability to self-regulate is related to increased risk for overweight.<sup>674,675</sup> Nationally representative data indicate that there is wide variability in children's ability to self-regulate intake.<sup>676</sup>

### **Interpersonal Characteristics**

Similar to national data for households with young children,<sup>308</sup> families in this study ate together often-- over 9 in 10 families ate at least 1 family meal per day. Meals tended to be eaten most often at a kitchen or dining room table, and less frequently in less healthful locations (e.g., in front of a TV, in the car, or at a fast food restaurant) that negate benefits that family meals confer.<sup>677</sup> The frequency of family meals is likely due to the high importance mothers placed on family meals, their willingness to invest time and energy in preparing family meals, and the pleasant atmosphere of their family mealtimes. Interestingly, mothers tended to be ambivalent about planning family meals when planning behaviors tend to be associated with actual execution of behaviors.<sup>678</sup>

Mothers reported relatively low levels of family conflict, or stated another way; felt their families were cohesive and that their households were fairly organized. Although maternal education and hours of paid employment, were not correlated with family conflict or disorganization, family

affluence was inversely correlated with family conflict and disorganization. Mothers agreed that their families were supportive of healthy diet and physical activity behaviors, which along with family cohesion may be necessary for engaging in healthy behaviors as evidence has shown support to be predictive of healthy behaviors.<sup>436</sup>

Mothers' verbal and physical engagement has been studied in parenting and child development literature,<sup>679</sup> but its association with health outcomes such as obesity has yet to be explored in detail. Mothers in this study strongly agreed that they verbally and physically interacted with their children. The 2003-2007 American Time Use Survey indicated that highly educated mothers spend more time caring for (e.g., physically caring for children) and playing (e.g., playing sports or doing arts and crafts) with toddlers than mothers with a high school education or less.<sup>680</sup> This study, however, uncovered no correlation between maternal education, employment status, or family affluence score and verbal or physical engagement.

### **Environmental Characteristics**

Similar to the findings reported by the Neighborhood Impact on Kids (NIK),<sup>681</sup> households in the study reported here had a great deal of equipment supportive of physical activity available and more accessible. Physical activity equipment availability and accessibility is essential to physical activity behavior.<sup>104</sup> Despite good availability and accessibility, mothers' physical activity levels tended to be low.

Similar to nationally representative data, children tended to have few media devices in their bedrooms,<sup>681</sup> yet had numerous devices in the home. Household media equipment accessibility was highest for TV and DVDs and tablets, smart phones, or educational devices. The preschool children in this study only had about 1 media device in their bedrooms, which may be a result of their younger age. About half of parents of Canadian 10-11 year old children reported children had a TV, DVD player, or video game console in their bedroom.<sup>682</sup> Fewer had a computer or cell or smart phone (21% and 17%). Children in this study with one or more media devices in their bedroom had significantly poorer sleep quality, yet significantly fewer hours of

computer and television time were allowed compared to children with no media devices in their bedrooms.

A nationally representative study of parents of 1 to 8 year old children found that the average US child was exposed to 232 minutes of background television on a typical day.<sup>683</sup> In this study, children were exposed to 256 minutes of TV time per day, some of which likely is accounted for time when the television was on with no one watching. Qualitative studies indicate that parents often keep a TV on for background noise or to entertain their children.<sup>684</sup> Preschool children should have no more than 180 minutes of screentime per day, and the 495 minutes parents allowed for total screentime in this study is substantially higher, yet similar to other studies which have found high amounts of screentime and TV watching.<sup>72,685</sup>

Mothers tended to be ambivalent about limiting children's TV viewing to commercial-free programming or programming just for children or limiting them to educational programs. Research indicates that pro-social and educational content is associated with positive effects on young children,<sup>686</sup> whereas violent and inappropriate shows are associated with negative effects.<sup>687</sup> A meta-analysis of 18 studies concluded that viewing food advertising increases food intake in children, indicating the importance of limiting TV viewing, especially food-related advertisements, to children.<sup>165</sup>

Marketing of food products to children through television advertisements is associated with increased preference and intake for advertised foods.<sup>688</sup> Research also shows that children who have less understanding of the persuasive nature of advertising are more likely to rate advertised foods as healthier and more nutritious.<sup>689</sup> In this study, mothers tended to agree that television can have a positive effect on child learning and only one-third talked often with their preschool children about television shows and commercials to protect them from television ads.

Overall, the household food environment provided adequate servings of healthy breakfast foods, yet availability of milk, 100% fruit juice, and fruits and vegetables was insufficient for families to meet intake recommendations. For example, the amount of milk usually kept on hand

would provide less than the family's recommended needs, which may be why intake of milk was low among mothers and children. Availability of less healthful foods tended to be higher. Mothers reported over 300 kilocalories available in the home per person per day from chips, doughnuts, ice cream, and candy alone. Sugary beverage availability, however, was limited to less than 1 serving per person per day and was reflected in both mother and child intake results. Mothers tended to not permit children to independently access foods, but were more likely to keep nutrient dense foods in places where children could easily see and reach than low nutrient dense foods, indicating overall healthy food access environments in the home.

### **Conclusion**

Families in this study had many healthy weight-related behaviors. Mothers consumed many fruits and vegetables and along with their children, consumed very few sugary beverages. This is more fruit and vegetable consumption than average national consumption by adults but near recommended intake of 5 servings per day.<sup>690</sup> Their home food environment was likely a contributor to diet quality as mothers reported limited availability of sugary beverages. Mothers used mostly healthy feeding behaviors, including not rewarding children for eating and having family meals most days of the week. Physical activity was encouraged and valued by mothers and they reported good availability and access of physical activity equipment. Family support for healthy physical activity and eating behaviors was high and conflict in the family was low. Despite these positive behaviors and environments, there are still areas that require improvement. The home food environment had less milk available than is needed to support intake recommendations, which likely is why milk intake was low in both children and mothers. Mothers tended to use restrictive feeding practices like making sure children did not consume too many unhealthy snacks, which could contribute to overweight in children.<sup>271,691,692</sup> Neither mothers nor children meet physical activity recommendations and mothers did not meet screentime requirements. If mothers increased time spent engaging in physical activity with their children and modeling healthy physical activity and media behaviors, this would increase both

child and parent time spent in physical activity. Finally, total hours of sleep for children did not meet requirements for age. Emerging evidence highlights the importance of sleep for children and adults for a myriad of health benefits, including overweight prevention.<sup>523</sup>

## **RESEARCH QUESTION 2 SUMMARY**

### **How do weight-related characteristics of home environments differ with the weight status of mothers?**

This study explored how interpersonal, intrapersonal, and home environment characteristics of mothers of young children differ by maternal weight status. Maternal BMI was categorized as underweight/ low normal weight (i.e., BMI < 22), high normal (i.e., BMI= 22 to 24.9), overweight (i.e., BMI 25 to <30), and obese (i.e., BMI 30 and higher). A total of 30 percent of the mothers were obese. These mothers tended to be Black or African American and have less education, greater risk of food insecurity, poorer health, more body shape dissatisfaction, lower physical activity levels, more screentime viewing hours, shorter sleep duration, poorer sleep quality, lower intake of vitamins associated with fruit and vegetable intake, and higher intake of fats and sugar-sweetened beverages than lower weight counterparts. Compared to other mothers, obese mothers were more likely to be emotional eaters, be concerned about their child's risk of becoming overweight, have experienced weight teasing when younger, and feel upset by the teasing experienced. Additionally, obese mothers placed less importance on physical activity for themselves and modeling physical activity and healthy eating behaviors to their children. They were less tolerant of food waste and less controlling of children's access to and decisions about food choices, but were more likely to report their children were food neophobic, their families ate family meals in front of a TV and not at a kitchen or dining table, and there were higher levels of conflict among family members in their home. In the homes of obese mothers, physical activity accessibility was lower and children were allowed significantly

more hours of screentime. Obese mothers also had fewer fruits, vegetables, and breakfast foods available in their homes than lower weight status mothers.

Child BMI percentiles for age were categorized as follows: below the 5<sup>th</sup> percentile is underweight; 5<sup>th</sup> to < 25<sup>th</sup> percentile is low normal weight status; 25<sup>th</sup> to 74<sup>th</sup> percentile is middle normal weight status; 75<sup>th</sup> to 84<sup>th</sup> percentile is high normal; 85<sup>th</sup> to < 95<sup>th</sup> is overweight, and 95<sup>th</sup> percentile and above is obese. Maternal and child weights were very strongly and positively correlated. Thus, similar to obese mothers, obese children were more likely to be Black or African American. Normal weight children were more likely to have mothers with a college education. Compared to lower weight status children, obese children tended to play more days outside in their neighborhood, sleep fewer hours, and consume more servings of vegetable juice, fruit drinks, soft drinks, other sugar-sweetened beverages, ate more family meals at in front of a TV, and had less ability to self-regulate food intake. Obese children also had more media devices in their bedrooms, more access to sedentary video games, and more sugar-sweetened drinks available in their homes. Underweight children tended to be permitted to only watch educational TV.

Interpersonal characteristics of mothers and children also were explored. Mothers' parenting behaviors differed by child weight status, though few consistent trends were evident. Mothers of obese children reported more time and energy for family meals and more planning of family meals. Mothers of overweight children tended to engage in more frequent modeling of healthy physical activity as well as more modeling of unhealthy media use. Mothers of overweight and obese children were less likely to tolerate food waste. Mothers of middle normal weight children controlled children's food access and decision making less than mothers of obese children.

#### **Differences Across Weight Categories**

Like the national population, a greater proportion of Black and Hispanic mothers in this study were overweight or obese and Asian mothers were the thinnest.<sup>1</sup> Low educational attainment and food insecurity were most common among obese mothers and least common among the



underweight/low-normal weight mothers, paralleling findings of other nationally representative samples of women.<sup>1,440</sup> Higher maternal education attainment appears to be protective against childhood obesity in the children in this study as well as others.<sup>693,694</sup> Additionally, low food insecurity risk was associated with healthier child weights thereby supporting nationally representative data showing that young children from food insecure low-income households tend to have a higher weight for age.<sup>565</sup> Although no significant differences were noted between maternal employment hours and child weight in this study and others,<sup>695</sup> some research indicates that maternal employment status adversely affects a young child's risk of obesity.<sup>564,696</sup>

Obese mothers in this study had significantly poorer general health, fewer days of not good mental or physical health, more chronic disease, and greater depression severity. These findings are congruent with other studies.<sup>697-699</sup> For instance, a phone survey of 5,000 individuals in the U.S. found that after controlling for demographics, health care utilization, chronic disease, and lifestyle behaviors, obese adults had a 233% higher risk of reporting poor health.<sup>700</sup> Unlike obese mothers, obese children did not have worse general health than lower BMI percentile peers. The highest proportion of children who were never breastfed were obese. This is consistent with evidence that breastfeeding appears to be protective against obesity both for preschool-age and older children.<sup>701-704</sup> There is no clear 'dose effect', however. Data from NHANES found a 37% decrease in overweight and 16% reduction in obesity among 3 to 5 year old children who had been breastfed at any time compared to those never breastfed.<sup>705</sup>

Although continuous BMI measures of maternal and child weights were strongly correlated, paternal weight status and child BMI categories were not associated. This may be explained by the way mothers were asked to report paternal weight (i.e., thin, very thin, average, heavy or very heavy) as a category instead of actual height and weight to calculate a continuous BMI. There is ample evidence that child obesity is associated with paternal obesity.<sup>25,706,707</sup>

#### **Physical Activity Behaviors, Environments and Weight Categories**

Compared to leaner counterparts, overweight and obese mothers in this and other studies<sup>708-710</sup> exhibited more obesogenic behaviors including low physical activity, high sedentary activity, and less than the recommended amount of sleep. Interestingly, children's physical and sedentary activity did not differ by weight status. This finding is similar to many cross-sectional studies like this one, however longitudinal research reports positive associations between body fatness in children younger than 10 years and TV viewing.<sup>711</sup> Like overweight and obese mothers, obese children slept fewer hours than their lighter weight peers, which supports numerous others studies reporting an inverse relationship between sleep hours and weight status in preschool children.<sup>539,712,713</sup>

Parent encouragement and facilitation of activity, along with importance placed on activity, are significantly positively related to children's physical activity level.<sup>70,100</sup> In this study, mothers of all weight statuses agreed that physical activity for children is important and reported the encouraged and facilitated children's physical activity. However, obese mothers were less likely to be physically active, model healthy physical activity and media behaviors, placed less importance on physical activity for themselves, reported less physical activity availability and accessibility, and permitted children to have more hours of screentime daily—all of which have been linked to reduced child physical activity and increased risk of obesity.<sup>104,714,715</sup> For example, parents' level of physical activity and sedentary behavior (e.g., television viewing time) are positively linked with children's physical and sedentary behaviors.<sup>716 717,718</sup> In this study, more days that a mother modeled physical activity behaviors to her child were associated with less obesity. Exercise equipment availability at home and access to recreational facilities also are predictive of adult's physical activity and, therefore, opportunities to model physical activity to children.<sup>719,720</sup>

Although physical activity availability and accessibility were not associated with children's weight categories in this study, evidence indicates that greater physical activity equipment availability is linked to more outdoor physical activity.<sup>716</sup> Interestingly, mothers of obese

children in this study reported more days of outside physical activity for their children than other mothers. Household media device and children's bedroom media device availability and accessibility also were not associated with children's weight categories. The evidence linking the home and near home physical activity availability and accessibility and young child obesity and related behaviors (i.e., increased physical activity and less sedentary time) is somewhat mixed according to a review from 2007.<sup>48</sup> However, some more recent studies have reported positive associations between environmental supports correlates (e.g., walking paths, open play areas) and negative associations between environmental barriers (i.e., media devices, especially in children's bedrooms<sup>153,161</sup>) and obesity and obesity-prevention behaviors.

#### **Dietary Behaviors, Food Environment and Weight Categories**

Lean mothers reported eating more fruits and vegetables compared to heavier mothers. This is consistent with other reports that obese mothers tend to have lower fruit and fiber intake.<sup>721</sup> Obese mothers' homes also had fewer fruit and vegetable servings available. Evidence shows that if more foods are available in the home, more of them tend to be eaten,<sup>722</sup> which may explain why they consumed fewer servings. Although there were no significant differences between child BMI categories and fruit and vegetable intake, mothers reported their obese children drank more beverages high in sugar.

Obese children consumed more servings of fruit drinks (not 100% fruit juice), soft drinks and soda/pop, and other sugar-sweetened beverages than children in lower BMI categories. Both cross-sectional<sup>723</sup> and longitudinal studies<sup>724</sup> indicate that 2-5 year old children who consume more sugar-sweetened beverages are more likely to be overweight or obese.<sup>725</sup> There were no associations, however, between child weight categories and beverages available in their homes. Among young children in this study, availability of sugary drinks (sugar and calories from sugar-sweetened drinks) was not be related to obesity, but previous research has found more soft drinks in the home were associated with more soft drink consumption among children.<sup>230</sup>

Similar to another study, obese mothers reported that they modeled healthy eating behaviors less often and exerted less control over their children's food access and decisions.<sup>275</sup> Mothers, regardless of their own weight, also were more likely to control access to and decisions about food if their child was obese. Parents of obese children tend to exert more control over their food choices,<sup>79</sup> yet if they themselves are obese, they control less.<sup>275</sup> Supporting young children's innate ability to self-regulate their food intake is important for obesity prevention.<sup>496,676,726</sup> Similar to other studies,<sup>674-676</sup> mothers of obese children reported the lowest scores of ability to self-regulate their food intake. These findings highlight the important role that parent and child weights play influencing child feeding practices.<sup>727</sup> Acceptance of food waste is another characteristic associated with both mother and child weights. Normal weight mothers and mothers of any weight whose child was obese were significantly less accepting of food waste (i.e., encouraged children to clean their plate). When young children are encouraged to "clean their plate" or given similar cues, they tend to consume more at that eating occasion,<sup>728,729</sup> which may explain why children whose mother's encouraged them to clean their plates were more likely to be obese in this study. Fear of trying new foods, or neophobia, has been reported in both underweight and overweight children,<sup>730</sup> but children of all weight groups in this study had fairly neutral food neophobia scores. Obese mothers, however, were more likely to report their child having more food neophobic tendencies, contrary to other findings.<sup>731</sup> It is interesting that obese mothers did not tend to encourage children to clean their plates, but had children with more food neophobia. These differences may be explained by other characteristics not explored here.

### **Maternal Teasing and Weight Categories**

Obese mothers were more likely to have been teased for their weight when younger and be more upset by the teasing experienced. It is commonly reported in the literature that overweight and obese adults are victims of weight-related bullying and bias.<sup>732</sup>

Consistent with other research,<sup>368</sup> concern for child's risk of being overweight was highest among obese mothers. This may be related to their awareness of potential weight-related teasing they experienced. This is consistent with other research.<sup>368</sup>

Belief that chubby children are healthier did not differ across weight categories. This may be due to influence of maternal race/ethnicity or country of origin, as a study of mothers from Mexico preferred their babies to be bigger, and those from California preferred smaller babies.<sup>733</sup> Almost all mothers in this study, however, were born in the United States and can assume to be highly acculturated. Mothers of obese children chose significantly thinner images of children as being underweight than mothers who had overweight and middle normal BMI children. They also chose images of heavier children when selecting a visual representation of a child that is overweight. Previous research has shown that maternal perceptions of actual and ideal body size differs among mothers living in different regions and of different ethnicities and races.<sup>734</sup> Education attainment may also attenuate the relationship; obese mothers in Portugal only correctly classified their child's weight if they were highly educated.<sup>735</sup>

#### **Family Characteristics and Weight Categories**

The family meal environment may be more important than the frequency that a family shares meals.<sup>677</sup> While the number of family meal occasions was not associated with any weight outcomes, eating family meals frequently in front of a TV occurred more often in families with obese mothers or obese children. Obese children also ate fast foods at family meals more often, further supporting other evidence associating fast food and having a television on during family meals with childhood obesity.<sup>736</sup> Mothers of any weight who had obese children reported significantly more family meal planning and time and energy for family meals. Social desirability or an awareness of her child's weight and desire to attenuate the child's weight gain may be driving this association.

There are suggestions in the literature that the family functioning and obesity relationship is bidirectional.<sup>737</sup> However, in this study obese mothers reported significantly higher levels of

conflict with their families. High levels of family conflict has been associated with disordered eating in teens,<sup>738</sup> and is higher in families with low socioeconomic status,<sup>739</sup> yet no research has explored its association with obesity. Further analysis and consideration of confounding factors including maternal education, marital status, and socioeconomic status could further clarify findings. It is unclear exactly how poor family functioning may lead to obesity, or if it is the presence of obesity or comorbidities that puts stress on the family that lead to conflict.

### **Conclusion**

Obese mothers and children had similar characteristics. Obesity in both was associated with shorter sleep duration, higher intake of sugar-sweetened beverages, and more family meals eaten in front of a TV. Lower physical activity, more screentime, and mothers allowing children more screentime also were associated with maternal and child obesity. A home environment that included more media devices in children's bedrooms and access to video games played sitting down was associated with child obesity. Lower intakes of fruits and vegetables and fewer fruits and vegetables available in the home were associated with obesity among mothers. These obese mothers also tended to display emotional eating behaviors and control children's access to and decisions about food. While mothers of obese children were less likely to accept food waste, if mothers were obese themselves, they were more likely to accept it. Compared to their counterparts, obese mothers were more likely to report that their child was food neophobic, and obese children were less likely to be able to self-regulate their food intake. Obese mothers and mothers of obese children spent more time and energy on family meals and did more family meal planning, yet were more likely to have meals consumed at locations other than a kitchen or dining table. There was also more conflict and less cohesion among family members if mothers were obese. These characteristics of the interpersonal, intrapersonal, and home environment of mothers and their children indicate areas of intervention for obesity prevention and treatment, and serve to inform assessment of obesity risk, as indicated in Research Question #3.

The findings in Research Question #2 support many existing findings, including the racial and socioeconomic differences between obese and non-obese mothers and differences in weight-related behaviors. These obese mothers tend to be emotional eaters, which may be tied to their lower education attainment and body shape dissatisfaction.<sup>740,741</sup> They are also concerned about their child's risk for becoming overweight. Despite their concern for their children, obese mothers engage in little modeling of healthy eating and physical activity behaviors and practiced feeding behaviors that do not support healthy child weights. At the interpersonal, intrapersonal, and environmental levels of the socioecological model, mothers are faced with problems in keeping their children's weights healthy.

Maternal and child BMIs are highly correlated, which questions why the mothers would not be engaging in these behaviors, as regardless of maternal weights, if her child was obese she more often engaged in healthy behaviors. Perhaps the influence of child's weight, as has been identified as a mediator of some behaviors, is influencing maternal practices. The potential influence of social desirability may also be influencing maternal survey responses.

### **RESEARCH QUESTION 3 SUMMARY**

**A: What intrapersonal, interpersonal, and home environment characteristics were associated with maternal obese vs. non-obese weight status? B: What is the obesity risk of non-obese mothers based on a score derived using the characteristics elucidated in Question 3A? C: How do non-obese mothers' intrapersonal, interpersonal, and home environmental characteristics differ based on their obesity risk score tertile?**

This study utilized a comprehensive data set to characterize the interpersonal, intrapersonal, and home environmental characteristics associated with weight-related behaviors among mothers of preschool children, identified characteristics predictive of maternal obesity, and explored how non-obese mothers varied by obesity risk. Binomial linear regression indicated that 8 of 51 maternal characteristics (i.e., African American race, lower education, greater number of

children, poorer general health rating, more weight teasing history, more concern about their children's overweight risk, more conflict/less cohesion in the home, and more body dissatisfaction) accounted for 53 percent of maternal obesity risk. Obesity risk scores for non-obese mothers generated using these 8 characteristics indicated those in the highest tertile tended to have greater food security risk, poorer health, more severe depression, worse sleep quality, less healthy diets, less healthy eating behaviors (i.e., more emotional eating), less parenting self-efficacy, and worse stress management. They also placed less importance on physical activity, less frequently modeled healthy media use and eating behaviors, were less accepting of food waste (i.e., encouraged children to clean their plates), ate family meals in front of a TV more often, had less positive atmospheres at family mealtime, tended to not plan meals or have time and energy to have family meals. In their home environments, high obesity risk mothers allowed more media devices in their children's rooms and gave their children more access to TV. They also had fewer fruits and vegetables available in the home and more fatty foods. The results of this study are congruent with existing literature indicating that poorer health behaviors are associated with higher BMI. It provides an alternate measure with which to explore a mother's risk for obesity aside from her weight and height. The obesity risk measure also provides insight into variables that predict obesity which are not easily changed through nutrition and health promotion programs (e.g., race), and those which are, yet are rarely targeted in interventions and programs (e.g., family conflict and body dissatisfaction).

### **Predicting Maternal Obesity Risk**

Maternal obesity risk score was created through a systematic evaluation of the comprehensive set of maternal variables examined in this study. Briefly, all maternal variables were first examined to exclude influences of multicollinearity. The remaining variables selected were included in a binomial logistic regression model which identified 54 independent variables predictive of maternal obesity. These 54 variables were again assessed with a binomial linear regression to identify the 8 independent variables that predict about half of maternal obesity risk.



The steps taken are similar to that of other regression analyses conducted to determine variables associated with obesity risk among children.<sup>193,742</sup> A study of 909 children explored risk factors of the family, demographics, and lifestyle, and used a multivariable binomial logistic regression analysis.<sup>193</sup> Among those variables examined, 8 were predictive of child obesity, including: higher birth weight, maternal smoking at 28-32 weeks gestation, not being exclusively breastfed, having an obese parent, getting less sleep, watching more hours of TV, and being obese in infancy.<sup>193</sup> Data from 103 3- to 5-year old low income children explored 43 behavioral items using random forests analysis and stepwise regression. The final model included 14 items and had a  $R^2$  of 0.74 (including BMI percentile).<sup>742</sup> Aside from these two studies, no other published studies could be located that also created a maternal obesity risk score that could be used to explore associations with other characteristics to further examine the intrapersonal, interpersonal, and environmental characteristics of those with increased risk for obesity (excluding those already obese).

The regression method used in this study to create the obesity risk score included 8 independent variables that predicted over half of maternal risk for obesity. These variables have been shown in other studies to be strongly associated with obesity risk.

- Women of African American race are more likely to be overweight or obese than other races and ethnicities.<sup>1</sup>
- Lower education attainment is associated with more overweight and obesity.<sup>1,440</sup>
- Another study found that for each additional child, a mother's obesity risk increased 7 percent.<sup>743</sup>
- Obese adults have more chronic disease<sup>697,698</sup> and report poorer health.<sup>700</sup>
- Obese women are more likely to have reported weight teasing history.<sup>744</sup>
- Concern about their children's risk of overweight is higher among overweight and obese mothers.<sup>368</sup>

- Poor family functioning (i.e., more conflict and less cohesion) is associated with increased risk of obesity and overweight in children and adolescents, but has not been explored for mothers.<sup>737</sup>
- More body shape dissatisfaction has been shown to be associated with obesity and overweight.<sup>745</sup> There are other risk factors that attenuate this relationship, however, including degree of overweight and race.<sup>745</sup>

One purpose of this study was to create a simple tool that could easily be administered by health professionals to assess risk of becoming obese among mothers of young children who are not obese. This tool also help to identify areas for education and intervention and points to areas often overlooked by nutrition education and health promotion interventions. Some cannot be altered, like race, but other characteristics can be included in interventions and education programs. Additionally, helping mothers with characteristics associated with obesity that cannot be changed realize their risk could help them increase their weight management efforts. Grouping mothers into tertiles of high, moderate, and low obesity risk provides a simple way to explore how risk level is associated with other interpersonal, intrapersonal, and environmental characteristics that were assessed in the HOMES survey. Statistical analysis with ANOVA and post-hoc tests compared maternal obesity risk tertiles; similar to the analysis done with maternal BMI categories. Numerous characteristics of mothers, children, and their environments were associated with mothers having high obesity risk (HOR) as well as being obese (as shown in Research Question #2). This indicates areas that should be focused on with future intervention and education efforts, such as targeting family functioning dynamics and body shape acceptance.

#### **Maternal Characteristics and Obesity Risk**

Numerous demographic and health characteristics trends were noted among both obese and HOR mothers, including food insecurity, lower family affluence, younger age at birth of first child, and greater depression severity. Similar to national data,<sup>1,440</sup> obese women in this study were more

likely to have lower socioeconomic status, which may also place these mothers at higher risk of becoming obese. Obese and high obesity risk mothers were also more likely to have given birth to their first child at a younger age. Other research has begun to explore this connection between younger age at first pregnancy, but the mechanism behind it is still unclear.<sup>23,746,747</sup> Mothers in the HOR tertile and obese mothers also had significantly higher depression severity, which is consistent with literature indicating obese women are more likely to suffer from depression.<sup>699</sup> Many of these health and demographic associations may be bi-directional in their association. The HOMES survey is not designed to assess causality or directionality of the association; however, it does indicate and add to the literature areas that should be targeted by social policies which may lead to improved health and wellness, such as improving education access and racial/ethnic sociodemographic disadvantages.

#### **Physical Activity Behaviors, Environments, and Maternal Obesity Risk**

Unlike obese mothers who had the lowest physical activity and highest screentime scores, HOR mothers did not differ from their lower obesity risk peers in their physical activity and screentime behaviors. These differences may be due to the obese mothers being much more likely to be sedentary and less active, hence when their data were not included in the obesity risk comparisons no significant differences emerged. These findings seem to suggest that activity level may not be a significant risk factor for maternal obesity, but is associated with obesity weight status, raising the question of reverse causality. That is, are obese mothers inactive and more sedentary due to their weight inhibiting activity instead of inactivity causing weight gain? Both obese and HOR mothers, however, reported significantly less physical activity equipment and space availability and accessibility. This highlights the importance of the environment availability and accessibility and its potential effects on weights as environments that promote access and availability of physical activity have been consistently associated with more physical activity behaviors.<sup>110-</sup>

<sup>112,117,118</sup> Other factors not measured in the survey (which would account for the other 47 percent

of the variance), such as time pressures, may be implicated in the reduction in physical activity seen in obese but not HOR mothers.

HOR mothers reported that their children tended to be less active than lower risk mothers. This is similar to other research showing associations between maternal characteristics and child activity and sedentary behaviors,<sup>100</sup> and highlights the importance of mothers in modeling, encouraging, and facilitating physical activity for their children.<sup>131</sup> HOR mothers also placed less importance on physical activity for their child and themselves (although not significant for self), engaged in less encouragement and facilitation of children's physical activity, and placed less importance on modeling physical activity to children. This mimicked a similar linear trend among obese mothers who did less encouragement, facilitation, and modeling of physical activity, and placed less importance on physical activity. Interestingly, underweight/low normal weight mothers, as well as mothers in the low obesity risk tertile engaged in significantly more modeling of sedentary behaviors through use of media devices to their children. These mothers also, however, engaged in modeling of physical activity more days per week. It is possible that mothers with normal weights and low obesity risk modeled more behaviors in general to their children, including less healthy media device use.

Media devices, especially TVs in children's bedrooms are associated with increased obesity risk among children.<sup>153,685</sup> HOR mothers reported significantly more media devices in their children's bedrooms (although the actual difference was less than 1 piece of equipment different). Low obesity risk mothers reported their children had significantly less TVs and DVDs accessible to their children. No differences were seen, however, between maternal BMI categories and home media availability and accessibility. Obese mothers did tend to allow children significantly more screentime, but there was no difference noted among obesity risk tertiles.

### **Sleep and Maternal Obesity Risk**

There is growing interest in the associations between sleep duration and quality and weight.<sup>523</sup> Hours of sleep was lowest for obese mothers, and for HOR mothers (although not significantly different). Poor sleep quality also was significantly more prevalent in HOR and obese mothers. HOR mothers reported their children also had the least sleep hours and poorest sleep quality. The associations of both sleep duration and quality with obesity and obesity risk add to the literature exploring how sleep may be related to weight gain and indicate the importance of including this topic in weight-management interventions.

#### **Dietary Behaviors, Food Environment, and Maternal Obesity Risk**

Both obese and HOR mothers consumed more soft drinks, fruit drinks (not 100% fruit juice), and energy from all sugar-sweetened drinks. HOR mothers also reported that their children consumed more sugar-sweetened beverages. There were no differences in household availability of sugary drinks and maternal obesity risk, however consumption occur outside of the home was not evaluated. HOR mothers did, however, report fewer fruits and vegetables available in their homes but there were no differences in their reported intake. Interestingly, mothers with moderate obesity risk had the highest fat intakes, which may indicate that fat intake is not necessarily a contributor to obesity risk in these mothers. The availability of fatty, salty, and sweet snacks was not different across obesity risk categories, but low obesity risk tended to have the lowest availability. This may explain why mothers with moderate obesity risk had the highest fat intakes. Perhaps mothers who have a lower weight and lower obesity risk as well as those with high risk or who are already obese have more awareness and hence keep less fatty foods in their home and consume less fat. Further studies should investigate whether this is a spurious finding or important in propelling moderate risk mothers to a higher risk. No differences were noted in child food access policies and food accessibility in homes of mothers compared to actual weight categories, however, HOR mothers reported significantly more low-nutrient dense foods (i.e., “junk” foods) accessible by her preschool child to have as a snack without help.

Emotional eating characteristics are more common in overweight and obese women.<sup>748</sup> Similarly, obese and HOR mothers in this study were more likely to be emotional and disinhibited eaters. HOR mothers were also more likely to agree that their children were emotional eaters. These mothers, although not currently obese, may be modeling emotional eating behaviors to their children. HOR mothers were also significantly less likely to be adventurous eaters. A similar linear trend was seen when comparing actual weight categories, with obese mothers tending to be less adventurous. Obese mothers were also more likely to have child with food neophobia, but this association was not found among HOR mothers. This is consistent with research that food neophobia is heritable.<sup>749</sup> The literature exploring food neophobia and weight is mixed,<sup>730,731</sup> yet here a positive association between weight and fear of new foods was found in mothers. These results show that both fear of new foods (e.g., not being adventurous for mothers and neophobia for children) and emotional eating in obese and HOR mothers is potentially also affecting their child's eating styles.

Modeling of healthy eating may contribute to these characteristics, as both obese and HOR mothers reported less healthy eating modeling. Obese mothers were also less likely to care if food was wasted, yet the inverse was true for HOR mothers. Promoting a "clean plate" is associated with increased weight and unhealthy eating habits in children,<sup>727,728</sup> but the association of this behavior with mothers' weights is less well-studied. Further exploration of potential mediators of this relationship may shed light on how this behavior is associated with weight-related behaviors and characteristics of mothers.

This study found no associations between family meal frequency and obesity or obesity risk scores. Other studies have found cross-sectional associations of family meal frequency inversely associated with obesity in adolescents, but longitudinal analyses have not corroborated those results.<sup>320-322</sup> The results in this study contribute to the mixed associations of family meals and weight.<sup>677</sup> It may be that characteristics of the family meal environment are confounding potential associations. For example, HOR and obese mothers reported significantly more family

meals in front of a TV. Consuming family meals with a TV on has been associated with less healthy foods consumed at those meals.<sup>163,326,750</sup>

Meal planning and making time for healthy eating is often encouraged by dietitians and health professionals as tactics to improve weight and healthy eating. HOR mothers were less likely to agree that they engaged in family meal planning and had time and energy for family meals. Obese mothers also tended to engage in less family meal planning, but this difference was not significant. Meal planning skills are important for both prevention of obesity and treatment for weight loss in women already obese.

#### **Family Characteristics and Maternal Obesity Risk**

HOR mothers had significantly less family support for healthy behaviors, yet no differences in support were observed between actual weight categories. Figure 4 outlines the proposed influences of social support perceptions on health behaviors. More family support has also been associated with more weight loss among obese women compared to those with less support.<sup>436</sup> Social support may be an important indicator of potential for weight gain or future obesity.

Maternal engagement with children was not associated with maternal weight categories nor with maternal obesity risk, but there was a trend that more obesity risk was associated with less engagement. There may be other variables, such as socioeconomic status or education that attenuate this association. While limited, there is some evidence that insecure parental attachment (e.g., “seeks and enjoys being hugged by mother” and “when crying or upset, is easily comforted by contact with the mother”) with children is associated with weight gain between ages 2 and 4,<sup>751</sup> emphasizing the need for engagement for child obesity risk more than maternal risk.

#### **Conclusion**

Mothers in the high obesity risk tertile shared numerous characteristics with obese mothers. Numerous demographic characteristics were associated with both categories, including low family affluence scores, high food insecurity risk, and having her first child at a younger age.

Both obese and HOR mothers also had higher depression severity scores. HOR mothers reported their child's general health was worse and more days of their child having not good health, but was not associated with obesity. HOR and obese mothers consumed more soft drinks, but only obese mothers reported more soft drinks available in their homes. Sleep quality was lowest in HOR mothers, and obese mothers had shorter sleep duration. HOR mothers had more unhealthy eating habits, including more disinhibited eating, emotional eating, and were less adventurous eaters. They also modeled healthy eating behaviors less often as did obese mothers. Family meal cognitions and practices were similar for obese and HOR mothers; they less often ate family meals at kitchen or dining tables, did less meal planning, and reported less time and energy for family meals. There was less physical activity availability and accessibility in the home and near environment for HOR mothers, but no differences in their physical activity behaviors. Obese mothers, however, reported lower physical activity levels but no differences in their environments. Physical activity cognitions, including importance of physical activity and modeling frequencies were associated with HOR and obesity in mothers. HOR mothers also reported less support from their family for healthy behaviors. Overall, mothers with high obesity risk and obese mothers tended have more unhealthy eating behaviors, higher intake of sugary drinks, place less value on the importance of and modeling healthy behaviors, unhealthy family meal environments and lack of planning. Mothers at high risk for obesity also had less physical activity equipment and space available and accessible.

These results highlight future areas to target for nutrition education initiatives and health care providers. Demographic inputs to the obesity risk score, such as education, are difficult to change, yet these results highlight the importance of promoting social policies to improve demographic health disparities. The obesity risk score also underscores concepts often overlooked by nutrition educators and programs, including body dissatisfaction and family functioning. A more holistic approach to obesity prevention that includes these concepts is warranted. The interpersonal, intrapersonal, and environmental characteristics associated with high obesity risk



for mothers are also important to target for intervention and education. Sleep length and quality, as well as modeling of healthy activity and eating behaviors including health family meal environments are key areas to promote for obesity prevention among mothers. Physical activity access and availability, while not associated with obesity, was strongly associated with increased obesity risk. Although few environment characteristics were associated with obesity, they may be more important for obesity risk and weight gain prevention.

### **LIMITATIONS AND STRENGTHS**

The findings of this study must be considered in light of its limitations. First, as with any human research, participant self-selection must be considered. However, recruitment materials attempted to avoid attracting those with an interest in health and nutrition by requesting completion of a survey to help researchers “learn more about families with young kids.” In addition, the mothers sampled participated regularly in surveys focusing on many topics and received compensation for participation; thus, they may not have had a particular interest in the topic of this study. The population sampled for this study included mothers who often took online surveys, and had less full time occupation than the national population of women of a similar age range. The differences of these mothers (e.g., more White, higher education attainment, primarily English-speaking) may account for some of the variations seen between this and nationally representative results. The survey only captured responses of mothers, not of fathers. Some literature has shown discordance between adult dyads in the home.<sup>752,753</sup> Mothers were selected to obtain an adequate sample size as obtaining a sufficient sample size to assess sex differences were beyond the scope of this study.

When indicated, various components of the study also underwent rigorous pre-testing and validity assessment (i.e., the body circumference measurements and physical activity and media environment questions). The accuracy of self-reported height and weights is typically questioned; however numerous studies indicate that these data tend to be quite accurate among

adults.<sup>582,754-759</sup> This study also collected waist, hip, and neck circumference measurements. To promote accuracy of these measurements, participants were asked to watch a brief instructional video then take their measurements using their own flexible measuring tape video to create one using a downloadable pdf. A validation and test: retest reliability study indicated self-measured circumferences taken after watching the video result in accurate measures.<sup>760</sup>

As with all survey data collection, differences between study methodology limits many direct comparisons between samples. Measurement of sedentary behavior is an example. Some studies group inactive respondents as being sedentary and not meeting criteria for high or moderate levels of activity, yet the differences between sedentary and light-intensity activity are not fully captured.<sup>761</sup> In this survey, sedentary participants were grouped with low physical activity attaining participants, which should be considered for comparisons with other data sets.

Cross-sectional analyses also have inherent limitations. Causality cannot be ascertained by this type of analysis, only associations in the data. However, this study provides a basis for more in-depth analysis and longitudinal and prospective research. Reverse causality is another potential limitation. For example, obese mothers have lower IPAQ scores. Obese mothers may be less active, which contributes to energy imbalance and ultimately weight gain, or, because mothers are obese, it is more difficult or painful for them to engage in physical activity. The associations examined in this study, however, are similar to those found in other research of obesity and obesity risk.

This survey aimed to comprehensively examine the home environment, and as such, required condensing longer scales to permit assessment of a broad array of variables while minimizing participant burden. While it is usually noted that scales with more items tend to have superior psychometrics than those with fewer items, researchers have deemed the cost (i.e., time it takes for participants to complete) as an important consideration and note that longer instruments often have repetitive items which inflate reliability coefficients. Thus, shorter

instruments and shortening longer instruments allow inclusion of a broader array of variables and if shortening is done carefully can result in acceptable reliability coefficients.<sup>762,763</sup> In this study, scales measuring dimension of interest were carefully assessed and whenever possible shortened using a multi-step process designed to ensure the items and scales used valid and reliable. Steps included the use of published factor analysis data to identify the items with the strongest factor loadings and expert review to ensure content validity. Analysis of the survey data indicated that the shortened scales all had relatively high Cronbach alphas, indicating good reliability. Most internal consistency scores were at least acceptable (mean  $0.74 \pm 0.11$ , range 0.50-0.95), using George and Mallery (p. 231) standards ( $>0.9$  Excellent,  $>0.8$  Good,  $>0.7$  Acceptable,  $>0.6$  Questionable,  $>0.5$  Poor, and  $<0.5$  Unacceptable).<sup>764</sup> The study results also are only applicable to mothers of 2- to 5-year old children in the United States. Thus, they cannot be generalized to other population groups.

Finally, the survey examined a broad array of variables; however, emerging research indicates additional areas that should be investigated in future research. For example, genetic links appear to be both related to and independent of BMI mechanisms that may affect the association between early menarche and higher risk of adult disease. This implies that outcomes such as age of menarche may be an important, easy to assess, indicator of weight-related outcomes and weight-related disease risk.<sup>765,766</sup> Additionally, psychographic characteristics, such as self-identity construction (e.g., people who create an “identity” through behaviors, such as eating only organic food, that they portray to others), susceptibility to perceived normative influences (e.g., degree to which people are affected by perceived normative behaviors), and need for social approval/self-enhancement may affect diet, physical activity, and other health practices.

Despite study limitations, the study has many strengths. The sample of mothers of preschoolers was a large, diverse group whose demographics nearly matched those of a nationally representative population. The use of a survey panel to collect responses was a quick and relatively cost-effective method of data collection. Administering the survey online also made it

convenient and easy for respondents to complete the survey. Respondents answered survey questions posed by Survey Sampling International (SSI) after completing the survey, and gave it a mean rating of 4.5 (5 being the highest score) of overall enjoyment. SSI is "... Grand Mean Certified and has been [*sic*] given the highest awards for sample consistency (Gold in the US and Silver in EU)" and also has numerous technical measures in place to prevent survey fraud. Results were systematically examined by the author to ensure any remaining responses that appeared overtly fraudulent (e.g., straight-line of responses) were removed.

This is the first study to comprehensively assess the intrapersonal, interpersonal, and environmental characteristics of mothers and children mostly strongly associated with obesity risk. The development of a predictive obesity risk score may be adapted and expanded upon as additional research increases support for addition of other markers. The quick assessment provides practitioners with a simple and fast method of assessing obesity risk which may be easily administered during clinic visits. Further research to examine the prediction accuracy of the obesity risk score is recommended.

#### **FUTURE RESEARCH RECOMMENDATIONS**

These results indicate numerous future research needs that will further our understanding of the connections between interpersonal, intrapersonal, and environmental influences on maternal and child weights and obesity risk. While careful steps were taken to ensure the most accurate responses from participants, further exploration of accuracy of maternal-reported heights, weights, and circumferences could improve understanding of alternative measures of body fatness. Generating body shapes using waist, hip, and neck circumference measures and correlating these to BMIs calculated from self-report heights and weights and BMI categories using predictive equations could provide more support for the usefulness of body circumferences as alternate or ancillary measures. Comparison of circumferences and obesity risk scores also

may provide evidence for strengthening the obesity risk score if circumferences are higher in those with more risk.

Other research has indicated that mediators of BMI and obesity risk may influence the associations uncovered here. Often, associations are mediated by demographic characteristics (i.e., race, ethnicity, income level), which demonstrate that subsets of the population may be at more or less risk for obesity when they have other characteristics or engage in certain behaviors or environments. For example, other research indicates that poverty leads to families with more household chaos and instability, as well as parents who are less responsive, more authoritarian, and less involved in their children's school lives.<sup>739</sup> Poor children often live in neighborhoods which are less safe and have fewer services available.<sup>739</sup> Low socioeconomic status (SES) may be an important mediator of the associations between family conflict and obesity, and splitting families by SES may elicit different associations with obesity between high and low SES families. There are also differences between the cognitions and perceptions of mothers who are already overweight or obese compared to normal weight mothers. Few obesity prevention interventions include family and household dynamic issues or weight-related perceptions which may influence outcomes.

Sex and age differences may also contribute to different outcomes. Although preschool children ages 2-5 are usually grouped together in research, there are numerous developmental differences between the youngest and oldest children which may influence parenting behaviors and perceptions. For example, younger children aged 2-3 are likely to display more difficulty trying new foods than older children aged 4-5 years.<sup>767</sup> Mothers also may parent girls and boys differently, and the number of children they have can also influence behaviors and environments. Further analysis of the data to assess differences between sex, age, and number of children in the home may provide more detail on the influence of interpersonal, intrapersonal, and environmental characteristics on obesity and obesity risk.

Future studies should use the obesity risk score developed in this study with other cohort (i.e., more racially diverse, less educated mothers) to confirm results found in this study. Additionally, future research efforts should apply the methodology used to develop the maternal obesity risk score to create child obesity risk scores and explore how children at high risk differ from those at lower risk for obesity. Identification of personal and environmental characteristics associated with increased childhood obesity risk could inform the development of effective childhood prevention interventions.

## CONCLUSIONS

In conclusion, this study provides a comprehensive description of the interpersonal, intrapersonal, and environmental factors associated with obesity and obesity risk in mothers with young children. This study's survey was developed systematically using valid, reliable instruments and best practices to ensure participants provided the most accurate responses. The survey may be used by other investigators to assess the overall home characteristics (as done here), or components of the survey may be used to assess specific characteristics (e.g., home food environments) associated with obesity and obesity risk.

Comparisons of maternal and child results revealed that obese mothers and children shared similar characteristics. Shorter sleep durations, higher intake of sugary drinks, more family meals in front of a TV were shared by obese mothers and obese children. They were also more likely to be minority races, have more food insecurity and less family affluence. Lower activity levels, more screentime, and home environments with more media devices in child bedrooms and access to sitting video games were reported by mothers of obese children. Obese mothers had less intake of and availability of fruits and vegetables in the home. Intrapersonal family characteristics of more conflict and less cohesion was more often found among obese mothers. Obese mothers concern for their child's risk of overweight and their role modeling

characteristics, such as emotional eating and less healthy modeling of eating and activity may moderate these characteristics.

Creation of an obesity risk score and categorization into low, moderate, and high obesity risk helps to identify characteristics of mothers not yet obese. The variables included in the obesity risk score highlight areas that are most closely associated with obesity which are difficult to change with intervention, such as African American race, lower education, more children, general health rating, and more weight teasing history. Other variables such as home conflict, concern about child's weight and body dissatisfaction may be modified, but are also difficult to affect in intervention and education initiatives. The characteristics associated with high obesity risk and existing obesity in mothers provides insights to areas which can be targeted by educators.

The study's findings can guide future research directions as well as health promotion programs and interventions. The characteristics associated with obesity in mothers and children may be used to guide the development of weight-management and obesity prevention programs. For example, results indicate that constructs associated with maternal obesity risk should be incorporated in interventions: family meal environment, children's media accessibility and rules, sugar-sweetened beverage consumption, and family conflict. Other characteristics, such as race and education cannot be changed with interventions, but policies to support SES equalities should be supported and offering culturally-sensitive and educationally adjusted interventions are important. These characteristics are strongly associated with obesity and obesity risk and improving them may help to alleviate a large, costly, and painful public health problem.

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**Appendix A**  
**Instruments that Assess Constructs Associated with the Home Environment**

**Physical Environment: Physical Activity, Media, and Food Availability and Accessibility**

Scale/Survey Name	Original Number of Items	Answer Choices	Scoring Methodology	Population(s) Used for Validity/Reliability Testing	Validity and Reliability Tests	Recommended Modifications
Home Physical Activity Equipment Scale <sup>102</sup>	14 items	Yes/no checklist	Scored with 1 point for each yes; higher score indicates more available physical activity equipment	Families of 5-11 year olds	Construct validity indicated that home physical activity equipment was negatively associated with television viewing time ( $\beta = -.23$ , $p < 0.05$ ) and BMI z-score in children ( $\beta = -.19$ , $p = 0.07$ ) <sup>102</sup> Test-retest reliability for the equipment scale was fair to good (ICC range .53 to .85)	Remove swimming pools and laptops without internet
Neighborhood Environment Walkability Scale-Youth (NEWS-Y) <sup>122</sup>	66 items	Varies: Likert-type frequency and agreement responses	Scored by calculating z-scores for 9 subscales and summing; higher scores indicates more walkable environment	Parents of 5-11 year olds	No association between scales and children's physical activity level Test-retest reliability fair to good (ICC range .56-.87) (street connectivity was the lowest); and internal consistency good (Cronbach alpha range .75-.87)	N/A
International Physical Activity Study Environmental Module <sup>124</sup> (also known as the Physical Activity Neighbor-	17 items	Likert-type responses ranging from strongly disagree to strongly agree	Varies; may be scored to indicate walkability of environment or number of features that improve environment	Adults from varied income levels and 'walkable' neighborhoods in Cincinnati, San Diego, and Boston	Test-retest reliability fair to good reliability (ICC ranged from 0.64 for recreation to 0.84 for sidewalks presence) <sup>124</sup>	N/A

hood Environment Survey-PANES)						
Parental Perceptions of the Neighborhood Environment survey <sup>125</sup>	7 items	Varies: Likert-type agreement response	Each item treated as its own construct/variable	Australian parents of 5-6 year olds from varied socio-demographics	Test-retest reliability was fair to good (ICC range 0.60 to 0.89)	N/A
Children's Leisure Activities Study (CLASS)-Physical Environment <sup>126,127</sup>	48 items	Yes/no checklist and how often	Environment items are scored if 'yes' answered; more time spent in activities indicates higher levels of physical activity	Australian parents of 5-6 year olds, and 10-12 year olds	N/A	N/A
Physical Activity and Media Inventory (PAMI) <sup>93</sup>	55 items	Availability answered with checklists of equipment amount; Access answered by Likert-type questions ranging from "put away" to "in plain view"	Household PA and media equipment density score is calculated by dividing the total number of items by the total number of rooms/locations in the home; higher density score means greater availability of equipment.	Families with a child aged 10-17	Validation was assessed by researcher observation of the home and participant completion of the survey; showed moderate to strong validity ( $r = 0.67$ to $0.98$ ) Good reliability (physical activity equipment ICC = $0.76$ to $0.99$ ; media equipment ICC = $0.72$ to $0.96$ )	N/A

			Accessibility is determined by multiplying each item by an accessibility factor (i.e., 1 = put away to 4 = in plain view and easy to reach).			
Physical and Nutritional Home Environment Inventory <sup>86</sup>	75 items	Varies; yes/no, Likert-type frequency responses, continuous variables	Varies; yes/no items summed for equipment availability, more items equals more availability	N/A	N/A	N/A
Healthy Home Survey (HHS) <sup>129</sup>	113 items	Varies; yes/no, Likert-type frequency responses, continuous variables	Varies; yes/no items summed for availability, more items equals more availability	Families with a child 3-8 years old	The majority of the domains demonstrated almost perfect agreement between the two phone interviews and between the first phone interview and a home assessment (Kappa statistics varied 0.36 to 0.88, and percent agreement 42 to 98%) The majority of items on the survey had moderate to high reliability, except restrictions on outdoor play	HHS was shortened to 61 items and used successfully with a sample of Hispanic and African-American caregivers of children enrolled in Head Start <sup>130</sup>
Home Environment Survey (HES) <sup>131</sup>	126 items	Varies; yes/no, Likert-type frequency responses, continuous variables	Varies; yes/no items summed for availability, more items equals more availability	Parents of children 8-12 years old	The HES overall showed good internal consistency and reliability compared to other similar questionnaires	N/A

Neighborhood Environment for Children Rating <sup>133,134</sup>	8 items	Likert-type frequency responses	The mean value of all responses is the score of perceived neighborhood safety, with lower scores indicating more perceived safety	Population-based study of mothers	The internal reliability of the scale was 0.91 <sup>133</sup>	N/A
Project on Human Development in Chicago Neighborhoods (PHDCN): Home and Life Interview <sup>135</sup>	136 items	Varies; yes/no, Likert-type frequency responses, continuous variables	Varied by scale	Demographically varied families with children 3-15 years old	Adequate validity Most scales were adequately reliable	Items with low factor analysis or validity/reliability were removed
Home Electronics Equipment scale <sup>102</sup>	21 items	Open-ended numerical responses	Responses are summed to express the total number of electronics and an overall home electronics availability score	Parents of 5- to 11-year-olds	Test-retest reliabilities for the three subscales were good, ranging from 0.71 to 0.92	N/A
Sedentary Opportunities at Home <sup>183</sup>	8 items	Yes/no; open-ended numerical responses		Parents of children (mean age 11 years)	Use of this inventory with adolescent girls found a positive association between number of media resources and percent body fat after adjustment for the girls' age, race/ethnicity, parental education attainment, and family environment measures (three scales that assessed family physical activity environment,	

					family TV use and the family food environment) using linear regression models. <sup>121</sup> High test-retest reliability (percent agreement, 91% to 99%; Cohen's Kappa 0.6 to 0.9). <sup>183</sup>	
Parental Measures-Support, Enjoyment and Importance Scales <sup>70,139</sup>	4 scales; exact number of items unknown	Varies; yes/no, Likert-type frequency responses, continuous variables	Items assigned scores, allowing creation of a composite score for each variable	Parents of children in grades 4-12	Test-retest reliability varied from R=0.67 (importance of physical activity) to R=0.81 (parental support for physical activity)	N/A

#### Feeding-Related Aspects of the Home Environment

Scale/Survey Name	Original Number of Items	Answer Choices	Scoring Methodology	Population(s) Used for Validity/Reliability Testing	Validity and Reliability Tests	Recommended Modifications
Caregiver's Feeding Style Questionnaire (CFSQ) <sup>255,257</sup>	19 items	Likert-type frequency responses	Items are scored on dimensions of demandingness and responsiveness that are scored to categorize parent feeding style	Black, white, and Hispanic families with children of varying ages	Convergent validity established through associations with other validated measures of parenting; Construct validity evidence includes results that parents with indulgent/permissive feeding style were more likely to have overweight children compared to authoritarian parents Test-retest reliability for the items has been established as very good (0.82 and 0.85 for child- and parent-centered directives),	Recommendation to examine scoring as continuous measures to examine differences between parents who have a distinct feeding style and those who fall on the border of two

						styles <sup>255</sup>
Child Feeding Questionnaire (CFQ) <sup>285</sup>	31 items	Likert-type agreement and frequency responses	Sub-scales may be analyzed to characterize parents into one of four feeding styles (authoritative, authoritarian, indulgent/permissive, uninvolved), or to assess other feeding behaviors (pressure, control, restriction)	Parents of 2- to- 11-year old children	(confirmatory factor analysis done to refine original items)	A Hispanic sample required modification (dropping of 2 items from Pressure to Eat and 2 items from Restriction) for good fit <sup>285</sup>
Parental Feeding Style Questionnaire (PFSQ) <sup>275</sup>	25 items	Likert-type frequency responses	Scale scores obtained by calculating the means of the items comprising each scale	Normal and obese parents of children (mean age 4.4 years) in U.K. residents with diverse education and occupations; Low-income African American families	Good internal reliability coefficients (Cronbach alpha ranging from 0.65 to 0.85 for each sub scale) and good test-retest reliability (Pearson correlations ranging from 0.76 to 0.83) <sup>275</sup>	N/A
Feeding Demands Questionnaire (FEEDS) <sup>294</sup>	8 items	Likert-type agreement responses	Items scored to characterize factors of parental feeding: anger/frustration,	Parents of 3- to 7-year old children (from diverse backgrounds)	Good validity Acceptable internal consistency ( $\alpha$ ranging from .70 to .86)	N/A

			food amount demandingness, and food type demandingness			
Overt and Covert Parental Feeding Practices <sup>279</sup>	10 items	Likert-type frequency responses	Items summed for each sub-scale with higher frequencies indicating more use of control feeding practices	Parents (92.8% mothers) of 4- to 11-year old school children in England that were mostly white and middle class	Good reliability Cronbach's alpha=0.71 <sup>279</sup>	Factor loading results showed that the covert control could be assessed with one question instead of five, and that overt control could be assessed with four questions instead of five
Parental Dietary Modeling Scale <sup>306</sup>	6 items	Likert-type frequency responses	Individuals items are summed and divided by the total to indicate a score of parental dietary modeling behavior.	African American parents	The full scale had an alpha of 0.59	N/A
Project EAT Questionnaire <sup>346</sup> Family Meal Frequency	1 item	Response options are "never," "1-2 times," "3-4 times," "5-6 times," "7 times," and "more than 7 times"	Item indicates how often family meals occur	N/A	N/A	N/A
National Longitudinal	1 item	Response options	Item indicates how often family	N/A	N/A	N/A

Survey of Youth (NLSY), 1997 includes a family dinner question to determine family meal frequency. <sup>351</sup>		include 0-7 days	meals occur			
Family Mealtime Questionnaire <sup>314</sup>	13 items	Varies; open-ended responses, 0-7 days	Varies; items of frequency summed to indicate frequency of family meals	N/A	N/A	N/A
Project EAT survey <sup>328,346</sup> Family Mealtime Environment Characteristics Sub-scale	12 items	Likert-type agreement response	Items assessed individually to assess agreement with characteristics of mealtimes		The test-retest reliabilities for individual items ranged from $r = .54$ to $r = .70$ .	N/A
Mealtime Environment Scale <sup>353</sup>	6 items	Likert-type agreement scale	Items are summed to create a total score of family conflicts during mealtimes, with a higher score indicating more conflicts	Parents of preschool children in Québec	Internal consistency of the survey was moderate with Cronbach's Alpha = 0.55	N/A
"Scale to identify time scarcity and fatigue	9 items	Likert-type frequency scales	Items summed and averaged with higher scores indicating	Parents of children aged 2-6 years	Spearman correlations showed adequate discriminant validity as time scarcity ( $r=0.25$ ) and fatigue ( $r=0.25$ ) had low correlations	N/A



around meal planning or preparation” <sup>35</sup>			more time scarcity or fatigue		with time and energy for meal planning. The time and fatigue scales also correlated negatively with a measure of healthy food availability, suggesting adequate concurrent validity. <sup>355</sup>	
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### Maternal Psychographics

Scale/Survey Name	Original Number of Items	Answer Choices	Scoring Methodology	Population(s) Used for Validity/Reliability Testing	Validity and Reliability Tests	Recommended Modifications
Three-Factor Eating Questionnaire <sup>359</sup>	51 items	True/false Likert-type responses	Scores for true summed; higher scores indicate greater dietary restraint, disinhibition, and perceived hunger <sup>360</sup>	Middle-aged men and women. <sup>361</sup>	Good reliability and validity <sup>360</sup>	N/A
Eating Habits Subscale from the Project EAT survey <sup>344</sup>	90 items	Varies; Likert-type and open-ended responses	Varies	N/A	N/A	N/A
Dutch Eating Behavior Questionnaire (DEBQ) <sup>364</sup>	33 item	Likert-type frequency responses		College Students	High validity (Cronbach alpha, respectively, 0.88 to .94)	N/A
“two questions to assess if their children were teased for	2 items	Yes/no	Each item assessed individually	N/A	N/A	N/A

their weight, or otherwise <sup>386</sup>						
Center for Epidemiologic Studies Depression Scale (CES-D) <sup>296</sup>	20 items	Likert-type frequency responses	Items summed and higher score indicates more likely depression	Mothers; German parents of overweight and obese 7-15 year olds	Reliability studies with mothers have found good internal consistency (Cronbach alpha coefficient 0.90) <sup>403</sup> A German version of the CES-D showed good internal consistency (Cronbach alpha 0.89). <sup>404</sup>	N/A
Edinburgh Postnatal Depression Scale (EPDS) (if used with non-postnatal women with older children, called the Edinburgh Depression Scale) <sup>405,406</sup>	10 items	Likert-type frequency responses	Items summed and higher score indicates more likely depression	N/A	N/A (Good sensitivity, with the proportion of depressed women who were true positives at 86%, and specificity using true negatives was 78%. The EPDS also is sensitive to changes in depression of mothers over time) <sup>406</sup>	N/A
Patient Health Questionnaire PHQ-2 <sup>407</sup>	2 items	Likert-type frequency response	A global score for depression calculated from answers; score of 3 or greater has a sensitivity for major depression	Varied (see next bod)	Valid and reliable good sensitivity and specificity for detecting depression in a variety of settings and populations including: mothers, <sup>413</sup> adolescents, <sup>414</sup> postpartum mothers of 0 to 1 month olds, <sup>415</sup> and adults <sup>416</sup> in clinical settings.	N/A
Beck Depression Inventory (BDI) <sup>417</sup>	21 items	Likert-type frequency responses	Scored by summing the ratings of individual items;	Varied	Good reliability and validity as an indicator of depression severity <sup>418</sup>	N/A

			higher scores on indicate higher depression severity			
Zung Self-Rating Depression Scale (SDS) <sup>419</sup>	20 items	Likert-type frequency responses	Scores are calculated by summing item scores. A score that exceeds 50 indicates the likelihood of depression.	Varied	Good reliability and validity <sup>420</sup>	N/A
The National Center for Health Statistics <sup>421</sup>	1 item	Yes/no	‘Yes’ indicates person has been told in the past by a physician that he/she has depression.	N/A	N/A	N/A
Perceived Stress Scale (PSS) <sup>427</sup>		The higher the total score, the more stressed the individual is considered to be		Community-based subjects, college students, older mothers, mixed demographic low-income parents	Adequate reliability in samples of college students and community-based smoking cessation participants. Adequate internal and test-retest reliability and is correlated with a range of self-report and behavioral criteria. The coefficient alpha for the PSS was 0.91 in a sample of older mothers. In mixed-demographic low-income parents (Cronbach alpha = 0.73)	May use the 4-item PSS as reliable and valid shortened scale
“measures of perceived social support specific to	18 items	Likert-type frequency responses	Scores on the sabotage scale items were originally	Adults	Conflicting validation results. Sallis et al <sup>445</sup> found that social support was correlated with self-reported diet and exercise habits	One study found that the sabotage item about refusal to

health-related eating and exercise behaviors,” survey (parental measures-support, enjoyment, and importance scale) <sup>440,445</sup>			reversed so that for all subscales, a higher score reflected great social support (either greater support or less sabotage).		in men and women. <sup>445</sup> Among another sample of women, frequency of support from friends for healthy eating was the best predictor of weight loss. Women in the Australian Longitudinal Study on Women’s Health (n=790), however showed that social support was associated with a higher BMI, and having more friend’s sabotage was associated with lower BMI. <sup>440</sup>  Internal reliability of the subscales using Cronbach $\alpha$ , generally adequate to excellent ranges (0.58 to 0.78, <sup>440</sup> 0.61-0.91, <sup>445</sup> and 0.61-0.84 <sup>436</sup> ), with the social support items usually having the highest reliability scorings.	participate in healthy behaviors was infrequently endorsed, and removing it improved the internal consistency of subscales. <sup>436</sup> These authors concluded that the sabotage subscale could be improved.
“Modified general social support and strain subscales”. <sup>440,445 436,446,447</sup>	28 items	Likert-type frequency responses	Scores summed; higher score indicates more social support	Adults	Good psychometrics (e.g., Cronbach $\alpha$ = 0.79–0.88) <sup>446,447</sup>  Recommend adding a 5 <sup>th</sup> response category and changing the labels to range from “almost never” to “almost always,” rather than “never” “n/a”, etc. Also recommended using means rather than totals for subscale scores to directly reflect response labels and thus simplify interpretation. <sup>436,448</sup>	
Multidimensional Scale of Perceived Social Support	12 items	Likert-type agreement responses	Total social support score may be derived by summing the responses	Adults, teens	Cronbach alpha was good to excellent for the subscales (all >.80). <sup>449,450</sup> Test-retest reliability performed 2 to 3 months later showed .72, .85, and .75 for	N/A

(MSPSS) <sup>449</sup>					subscales, and .85 for the full scale. Construct validity for the scale negatively related to depression, as expected ( $r=-.25$ , $p<.01$ ).	
Perceived Social Support (PSS) questionnaire <sup>435,455</sup>	40 items	Yes/no	1 point to indicate support, 0 points to indicate no support; Higher scores indicate more family or friend support	College students; chronic-psychiatric patients	Internal consistency using Cronbach alphas ranged from .84 to .92 <sup>435</sup>	N/A
Centers for Disease Control and Prevention Health-Related Quality of Life 4-item measures (HRQOL-4) <sup>460</sup>	4 items	Likert-type agreement responses	More agreement indicates higher perceived health-related quality of life	Varies	Numerous studies have confirmed its validity and reliability, and it has been shown to be able to detect change over time. <sup>460</sup>	N/A
Family Environment Scale <sup>470,471</sup>	90 items	Likert-type agreement responses	Scores are summed for each subscale, with a higher score indicating more behaviors in that area	Mothers of obese 8- 16 year olds.	Each subscale displays adequate test-retest reliability over 8 weeks (estimates average .80) and 12 weeks (estimates average .75) with adequate internal consistency (average $\alpha=.73$ ) <sup>470</sup> Intercorrelation between subscales average .20, indicating that they each measure distinct aspects of the family social environment.	N/A
Family Assessment	12 items	Likert-type agreement	Scores summed to provide a	Various families (from	Good reliability in various sample groups (Cronbach alpha	N/A

Device-General Functioning Subscale <sup>474,475</sup>		responses	score, with a higher score better family functioning	psychiatric population, stroke rehab, and college students)	=0.92 <sup>474,475</sup> ) Factor analysis shows that the subscale summarizes family functioning well <sup>476</sup>	
Confusion, Hubbub, and Order Scale (CHAOS) <sup>465</sup>	15 items	Likert-type true/false	Scores summed to provide a score, with a higher score indicating a more chaotic, disorganized, and hurried home characteristic	Children and families that were mostly white, but varied SES	Coefficient alpha for the 15-item scale was 0.79. A subsample showed test-retest correlation was 0.74 over a 12-month period and there was no significant change in the mean or variance for the score over the 12-month interval. <sup>465</sup> The correlations of observed home environment chaotic conditions with maternal perceptions in the Twin study were also correlated. <sup>465</sup>	Modified by other researchers to include 6-items assessed with a 5-point scale (1=definitely untrue and 5=definitely true). <sup>478,479</sup> Within this sample, the alpha was lower than the longer version of the scale and the correlation between mothers' and fathers' ratings was $r=.52$ . <sup>479</sup>
Need for Cognition <sup>476,477</sup>	18 items	Likert-type agreement responses	Scores summed to provide a score, with a higher score indicating more need for cognition	College students	18-item scale created based on factor analysis from original 34-item scale. Reliability as theta coefficient was 0.90.	N/A

**Child Psychographics**

<b>Scale/Survey Name</b>	<b>Original Number of Items</b>	<b>Answer Choices</b>	<b>Scoring Methodology</b>	<b>Population(s) Used for Validity/Reliability Testing</b>	<b>Validity and Reliability Tests</b>	<b>Recommended Modifications</b>
Child Behavior Questionnaire (CBQ) <sup>497,498</sup> Very Short Form	36 items	Likert-type agreement responses	Scores summed to provide scale scores, with a higher score indicating more behavior in that area	Mixed demographic background parents with children ages 2-8 years	The very short form includes 3 scales that have shown good internal consistency: urgency (.70-.76), negative affect (0.66-0.70), and effortful control (0.62-0.77)	N/A
EAS (Emotionality, Activity, and Shyness) Temperament Survey <sup>500</sup>	20 items	Likert-type agreement responses	Scores are summed and a mean score is calculated for each subscale, with higher scores indicating that a trait is more typical of the child.	Dutch children ages 4 to 13 years old and U.S. children 3-8 years old	Good reliability with Cronbach's alpha values ranging from 0.58 (sociability) to 0.83 (emotionality) with a sample of 3 to 8 year olds. <sup>490</sup> Good internal consistency and interrater reliability with a sample of Dutch children. <sup>501</sup>	N/A
8-item scale about Self-Regulation in Eating was developed by Tan and Holub <sup>502</sup>	8 items	Likert-type agreement responses	Scores summed and higher scores indicate more energy regulation.	3-8 year olds	The internal consistency for this scale was good (Cronbach alpha=0.87).	
Children's Eating Behavior Questionnaire (CEBQ) <sup>504</sup>	35 items	Likert-type frequency responses	Mean scores are calculated from the responses to each subscale and higher scores indicate a	parents of young children who vary in ethnicity and location	Good internal validity with child BMI and reliability. <sup>490,504,505</sup> A longitudinal study found that the CEBQ subscales had significant correlations between two time points, but lower	The CEBQ shows some inability to distinguish between food pickiness and

			greater prevalence of that particular eating behavior		correlation coefficients with satiety responsiveness, slowness in eating, food responsiveness, enjoyment of food, emotional overeating and food fussiness ranging from $r=0.44$ to $.55$ and emotional under eating $r=0.29$ . <sup>490,504</sup>	food neophobia <sup>506</sup>
Feeding Problem Questionnaire <sup>507</sup>	8 items	Likert-type frequency responses	A feeding problem severity score is based on the number of time a parent chooses the two highest frequency responses.	Dutch sample of parents of children aged 1- to 36-months	The pickiness items had relatively high factor loadings (range 0.59-0.74) and internal consistency (Cronbach alpha 0.78), and disturbing mealtime behaviors had fair factor loading (range 0.43-0.55) and good internal consistency (Cronbach alpha 0.61).	N/A
About Your Child's Eating-Revised (AYCE-R) <sup>352</sup> questionnaire	25 items	Likert-type frequency responses		8- to 16-year and 2- to 6-year olds	Good internal consistency. Significant correlation with another environment scale in expected directions showed that the AYCE-R factors had good convergent validity.	N/A

#### Social Cognitive Theory

Scale/Survey Name	Original Number of Items	Answer Choices	Scoring Methodology	Population(s) Used for Validity/Reliability Testing	Validity and Reliability Tests	Recommended Modifications
Parent Expectations Survey (a measure of perceived self-	20 items	Likert-type responses (cannot do to can do)	Items are summed with higher scores indicating more perceived self-	Parents of newborns	Good concurrent validity with other similar scales (0.40 to 0.75) and predictive validity. Internal consistency was .91 at one month post partum and .86 at	N/A



efficacy) <sup>428</sup>			efficacy for various behaviors		3 months post partum.	
Ball and Crawford used a 9-item self-efficacy scale <sup>440</sup>	9 items	Likert-type responses (not at all confident to very confidence)	Items are summed to give 3 summary scores, with higher scores indicating more self-efficacy.	Young women enrolled in weight loss program	Adequate internal reliability (Cronbach's alpha values 0.68-0.91). <sup>440</sup>	N/A
"self-efficacy scales for health-related diet and exercise behaviors" <sup>515</sup> were	32 items	Likert-type responses (not at all confident to very confidence)	Sum scores and averaging them, with higher scores indicating higher self-efficacy.	Various populations	Generally considered valid and reliable	N/A
Van Beurden et al <sup>518</sup> 9-item scale	9 items	Likert-type responses (no to very sure)	Scores summed with higher scores indicating higher self-efficacy	Australia adults in cholesterol reduction program	Correlations between initial and 3-month retests ranged from 0.26 to 0.62	N/A
Harvey-Berino et al <sup>290</sup> 10-item scale	10 items	Likert-type responses (very unlikely to very likely)	Scores summed and higher scores indicate more ability to overcome barriers, more expectations and importance of physical activity	N/A	N/A	N/A
Women and Physical Activity Survey <sup>519</sup> self-efficacy items	3 items	Likert-type agreement responses	Scores summed and higher scores indicate more self-efficacy	Diverse adult women	Good reliability (0.72; 95% CI, 0.66-0.77). <sup>519</sup>	N/A

Ball and Crawford 14-item scale <sup>440</sup>	14 items	Likert-type responses (very unlikely to very likely)	Higher score indicated more agreement with outcomes for physical activity	N/A	N/A	N/A
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### Sleep

Scale/Survey Name	Original Number of Items	Answer Choices	Scoring Methodology	Population(s) Used for Validity/Reliability Testing	Validity and Reliability Tests	Recommended Modifications
Nurses' Health Study	1 item	Open-ended hours of sleep	N/A	Adult women	Good correlation of question ( $r=0.79$ ) with 1 week of sleep diaries. <sup>540</sup>	N/A
Pittsburgh Sleep Quality Index (PSQI) <sup>544</sup>	24 items	Open-ended hours of sleep, agreement with items about sleep quality	Varies	Adults including those with chronic disease	Good reliability and validity <sup>545,546</sup>	An adapted version of the PSQI which includes only 2 questions to assess sleep time and perceived-quality has been used in adolescent samples. <sup>547</sup>
Children's Sleep Habits Questionnaire (CSHQ) <sup>548-550</sup>	45 items	Likert-type frequency responses	A Total Sleep Disturbance score is the mean of all items. <sup>548</sup>	Used in 2-5 year olds	Internal consistency for the 33-item CSHQ ranged from .36 to .70 in a community sample of 4- to 10-year old children, and test-retest reliability estimates over a	An abbreviation of the study by Owens et al reduced the

					2-week interval ranged from .62 to .79. <sup>548</sup>	CSHQ to 33-items
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**APPENDIX B:**  
**Survey Items and Scoring Protocol**  
**HOME & NEIGHBORHOOD PHYSICAL ACTIVITY ENVIRONMENT**

This questionnaire assesses the availability, accessibility, and frequency of use of space and/or equipment for active play by families with young children. It was modified from existing, validated instruments to shorten it and reduce participant burden and include play equipment examples appropriate for young children.<sup>70,86,129,131,133,135,138-140</sup> It is designed to be completed by parents of young children.

**Scale 1: Physical Activity Availability in the Home**

**Think about your child doing active play inside your home.**

*Active play means doing activities that make you sweat and breathe harder than normal, like riding scooters or tricycles, running, and jumping.*

***Availability items-Home***<sup>86,129,131,135</sup>

1. My child has plenty of room for active play inside our home.
2. My child has plenty of toys that can be used indoors to help build muscles. These are toys like balls, tricycles, and scooters.
3. My child has siblings or friends that live nearby to play with indoors.
4. My child has video games that help the child be active (like Dance, Dance Revolution, and Wii Fit).

***Accessibility items (parent policie)s-Home***<sup>129,131</sup>

1. I put limits on the amount of time my child can have active play indoors. \* #
2. It's easy for my child to actively play indoors without my help.#
3. Indoor play equipment is stored where it is easy for my child to see and reach.#

***Frequency of access items-Home***<sup>129</sup>

1. How often does your child usually play actively inside your home?
2. How often does your child play indoors with toys that help build muscles? These are toys like balls, tricycles, scooters.
3. How often does your child actively indoors with siblings or kids that live nearby?

## **Scale 2: Physical Activity Availability in the Yard or Area Near the Home**

**Think about your yard or area right outside your home.**

### ***Availability items-Yard***<sup>70,86,129,139</sup>

1. The yard or area **outside** our home has plenty of room for my child to actively play.
2. There is a paved or flat area in the yard or area **outside** our home that is big enough for my child to safely ride a tricycle, bike, scooter, or other wheeled toy.
3. My child has shoes and clothes for playing **outside**.
4. The yard or area **outside** our home has plenty of swings, slides, or other play equipment my child can use.
5. My child has plenty of toys for playing **outside**, like balls, jump ropes, skates, swimming or kiddie pool, hula hoops, or sleds<sup>140</sup>.
6. My child has a tricycle, bike, scooter, or other wheeled toy to use **outside**.

### ***Accessibility items (parent policies-Yard)***<sup>129</sup>

1. It's easy for my child to actively play in the yard or area **outside** our home without my help.#
2. I often limit my child's active play in the yard or area **outside** our home.\*#
3. Toys my child can play with **outside** are stored where they are easy for my child to see and reach. #

### ***Frequency of access items-Yard***<sup>86</sup>

1. Do you have a dog? If yes, how often does your child go on walks with the dog or play with it outside (doing things like throwing balls)?
2. When the weather is good, how often does your child usually play in the yard or area **outside** your home?

### **Scale 3: Physical Activity Availability in the Neighborhood**

**Think about your neighborhood and the area nearby.**

#### ***Availability items-Neighborhood<sup>129</sup>***

1. There are **outdoor** areas, like parks, pools, and playgrounds, nearby my home where kids can play.
2. There are free or low-cost recreation centers or other indoor places where kids can play.
3. The outdoor areas in my neighborhood have plenty of swing sets, slides, or other play equipment my child can use.

#### ***Accessibility items: Neighborhood safety<sup>129,133,135,138</sup>***

1. I feel safe from traffic when I walk in my **neighborhood and nearby**.
2. I feel safe from crime in my neighborhood and nearby.
3. I feel safe from biting insects, like mosquitos and ticks, in my **neighborhood and nearby**.
4. Outdoor child play areas are easy to get to in my **neighborhood**.
5. The outdoor areas in my **neighborhood** where my child can play are safe.
6. The outdoor areas in my **neighborhood** where my child can play are clean

#### ***Frequency of access items-Neighborhood***

1. When the weather is good, how often does your child usually play in **outdoor** areas, like parks, pools, and playgrounds, near your home?
2. How often does your child usually play in free or low-cost recreation centers or other indoor places near your home?

### **Answer Choices & Scoring Methodology**

#### ***Physical Activity Availability items***

##### **Answer Choices**

Strongly agree, agree, neither, disagree, strongly disagree for all items except Scale 2, Item 6: answer is yes/no.

##### **Scoring Methodology**

1. Raw data are assigned values of 1-5 based on the response: strongly disagree=1, disagree=2, neither agree nor disagree=3, agree=4, strongly agree=5; or 1=no and 5=yes.
2. Items are averaged to create the scale score; higher score indicates greater availability of space and/or equipment for physical activity.

#### ***Physical Activity Accessibility items***

##### **Answer Choices**

Strongly agree, agree, neither, disagree, strongly disagree

##### **Scoring**

1. Raw data are assigned values of 1-5 based on the response: strongly disagree=1, disagree=2, neither agree nor disagree=3, agree=4, strongly agree=5. Scoring is reversed for items marked with an asterisk (\*).

2. Items are averaged to create the scale score; higher score indicates **greater accessibility of space and/or equipment for physical activity**.

***Physical Activity Frequency of access items***

Answer Choices

Every day, most days, sometimes, once in a while, almost never

Scoring

1. Raw data are assigned values of 1-5 based on the response: almost never=1, once or twice a week=2, 3 to 4 times a week=3, 5 to 6 times a week=4, and every day =5. Scale 2, item 3 is scored 1 for a “no” response, and for yes, the frequency of dog walks serves as the score.
2. Items are averaged to create the scale score; higher score indicates greater frequency of access of space and/or equipment for physical activity.

# Items marked with a pound sign (#) can be averaged to create a **Parent Policies related to Physical Activity scale** score (9 items total= 4 *Accessibility Items-Home*, 3 *Accessibility items- Yard*, 2 *items Accessibility/Use Media Items*)

## HOME MEDIA ENVIRONMENT

This questionnaire assesses the availability, accessibility, and frequency of use of media promoting sedentary behavior by families with young children. It was modified from existing, validated instruments to shorten it and reduce participant burden and include examples appropriate for young children.<sup>86,129,131</sup> It is designed to be completed by parents of young children.

### **Scale 1: Media Availability in the Home**<sup>86,129,131</sup>

**Think about all the TVs, DVD players, computers, and smart phones at your home that work**

1. How many of each of these are in your home? (Check all that apply)
2. TV
3. DVD Player
4. Computer/Laptop
5. Smart Phone/Tablet
6. Internet Access at home
7. Xbox, PlayStation or other video games
8. Which of these can your child use in his or her bedroom? (Check all that apply)@
9. TV
10. DVD Player
11. Computer/Laptop
12. Smart Phone/Tablet
13. Internet Access at home
14. Xbox, PlayStation or other video games

#### Answer choices

Item 1: drop down menu with numbers

Item 2: yes/no

#### Scoring Methodology

1. Item #1: Raw data for are summed; higher score indicates greater availability of media devices in the home.
2. Item #2: Raw data are assigned values of 0-1 based on the response: 0=no and 1=yes. Responses are summed to create the scale score; higher score indicates greater availability of media devices in the child's bedroom.

### **Scale 2: Use Frequency Items-Media**<sup>86,129,131</sup>

1. It's easy for my child to watch TV or movies with little or no help. #
2. It's easy for my child to play with computers, tablets, video games (like Xbox or PlayStation), smart phones, or educational devices (like LeapPad) with limited help. #
3. How often is a TV on when meals and snacks are eaten at your home?
4. How often do you use a computer, tablet, video game (like Xbox or PlayStation), smart phone, or educational device (like LeapPad) during meals and snacks at home?



Answer choices

Strongly agree, agree, neither, disagree, strongly disagree

Scoring Methodology

1. Raw data are assigned values of 1-5 based on the response: strongly disagree=1, disagree=2, neither agree nor disagree=3, agree=4, strongly agree=5.
2. **Items in each scale are summed and averaged to create the scale score;** higher score indicates more frequency of access of media

**Scale 3: Frequency of Access-Media**

1. Each day, how much time is the TV on when no one is watching it?
2. Each day, how much time do you usually allow your child to watch TV or movies at home?
3. Each day, how much time do you allow your child to play with computers, tablets, video games (like Xbox or PlayStation), smart phones, or educational devices (like LeapPad) at home?

Answer choices

Actual time in 15 minute increments

Scoring Methodology

1. Responses put into categories 1=0 time; 2= less than 2 hours; 3=2 to <4 hours; 4=4 to <6 hours; 5=6 or more hours. Categories may change based on range of answers. Item 1 also may be used to assess family meal environment score (see scale *Family Meal Practices*).
2. Items in each scale are averaged to create the scale score; **higher score indicates more frequency of access of media.**
3. Items 2 and 3 can be summed and averaged. If a parent scores 2 or less, he or she follows guidelines for screentime for preschool-aged children.<sup>148</sup>

**Scale 4: Parent Policies-Media**<sup>86,129</sup>

1. I try to limit the number of commercials my child sees on TV.
2. I try to limit the TV shows and movies my child sees to only those made for kids.
3. I often talk with my child about advertisements on TV.
4. I talk often with my child about TV shows, video games, or movies.

Answer choices

Strongly agree, agree, neither, disagree, strongly disagree

Scoring Methodology

1. Raw data are assigned values of 1-5 based on the response: strongly disagree=1, disagree=2, neither agree nor disagree=3, agree=4, strongly agree=5.
2. Items in each scale are averaged to create the scale score; higher score indicates greater congruence of parent policies with expert recommendations.

## PHYSICAL ACTIVITY/MEDIA USE

### **Scale 1: Parent Behavior Modeling, Importance, Encouragement of Physical Activity and Media Use**

This questionnaire assesses the physical activity behavior modeling of parents of young children and their encouragement of physical activity in their children. It was modified from existing, validated instruments to shorten it and reduce participant burden and include play equipment examples appropriate for young children. It is intended for use by parents of young children.

#### ***Parent Modeling of Physical Activity and Media Use*<sup>86,129,131,135</sup>**

1. **In the last month**, how often did you play actively indoors for at least 15 minutes with your child? *Active play means doing activities that make you sweat and breathe harder than normal, like riding scooters or tricycles, running, and jumping*
2. **In the last month**, how often did you play actively outdoors for at least 15 minutes with your child? *This could be going for a walk together, playing on swings, playing games like tag.*
3. **In the last month**, how often did your child see you doing heavy physical activity? *Heavy physical activity includes things like running, fast bicycling, aerobics, digging. Think about only the times you did these activities **for at least 10 minutes** at a time.*
4. **In the last month**, how often did your child see you doing moderate physical activity? *Moderate physical activity includes things like bicycling at a regular speed, sweeping, vacuuming the floor, raking leaves, walking the dog, or washing windows. Think about only the times you did these activities **for at least 10 minutes** at a time.*
5. **In the last month**, how often did your child see you using computers, video games, tablets, or smart phones for more than 2 hours daily?\*
6. **In the last month**, how often did your child see you watching TV or movies for more than 2 hours daily?\*

#### Answer choices

Every day, most days, sometimes, once in a while, almost never

#### Scoring Methodology

1. Raw data are assigned values of 1-5 based on the response: almost never=1, 1 to 2 days a week=2, 3-4 days a week=3, 5-6 days a week=4, and every day =5. \*Items are reverse scored.
2. Items are summed and averaged to create the scale score; higher score indicates greater frequency of parent modeling of physical activity and appropriate media time use (8 items total = 6 items here + 2 items marked with “\$” in *Parent Encouragement*).

#### ***Importance Placed on Physical Activity/Media Use by Parents*<sup>70,139</sup>**

1. I make time to be physically active almost every day.
2. I do not let things get in the way of keeping myself physically active.
3. It is important for me to be physically active.

4. It's important that my kids do not see me spending a lot of time watching TV and movies.
5. I tell my kids it's important **not** to spend too much time watching TV and movies.

Answer choices

Strongly agree, agree, neither, disagree, strongly disagree

Scoring Methodology

1. Raw data are assigned values of 1-5 based on the response: strongly disagree=1, disagree=2, neither agree nor disagree=3, agree=4, strongly agree=5.
2. Items are summed and averaged to create the scale score; higher score indicates greater importance placed on being physically active and modeling being physically active to children.

***Parent Encouragement of Physical Activity/Media Use Reduction***<sup>70,86,139</sup>

1. I make it easy for my kids to be physically active, such as by getting out play equipment, taking them to the park or classes like swimming, dance, or karate.
2. I make sure my child is physically active almost every day.
3. I do not let things (like the weather) keep my child from being physically active.
4. It's important for my child to be physically active.
5. I tell my kids that I enjoy being physically active. \$
6. It's important for my kids to see me being physically active. \$
7. I often encourage my child to do something other than watch TV or movies, like play outside.
8. I often encourage my child to do something other than play with computers, tablets, and smart phones, like play outside.
9. I often do things to make it easy for my child to do something other than watch TV or movies, like play outside.
10. I often do things to make it easy for my child to do something other than play with computers and smart phones, like play outside.

Answer choices

Strongly agree, agree, neither, disagree, strongly disagree

Scoring Methodology

1. Raw data are assigned values of 1-5 based on the response: strongly disagree=1, disagree=2, neither agree nor disagree=3, agree=4, strongly agree=5.
2. Items are summed and averaged to create the scale score; higher score indicates greater encouragement of physical activity and reduction of media use.

## PHYSICAL ACTIVITY LEVEL AND SLEEP

### **Scale 1: Parent Activity and Sleep**<sup>70,139,196,544</sup>

**Think about how you spent your time this past week. This includes time spent at home, with friends, working, and so forth.**

1. **In the last week**, how much time each day did you usually sleep?
2. **In the last week**, how much of time each day did you spend watching TV or movies, or playing games on computers or smart phones?
3. **In the last week**, how many days did walking for at least 10 minute at a time?
4. **In the last week**, how many days did you do moderate physical activity? *Moderate physical activity includes things like bicycling at a regular speed, sweeping, vacuuming the floor, raking leaves, or washing windows.*
5. **In the last week**, how many days did you do heavy physical activity? *Heavy physical activity includes things like running, fast bicycling, aerobics, digging, or chopping wood.*
6. When you run errands, how do you usually get there?
7. **Think about your sleeping during the past month.**
8. How would you rate your sleep quality overall?

#### Answer choices

Items 1 to 3: actual time in 15 minute increments

Items 4 and 5: number of days 0 to 7

Item 6: walk, bike, motorcycle, car, bus, subway, train, other, specify \_\_\_\_\_

Item 7: very good, good, OK, bad, very bad

#### Scoring Methodology

1. Item 1: Responses put into categories based on CDC <7=1 insufficient sleep; 8=2 adequate sleep; >8=3 long sleep duration.<sup>768,769</sup>
2. Item 2: Response put into category to determine whether parent meets screen-time recommendations  $\leq 2$  hours = 1;  $>2$  hours =0
3. Items 3 to 5: Enhanced version of IPAQ categorical scoring; physical activity = (# days of vigorous activities per week x 3) + (# days of moderate activities x 2) + (# days of walking 10 minutes at a time) “The IPAQ categorical scoring method was enhanced to account for relative intensity of activity; that is, vigorous activity was weighted higher than other types of activities and moderate activity was weighted higher than walking and strength training. The physical activity index score could range from 0 to 49. Scores were categorized into three levels of physical activity: sedentary (score 0 to <20), moderate (score 20 to <30), and high (score  $\geq 30$ ).”<sup>605</sup>
4. Item 6: walk and bike are scored 2; subway, train, bus are scored 1 (because you have to get to them); motorcycle and car are scored 0.
5. Item 7: answer choices: 5=very good; 4= good; 3=OK; 2=bad; 1=very bad; indicates sleep quality

### **Scale 2: Child Activity and Sleep**<sup>70,139,196,544</sup>

**Think about how your child spent his or her time this past week.**

1. **In the past week**, how many hours of actual sleep did your child usually get each night? *This may be different than the number of hours spent in bed.*
2. **In the past week**, how many hours did your child usually nap each day?
3. **In the past week**, how much of the time each day did your child spend watching TV or movies, or playing games on a computer or smart phone?
4. **In the past week**, how many days did your child walk continuously for at least 10 minutes at a time to do things like go for a walk, walk the dog, or walk to school?
5. **In the past week**, how many days did your child run, jump, or do other things that made him or her sweat or breathe **a little** harder than usual?
6. **In the past week**, how many days did your child run, jump, or do other things that made him or her sweat or breathe **a lot** harder than usual?
7. **Think about your child's sleeping during the past month.**
8. How would you rate your child's sleep quality overall?

Answer choices

Items 1 to 3: actual time in 15 minute increments

Item 4: number of days 0 to 7

Item 5 and 6: number of days 0 to 7 and how many minutes each day

Item 7: answer choices: 5=very good; 4= good; 3=OK; 2=bad; 1=very bad; indicates sleep quality

Scoring Methodology

Item 1: Responses put into categories based on recommendations by age.<sup>614</sup>

Age	Total Sleep	Night-time Sleep	Naps
2 years	12 to 14 hours	10 to 12 hours	1 nap (1 to 4 hours long)
3 years	12 to 14 hours	10 to 12 hours	1 nap (1 hour long)
4 and 5 years	11 to 13 hours	10 to 11 hours	Usually no longer need a nap
Adults <sup>528,770</sup>	7 to 9 hours	7 to 9 hours	Not necessary

Item 2: We can use this as a proxy for daytime sleepiness (PSQI)

Item 3: Response put into category to determine whether child meets screen-time recommendations  $\leq 2$  hours = 1;  $> 2$  hours = 0

Items 4 to 6: Enhanced version of IPAQ categorical scoring; physical activity = (# days of vigorous activities per week x 3) + (# days of moderate activities x 2) + (# days of walking 10 minutes at a time) + (# days of strength training). "The IPAQ categorical scoring method was enhanced to account for relative intensity of activity; that is, vigorous activity was weighted higher than other types of activities and moderate activity was weighted higher than walking and strength training. The physical activity index score could range from 0 to 49. Scores were categorized into three levels of physical activity: sedentary (score 0 to <20), moderate (score 20 to <30), and high (score  $\geq 30$ ).<sup>605,606</sup>

Item 7: answer choices: 5=very good; 4= good; 3=OK; 2=bad; 1=very bad; indicates sleep quality

## **FOOD AVAILABILITY AND ACCESSIBILITY IN THE HOME ENVIRONMENT**

The purpose of this section is to describe the types of foods available in homes (i.e., fruits, vegetables, high fat foods, salty and sweet snacks, sugar sweetened beverages, and breakfast cereals). Another purpose is to determine how easy it is for young children to access these foods in their homes.

### **Scale 1: Fruit and Vegetable Availability**

This questionnaire assesses the availability of fruits and vegetables in the home. It was modified from the Block Fruit-Vegetable-Fiber Screener.<sup>131,241</sup> A study using the Block Screeners to assess household food inventories<sup>617</sup> demonstrated the utility of these screeners in assessing availability of fruits, vegetables, vitamin C, dietary fiber, total fat, saturated fat, and cholesterol in household food supplies.<sup>240</sup>

**Think about the meals and snacks eaten in your home during the past year or so. Think about the number of meals and snacks each family member usually eats at your home.**

**How often was there enough food for most people in your home to have one serving of these foods?**

**(Do not count food eaten in restaurants, work, school, or other places.)**

1. Fruit of any type including fresh, frozen or canned (not juice)
2. Green salad
3. Potatoes, any kind, including baked, mashed (not fried)#
4. Vegetable soup, or stew with vegetables
5. Any other vegetables, including string beans, peas, corn, broccoli or any other kind
6. Beans such as baked beans, pinto, kidney, or lentils (not green beans)
7. Dark bread such as whole wheat or rye

### **Answer choices**

Less than 1 time each week, 1 day each week, 2 days each week, 3 days each week, 4 days each week, 5 days each week, 6 days a week, 7 days a week, More than one time each day

### **Scoring Methodology**

1. Items are assigned scores as follows: 5= More than one time each day; 4=7 days each week, 3=4,5,6 times each week; 2=3,2 times each week; 1=1 day each week, 0=less than 1 time each week.
2. Scores are calculated as follows: Items #1-7 (plus 4 on other scales, marked with \$, #, or %) are summed to create a Fruit/Vegetable/Bean Score (0-55). Using the equations below, the number of servings of Fruit/Vegetables and various nutrients available in the home may be assessed.

Fruit/Vegetable servings (Pyramid definitions of servings per day) =  $-0.23 + 0.37 (\text{Score}) - 0.55 (S)$

Vitamin C (mg) =  $56.5 + 6.6 (\text{Score}) - 26.7 (S) - 0.45 (A)$

Magnesium (mg) =  $272 + 11.6 (\text{Score}) - 92.3 (\text{S}) - 1.7 (\text{A})$   
 Dietary Fiber (gms) =  $12.6 + 0.77 (\text{Score}) - 0.16 (\text{A}) - 5.12 (\text{S})$   
 Potassium (mg) =  $2348 + 114.8 (\text{Score}) - 759 (\text{S}) - 13.8 (\text{A})$   
 A=Age, S=Sex (male =0, female =1)

\$The vegetable juice item and the fruit juice item in the *Beverage Availability* also needs to be averaged with these for the Fruit-Vegetable-Fiber Screener Score.

#The fried potato item in the *Dietary Fat Availability* needs to be averaged with this item for the Fruit-Vegetable-Fiber Screener Score.

% The Fiber Cereal item in the *Breakfast Food Availability* needs to be averaged with these items for the Fruit-Vegetable-Fiber Screener Score.

### **Scale 2: Dietary Fat, Salty and Sweet Snack Availability**

This questionnaire assesses the availability of fatty foods in the home. It was modified from the Block Dietary Fat Screener<sup>131,241</sup> and the Block Kids' Screener<sup>771</sup> as described above in the Fruit and Vegetable Availability section.<sup>240,617</sup>

**Think about the meals and snacks eaten in your home during the past year or so. Think about the number of meals and snacks each family member usually eats at your home. How often was there enough food for most people to have at least one serving of these foods?**

**(Do not count food eaten in restaurants, work, school, or other places.)**

1. Hamburgers, ground beef, meat burritos, tacos
2. Beef or pork, such as steaks, roasts, ribs, or in sandwiches
3. Fried chicken
4. Hot dogs, or Polish or Italian sausage
5. Cold cuts, lunch meats, ham (not low-fat)
6. Bacon or breakfast sausage
7. Salad dressings (not low-fat)
8. Margarine, butter or mayo on bread or potatoes
9. Margarine, butter or oil in cooking
10. Eggs (not Egg Beaters or just egg whites)
11. Pizza
12. Cheese, cheese spread (not low-fat)
13. Whole milk\*
14. French fries, fried potatoes#
15. Corn chips (like Doritos, tortilla chips, Fritos), potato chips, popcorn, crackers
16. Doughnuts, pastries, cookies, cake (like Ho-Hos) (not low-fat)
17. Ice cream (not sherbet or non-fat)
18. Candy, candy bars

Answer choices

Less than 1 time each week, 1 day each week, 2 days each week, 3 days each week, 4 days each week, 5 days each week, 6 days a week, 7 days a week, More than one time each day

Scoring Methodology

1. Items are assigned scores as follows: 4= 5, 6, 7 days a week or more than once time each day; 3=3, 4 days each week; 2=2, 1 day each week; 1=Less than 1 time each week.
2. Scores for 1-17 are calculated as follows: Items #1-17 are summed to create a Dietary Fat Score (0-68). Using the equations below, various nutrients available in the home may be assessed.

Total fat (gms) =  $32.7 + 2.4 (\text{Dietary Fat Score}) + 11.2 S$

Saturated fat (gms) =  $9.4 + 0.88 (\text{Dietary Fat Score}) - 3.5 S$

Percent fat =  $19.8 + 0.6 (\text{Dietary Fat Score}) + 2.3 S$

Dietary cholesterol (gms) =  $120 + 7.8 (\text{Dietary Fat Score}) = 54.64 S + 36.6 R$

S = Sex: Male =0, Female =1

R= Race: White=0, Nonwhite=1

Items 15 & 16 are averaged to create a Salty Snacks availability score.

Items 17 & 18 are averaged to create a Sweet Snacks availability score.

\*Item will be located in the beverage section of this instrument.

#The fried potato item needs to be averaged with the potato item in the Fruit-Vegetable-Fiber Screener to derive the Fruit-Vegetable-Fiber Score.

\*Item will be located in the beverage section of this instrument.

#The fried potato item needs to be averaged with the potato item in the Fruit-Vegetable-Fiber Screener to derive the Fruit-Vegetable-Fiber Score.

Scale 3: Beverage Availability

This questionnaire assesses the availability of sugar-sweetened beverages, juice, and milk in the home. It was modified from the Block Kids' Screener<sup>771</sup>, the fast food/beverage screener,<sup>243</sup> and a survey for college-students (by West et al).<sup>244</sup> The modified survey may be used to estimate servings of beverages available, and calorie and sugar availability in the home from beverages.

**Think about the beverages in your home during the past year or so.**

**Think about the number of meals and snacks each family member usually eats at your home. How often was there enough for most people to have at least one serving of the beverage?**

**(Do not count food eaten in restaurants, work, school, or other places.)**

1. Milk to drink\*
2. What kind of milk do you usually have in your house?
3. Real 100% Fruit juice, like orange, apple, grape, fresh, frozen or canned. (**Not** sodas or other drinks)\$
4. Vegetable juice, like tomato juice, V-8, carrot\$



5. Soft Drinks and Soda/Pop like Coke or 7-up, (**not** diet soda)
6. Fruit drinks or other sugar sweetened beverages, like Hawaiian Punch, Hi-C, Kool-Aid, Ocean Spray cranberry juice cocktail, Snapple, Sunny Delight, Country Time Lemonade, Sobe, Arizona Ice Tea, sugar sweetened tea (**not** diet drinks)
7. Energy drinks (**not** sugar-free), like RockStar, Red Bull, Monster, Full Throttle
8. Sugar-sweetened specialty coffee drinks, like frappuccino, flavored latté/cappuccino

#### Answer choices

Item 1 and 3-8: Less than 1 time each week, 1 day each week, 2 days each week, 3 days each week, 4 days each week, 5 days each week, 6 days a week, 7 days a week, More than one time each day

Item 2: Whole milk, Reduced fat 2% milk, Low fat 1% milk, Nonfat milk, Chocolate milk, Soy milk (or almond or rice), Lactaid milk, Don't know

#### Scoring Methodology

1. Item 1 is used in the Fat Availability Scale if response to item 2 is whole milk; responses are scored as follows: 4= 5, 6, 7 days a week or more than once time each day; 3=3, 4 days each week; 2=2, 1 day each week; 1=Less than 1 time each week.
2. Items 3 and 4 are also used in the Block Fruit-Vegetable-Fiber Screener and are scored as follows: 5= More than one time each day; 4=7 days each week, 3=4,5,6 times each week; 2=3,2 times each week; 1=1 day each week, 0=less than 1 time each week.
3. Items 5-8 are scored as follows: 0=less than 1 time each week, 1=1 day each week, 2=2 days each week, 3=3 days each week, 4=4 days each week, 5=5 days each week, 6=6 days each week, 7=7 days each week, 8=more than one time each day.
4. Servings of beverages (milk, juice, and sugar-sweetened beverages) available in a home are determined by averaging scores for each item (milk=item 1; juice=items 3 and 4; sugar-sweetened beverages=items 5 to 8). A higher score indicates more of each beverage type available in the home.
5. Items 3 to 8 are used to determine the amount of calories and grams of sugar typically available in a home in a week from sugar-sweetened beverages are calculated by transforming data into frequency per week. Estimations of calorie availability are calculated as weekly frequency x typical serving size (from NHANES typical servings reported) x kcal per ounce for the beverage type.<sup>244</sup>

\*Item also goes in *Dietary Fat Availability* if Item 2 is whole milk.

\$ Items goes in the *Fruit-Vegetable-Fiber Screener*.

#### **Scale 4: Availability of Typical Breakfast Foods**

This questionnaire assesses the availability of breakfast food in the home. It was modified from the Home Environment Survey (header and answer choices)<sup>131</sup>, Block Kids' Screener<sup>771</sup>, and the Block Fruit-Vegetable-Fiber Screener.<sup>131,241</sup> The survey may be used to estimate servings of typical breakfast foods available in the home.

**Think about the meals and snacks eaten in your home during the past year or so. Think about the number of meals and snacks each family member usually eats at your home. How often was there enough food for most people to have at least one serving of these foods?**

**(Do not count food eaten in restaurants, work, school, or other places.)**

1. Fiber cereals like Raisin Bran, Shredded Wheat, Fruit-n-Fiber, Plain Cheerios, Grape Nuts, Wheat Chex, Kix, All Bran, Granola, Kashi%
2. Other plain cereals, like Corn Flakes, Special K, Rice Krispies, Wheaties, Oatmeal
3. Honey Nut Cheerios, Cap'n Crunch, Lucky Charms, Life, Golden Grahams, Frosted Mini Wheats
4. Other sweet cereals, like Frosted Flakes, Froot Loops, Apple Jacks, Trix
5. Eggs, breakfast sandwiches or breakfast burritos<sup>771</sup>
6. Breakfast bars, granola bars, protein bars<sup>771</sup>

#### Answer choices

Less than 1 time each week, 1 day each week, 2 days each week, 3 days each week, 4 days each week, 5 days each week, 6 days a week, 7 days a week, More than one time each day

#### Scoring Methodology

1. Item 1 is also used in the Block Fruit-Vegetable-Fiber Screener and are scored as follows: 5= More than one time each day; 4=7 days each week, 3=4,5,6 times each week; 2=3,2 times each week; 1=1 day each week, 0=less than 1 time each week.
2. Remaining item responses are assigned values as follows: 0=less than 1 time each week, 1=1 day each week, 2=2 days each week, 3=3 days each week, 4=4 days each week, 5=5 days each week, 6=6 days each week, 7=7 days each week, 8=more than one time each day.
3. Scores are calculated as follows: The amount of calories and grams of sugar typically available in a home in a week from ready to eat cereals are calculated by transforming data into frequency per week. Estimations of calorie intake are calculated as weekly frequency x typical serving size (from NHANES) x kcal per serving for the food types. Grams of sugar may be calculated in the same way.<sup>244</sup>
4. The number of servings of breakfast foods available in a home are determined by summing the scores for each item (7 items x 5= 0 to 35 possible score). A higher score indicates more availability of typical breakfast foods in the home.

% The Fiber Cereal item needs to be averaged with these items for the *Fruit-Vegetable-Fiber Screener Score*.

#### **Scale 5: Food Accessibility and Policies**

This questionnaire assesses the accessibility of healthy and unhealthy foods in the home. It has been modified from the availability surveys previously described and other measures of home food availability.<sup>129,131,241,243,244,618,771</sup> It is designed to assess how easy it is for children to access food items, and for parent policies related to food accessibility and choice for snacks.

**Which of these foods do you allow your child to get for a snack without your help?**

**Check all that apply.**<sup>129</sup>

1. potato chips, popcorn, crackers, corn chips, like Doritos, tortilla chips, Fritos\*
2. doughnuts, pastries, cookies, cake (like Ho-Hos) \*
3. ice cream \*
4. candy or candy bars\*
5. milk
6. soft drinks and soda/pop like Coke or 7-Up \*
7. fruit drinks or other sugary beverages\*
8. Real 100% juice, like orange, apple, grape
9. fruits or vegetables
10. cereal
11. breakfast bars, granola bars, protein bars

**Which of these are kept in places that are easy for your child to see and reach?**<sup>131</sup>

1. potato chips, popcorn, crackers, corn chips, like Doritos, tortilla chips, Fritos\*
2. doughnuts, pastries, cookies, cake (like Ho-Hos) \*
3. ice cream \*
4. candy or candy bars\*
5. milk
6. soft drinks and soda/pop like Coke or 7-Up\*
7. fruit drinks or other sugary beverages\*
8. Real 100% juice, like orange, apple, grape
9. fruits or vegetables
10. cereal
11. breakfast bars, granola bars, protein bars

**Answer Choices:**

yes/no

**Scoring Methodology**

1. Raw data are assigned values of 1 for yes; 0 for no (\*scores are reversed for the unhealthy foods scale).
2. Items on each scale are averaged to create the scale score; higher score indicates greater accessibility of healthy food or unhealthy food.

**FEEDING ASPECTS OF THE HOME ENVIRONMENT**

These questionnaires assess parent feeding practices, modeling of food behavior, and concern about weight. It also assesses family meal frequency, importance to parents, and environment, as well as meal preparation and planning responsibilities and barriers of families with young children. These instruments were modified from existing, validated instruments to shorten them and reduce participant burden.

### **Part A: Parent Feeding Practices**

These items were adapted from the Caregiver's Feeding Styles Questionnaire,<sup>255,257</sup> Parental Feeding Style Questionnaire,<sup>275</sup> Project EAT survey,<sup>343,345,615</sup> FEEDS survey,<sup>294</sup> Physical and Nutritional Home Environment Inventory,<sup>86</sup> measures of overt and covert control,<sup>279</sup> Home Environment Survey,<sup>10</sup> Child Feeding Questionnaire,<sup>4</sup> and Parent Dietary Modeling Scale.<sup>306</sup> They are designed to assess how parents use **rewards, overt and covert control, pressure** and **restriction** child feeding practices.

#### **Rewards**<sup>255,257,275</sup>

The goal of this scale is to determine whether parents use rewards (foods or non-food) as a strategy to get children to eat. The items are slightly modified from the Caregiver's Feeding Styles Questionnaire,<sup>255,257</sup> and Parental Feeding Style Questionnaire.<sup>275</sup>

#### **How often does this describe you?**

1. I promise my child something other than food if the child eats (for example, "If you eat your peas, we can play ball after dinner").<sup>255,257</sup> **P**
2. I warn my child that I will take away something other than food if the child does not eat (for example, "If you do not eat your meat, there will be no TV time after dinner").<sup>255,257</sup> **R**
3. I warn my child that I will take away a food if the child does not eat (for example, "If you do not eat your vegetables, you will not get dessert").<sup>255,257</sup> **R**
4. I encourage my child to eat something by using food as a reward (for example, "If you finish your vegetables, you will get dessert").<sup>255,257</sup> **P**
5. If my child misbehaves, I do not let the child have a favorite food.<sup>275</sup> **R**
6. I reward my child with something to eat when the child is well behaved.<sup>275</sup>

#### Answer Choices

Never, rarely, sometimes, most of the time, always

#### Scoring Methodology

1. Raw data are scored based on responses: never=1, rarely=2, sometimes=3, most of the time=4, always =5
2. Items in the scale are averaged to create the scale score; higher score indicates **more frequent use of rewards for eating and behaving**.
3. Items 3 to 6 assess whether food is used as a reward whereas items 1 and 2 evaluate whether a non-food reward is used.

#### **Pressure**

This scale aims to determine whether parents use pressure as a strategy for getting children to eat. These items are based on the Caregiver's Feeding Styles Questionnaire,<sup>255,257</sup> Home Environment Inventory,<sup>86</sup> and the Child Feeding Questionnaire.<sup>285</sup> Note that item 1 is taken directly from an original scale,<sup>285</sup> items 2-4 were created *de novo*, and item 5 is modified from an existing measure.<sup>86</sup>

**How much do you agree with these statements?**

1. My child should always eat everything on the child's plate.<sup>285</sup>
2. I really have to pressure my child to eat vegetables.
3. I really have to pressure my child to eat fruit.
4. I really have to pressure my child to drink milk.
5. My family knows that I do **not** like it when food is not eaten and goes to waste.<sup>86</sup>

***Restriction***

This scale aims to determine whether parents use restriction as a strategy for getting children to eat. These items are based on the Parent Feeding Style Questionnaire,<sup>275</sup> an Over/Covert Control Scale,<sup>279</sup> The Parent Dietary Modeling Scale,<sup>306</sup> the Caregiver Feeding Styles Questionnaire,<sup>255,257</sup> and the Physical and Nutritional Home Environment Survey.<sup>86</sup> Note that item 1 is taken directly from an original scale,<sup>306</sup> item 2 is modified from an existing measure,<sup>86</sup> and items 3 and 4 were created *de novo*.

1. I set rules for my child about the amount of fruits and vegetables they have to eat.<sup>306</sup>
2. I do **not** let my child have second helpings.<sup>86</sup>
3. I have to make sure my child does not eat too many sweets, like cookies and soda.
4. I have to make sure my child does not eat too many snacks, like potato chips.

Answer Choices

Strongly disagree, disagree, neither, agree, strongly agree.

Scoring Methodology

1. Raw data are assigned values of 1-5 based on the response: strongly disagree=1, disagree=2, neither agree nor disagree=3, agree=4, strongly agree=5.
2. The Restriction scale includes 8 items total, 3 located here, and 5 others marked with "R" in the Rewards and Control Scales.
3. The Pressure scale includes 7 items total, 5 located here, and 2 others marked with "P" in the Rewards scale.
4. Items in the scale are averaged to create the scale score; higher score indicates more frequency of **pressure or restriction over child's eating**.

***Parent Control of Intake***

This scale's purpose is to determine the degree to which parents or children control the foods eaten by the child and the amount eaten. In addition, it differentiates between the type of control parents use (i.e., overt measures that are obvious to the child vs. covert). It is based on a variety of questionnaires including the Caregiver's Feeding Styles Questionnaire,<sup>255,257</sup> Parental Feeding Style Questionnaire,<sup>275</sup> Project EAT survey,<sup>343,345,615</sup> FEEDS survey,<sup>294</sup> Physical and Nutritional Home Environment Inventory,<sup>86</sup> measures of overt and covert control,<sup>279</sup> Home Environment Survey,<sup>10</sup> and the Child Feeding Questionnaire.<sup>285</sup> Note items 3, 9, and 10 were modified from existing surveys,<sup>275,279,285</sup> and all others are taken directly from the original validated and refined questionnaires.

**Overt Control (items 1 to 8)****Who Chooses Foods Eaten Decisions**

1. I let my child choose which foods to eat for dinner from foods already prepared.<sup>255,257</sup>
2. If my child doesn't like the foods served, I make the child something else to eat.  
<sup>343,345,615 \*</sup>
3. I decide what my child eats for snacks between meals.<sup>275</sup>

**Who Decides When to Eat**

1. I let my child decide when to have meals.<sup>275 \*</sup>
2. I decide when it is time for my child to have a snack.<sup>275</sup>

**Who Decides Amount to Eat**

1. I allow my child to decide when she or he has had enough snacks to eat.<sup>275 \*</sup>
2. I decide the amounts of food that my child eats at meals.<sup>294</sup>

**Covert Control (items 9 to 12)**

1. I avoid buying foods that I do not want my child to eat, like cookies, candy, and soda.<sup>279</sup>
2. I keep foods that I want my child to eat in places that are easy to see and reach.<sup>279</sup>
3. I keep food I want my child to not eat, like soda and cookies, in places the child cannot see or reach them.

**Answer Choices**

Strongly disagree, disagree, neither, agree, strongly agree

**Scoring Methodology**

1. Raw data are assigned values of 1-5 based on the response: strongly disagree=1, disagree=2, neither agree nor disagree=3, agree=4, strongly agree=5. Scoring is reversed for items marked with an asterisk (\*).
2. Items in the scale are averaged to create the scale score; higher score indicates more frequency of **parent control over child's eating**.
3. Scoring is based on best practices (i.e., Satter recommendations. These recommendations are ONLY for ages 3 and up, cannot use with 2 year olds.<sup>772</sup>)
4. Items #1-7 may be considered "**Overt Control**", and "**Covert Control**" is assessed in items #8-10. Individual subscale scores can be computed to determine if overt control varies with which foods are eaten, when food is eaten, amount eaten, and concerns about amount eating.

**Part B: Modeling Food Behavior**

These items were adapted from the Parental Feeding Style Questionnaire<sup>275</sup> and the Home Environment Survey,<sup>10</sup> and measures of overt and covert control.<sup>279</sup> They are designed to assess how parents overtly model healthy eating behaviors in front of their children. Note that items 1-4 are taken directly from the original surveys and items 5-8 have been modified to generalize them to any eating (not just a snack or meal) and include specific examples of healthy and unhealthy foods.

How much do you agree with this statement?

1. I eat food I want my child to eat.<sup>306</sup>
2. I show my child I enjoy healthy foods, like fruits and vegetables, so he or she will try them.<sup>306</sup>
3. I encourage my child to eat lots of different kinds of foods.<sup>275</sup>
4. I encourage my child to taste each of the foods I serve at mealtimes.<sup>275</sup>
5. My child learns to eat healthy foods from me.<sup>306</sup>
6. My child sees me eating junk foods.<sup>306\*</sup>
7. I praise my child if she or he eats a new healthy food, like fruits or vegetables.<sup>275</sup>
8. When my child is around, I try not to eat unhealthy foods, like cookies and soda.<sup>279</sup>

#### Answer Choices

Strongly disagree, disagree, neither, agree, strongly agree

#### Scoring Methodology

1. Raw data are assigned values of 1-5 based on the response: strongly disagree=1, disagree=2, neither agree nor disagree=3, agree=4, strongly agree=5. Scoring is reversed for items marked with an asterisk (\*).
2. Items are averaged to create the scale score; higher score indicates a **more OVERT parental modeling of healthy eating behaviors.**

#### Part C: Concern About Weight

Concern about weight is assessed using parent concern about a child's weight. These items were adapted from the Child Feeding Questionnaire,<sup>285</sup> and are designed to assess parental concern about a child's weight. Item #4 is taken directly from another study which used the item to assess parent's opinion if a chubby baby is healthy or not.<sup>301</sup> Item 5 was created *de novo* to assess parent's perception of healthfulness of child being overweight.

#### *Concern about child weight*<sup>285</sup>

1. I am concerned that my child will become overweight.<sup>285</sup>
2. I am concerned that my child will have to diet to keep weight under control.<sup>285</sup>
3. I do not worry that my child will weigh too much.\*

#### *Overweight Healthfulness*

1. A chubby baby is a healthy baby.\*<sup>301</sup>
2. It's healthy for young kids to be chubby.\*

#### Answer Choices

Strongly disagree, disagree, neither, agree, strongly agree

#### Scoring Methodology

1. Raw data are assigned values of 1-5 based on the response: strongly disagree=1, disagree=2, neither agree nor disagree=3, agree=4, strongly agree=5. Scoring is reversed for items marked with an asterisk (\*).
2. Items 1-3 in the scale are summed and averaged to create the scale score; higher score indicates **more concern about child's weight**.
3. Items 4 and 5 are summed and averaged to create the scale score; higher score indicates a parent believes **having a chubby baby or young child is a healthier one**.

#### **Part D: Family Meal Frequency**

These items were adapted from the NEP Family Meal Time Questionnaire<sup>314</sup> to assess frequency of family meals. The items have been only slightly modified from the original items (although not validated).

##### ***Family Meals Frequency***<sup>314</sup>

1. How many times each week do most household members eat breakfast together? <sup>314</sup>
2. How many times each week do most household members eat lunch together? <sup>314</sup>
3. How many times each week do most household members eat dinner together? <sup>314</sup>

##### **Answer Choices**

Almost never, 1-2 times per week, 3-4 times per week, 5-6 times per week, every day

##### **Scoring Methodology**

1. Raw data are assigned values of 1-5 based on the response: almost never =1, 1-2 times per week =2, 3-4 times per week = 3, 5-6 times per week = 4, every day =5.
2. Items may be summed to assess weekly frequency of family meals and used individually to determine weekly frequency each meal is eaten as a family.

#### **Part E: Importance Placed on Family Meal**

Items #1 and #2 were adapted from the Project EAT survey<sup>343,345,615</sup> to assess parental values (importance) placed on having family meals frequently, and on having calm, happy mealtimes. Note that item 3 is newly created.

1. It is important that my family eat meals together often.<sup>343,345,615</sup>
2. We are just too busy to eat dinner together.<sup>343,345,615\*</sup>
3. Eating together as a family is not worth the effort.\*

##### **Answer Choices**

Strongly disagree, disagree, neither agree nor disagree, agree, strongly agree

##### **Scoring Methodology**

1. Raw data are assigned values of 1-5 based on the response: strongly disagree=1, disagree=2, neither agree nor disagree=3, agree=4, strongly agree=5. Scoring is reversed for items marked with an asterisk (\*).
2. Items are averaged to create the scale score; higher score indicates a higher value placed on importance of family meals.



### **Part F: Family Meal Environment**

These items are adapted from the Project EAT survey,<sup>343,345,615</sup> the Physical and Nutritional Home Environment Inventory,<sup>86</sup> the Healthy Home Survey,<sup>129</sup> About Your Child's Eating,<sup>352</sup> and the Physical and Nutritional Home Environment Inventory<sup>86</sup> surveys to assess if the family meal environment is positive and the healthfulness of the meal environment. Note that items #1 and #6 are from the original Project EAT survey.<sup>343,345,615</sup> Items #3-5 were created *de novo* for this survey; all others were heavily modified from existing surveys.<sup>4-6,8,15</sup>

#### ***Family Meals Atmosphere***

1. I enjoy eating meals with my family.<sup>343,345,615</sup>
2. Meals with my family are a usually stressful.<sup>86\*</sup>
3. There are lots of arguments during family meals. \*
4. Mealtimes with my family are not much fun. \*
5. It is important to have calm, happy mealtimes together.

#### ***Meal Environment: Where meals are typically eaten***

1. We often have family meals at fast food restaurants like McDonalds or Burger King.<sup>343,345,615</sup>
2. We often eat meals in front of the TV.
3. We rarely eat meals at the kitchen or dining room table.<sup>86,129,343,345,615</sup>
4. We are so busy, we usually eat in the car.

#### **Answer Choices**

Items 1-4: Strongly disagree, disagree, neither agree nor disagree, agree, strongly agree

#### **Scoring Methodology**

1. Raw data are assigned values of 1-5 based on the response: strongly disagree=1, disagree=2, neither agree nor disagree=3, agree=4, strongly agree=5. Scoring is reversed for items marked with an asterisk (\*).
2. Items 1-5 are averaged to create the scale score; higher score indicates parent perceives a **positive family meal environment**.
3. Items 6-9 may be summed and averaged to assess weekly **healthfulness of family meal environment (based on best practices<sup>308</sup>)**

### **Part G: Meal Preparation and Planning Responsibilities and Barriers**

#### ***Meal Preparation Responsibilities***

These items are adapted from the Project Eat Survey<sup>316,346</sup> to assess meal preparation responsibilities and involvement of children. Items 1 to 3 will be used to screen participants to ensure the participant is the primary family food gatekeeper. Items 4 and 5 were created *de novo*.

1. Who in the family has the major responsibility for deciding what foods to serve at family meals?<sup>316,346</sup>

2. Who usually does the grocery shopping in your family?<sup>316,346</sup>
3. Who usually prepares family meals?<sup>316,346</sup>
4. I often let my child help grocery shop.
5. I do not allow my child to help me prepare family meals.\*

#### Answer Choices

Items 1-3: me, my partner/spouse, someone else (please specify)

Items 4-6: Strongly disagree, disagree, neither agree nor disagree, agree, strongly agree

#### Scoring Methodology

1. Items 1-3 are to determine responsibilities.
2. Items 4-5: raw data are assigned values of 1-5 based on the response: strongly disagree=1, disagree=2, neither agree nor disagree=3, agree=4, strongly agree=5. Scoring is reversed for items marked with an asterisk (\*).
3. Scores are summed and averaged; **a higher score indicates child is more involved in family meal responsibilities.**

#### ***Barriers to Meal Planning and Preparation***

Time and energy barriers to meal planning are adapted from a measure of time scarcity and parent fatigue as barriers to meal planning and preparation.<sup>355</sup> The top 6 items using factor analysis from 9 original items are adapted here.<sup>355</sup>

#### Time and energy barriers to planning and prep meals:

1. I do not have enough time or energy to feed my children “right”.
2. I do not have enough time or energy to cook meals for my children.
3. I find time to cook meals for my children even when I am busy or tired.\*

#### Meal planning

1. I plan meals for my children at least 1 day in advance.\*
2. I plan meals for my children ahead of time when I know I am going to be busy.\*
3. I “go with the flow” and do not plan meals for my children or family.

#### Answer Choices

Strongly disagree, disagree, neither agree nor disagree, agree, strongly agree

#### Scoring Methodology

1. Raw data are assigned values of 1-5 based on the response: strongly disagree=1, disagree=2, neither agree nor disagree=3, agree=4, strongly agree=5. Scoring is reversed for items marked with an asterisk (\*).
2. Items 1-3 are averaged to create the scale score; **higher score indicates parent perceives more barriers and less time to meal plan.**
3. Items 4-6 are averaged to create the scale score; **higher scores indicate less meal planning.**

## **MATERNAL PSYCHOGRAPHICS**

This questionnaire assesses weight- and health-related psychographics of mothers of young children, including: parent eating styles, perceived weights of self and child, maternal history of disordered eating, body dissatisfaction, perceived teasing of the child and self, maternal depression, maternal stress, maternal social support, perceived health status and family/household functioning, and need for cognition. It was modified from existing, validated instruments to shorten it and reduce participant burden.

### **Part A: Parent Eating Styles**

The dimensions of parent eating styles to be assessed include disinhibited eating, emotional eating, dietary restraint, and food adventurousness. The Three-Factor Eating Questionnaire<sup>359</sup> assesses disinhibited eating, emotional eating, and restraint. The scales used here have been shortened based on factor analysis and previous research.<sup>359,361,608</sup> The 1-item Food Adventurousness scale<sup>609</sup> was enhanced from 1 item to 3 by adding the highest loading items from the Food Neophobia Scale.<sup>489,610</sup> This enhancement will permit the calculation of an internal consistency reliability coefficient.

#### ***Disinhibited Eating***<sup>359,361</sup>

Disinhibited eating assesses temporary loss of control over eating behaviors.

1. Sometimes when I start eating, I just can't seem to stop.
2. I am always hungry enough to eat at any time.
3. I am always hungry, so it is hard for me to stop eating before I finish the food on my plate.

#### ***Emotional Eating***<sup>359,361</sup>

Emotional eating assesses how emotions influence urge to eat or overeating.

1. When I feel lonely, I console myself by eating.
2. When I feel blue, I often overeat.
3. When I feel anxious, I find myself eating.

#### ***Dietary Restraint***<sup>359,361,608</sup>

Dietary restraint assesses intention of individuals to restrict or regulate food intake to prevent weight gain.

1. I deliberately take small helpings as a means of controlling my weight.
2. I consciously hold back at meals in order not to gain weight.
3. I do not eat some foods because they make me fat.
4. I avoid "stocking up" on tempting foods.

#### ***Food Adventurousness***<sup>489,609,610</sup>

Food adventurousness may be considered the opposite of food neophobia, and assesses acceptance of new or unfamiliar foods.

1. I often try unfamiliar foods.<sup>609</sup>
2. I don't trust new foods.<sup>489,610 \*</sup>
3. I am afraid to eat things I have never eaten before.<sup>489,610 \*</sup>

#### Answer Choices

Definitely false, mostly false, mostly true, definitely true

#### Scoring Methodology

1. Raw data are assigned values of 1-4 based on the response; definitely false =1, mostly false = 2, mostly true = 3, definitely true = 4.
2. Items in the scale are averaged to create the scale score; higher scores indicate **more disinhibited eating, emotional eating, and dietary restraint, and food adventurousness.**

### **Part B: Perceived Weights and Teasing**

The dimensions of perceived weights and related teasing include parent perception of her own and the child's weight, and maternal perceptions of her child being teased and herself being teased as a child. The weight perception items are adapted from the Child Feeding Questionnaire.<sup>285</sup> The originals were modified to include specific ages instead of ranges and has been used in previous research.<sup>8</sup> Maternal perception of her child being teased is an unmodified question from a survey of child teasing,<sup>386</sup> with a *de novo* open-ended response item to assess teasing reasons. Maternal perceptions of teasing in her childhood are original items from the Perceptions of Teasing Scale<sup>611</sup> to assess frequency of teasing and effect on the mother (i.e., how upset she was).

#### ***Perceived Weight of Parent***<sup>285,362</sup>

1. How would you describe your weight when you were in 1<sup>st</sup> grade?
2. How would you describe your weight when you were in 6<sup>th</sup> grade?
3. How would you describe your weight in 10<sup>th</sup> grade?
4. How would you describe your weight around age 20?
5. How would you describe your weight now?

#### Answer Choices

Very thin, Thin, Average, Slightly Heavy, Overweight

#### Scoring Methodology

1. Raw data are assigned score 1-5: very thin=1, thin=2, average =3, slightly heavy=4, overweight=5.
2. Items are summed and averaged to create the scale score; higher score indicates a parent view of being more overweight.

#### ***Perceived child Weight***<sup>285,362</sup>

1. How would you describe your child's weight before they were 1 year old?
2. How would you describe your child's weight between age 1 and 2?
3. How would you describe your child's weight between age 3 and 5?

Answer Choices

Very thin, Thin, Average, Slightly Heavy, Overweight, (Not applicable)

Scoring Methodology

1. Raw data are assigned score 1-5: very thin=1, thin=2, average =3, slightly heavy=4, overweight=5.
2. Items are summed and averaged to create the scale score; higher score indicates a parent view of child being heavier.

***Maternal Perception of Child Teasing***<sup>386</sup>

1. Do others tease, joke, or make fun of your child?
2. Why do you think others tease, joke, or make fun of your child?

Answer Choices

Item #1; Yes or No

Item #2; Open-ended

Scoring Methodology

1. Item #1 is scored as yes or no to assess whether parent thinks child is teased.
2. Item #2 can be coded using qualitative content analysis methods to determine why children are usually teased (e.g., weight)

***Maternal Perception of Teasing in Her Childhood***<sup>611</sup>

1. When you were between the ages of 5 and 16, how often did people make fun of you because of your weight? (Never, Skip to Question 3)
2. How upset were you?
3. When you were between the ages of 5 and 16, how often did people call you names like “fatso”? (Never, Skip to Question 5)
4. How upset were you?
5. When you were between the ages of 5 and 16, how often did people laugh at you because of your weight? (Never, Skip Question 6)
6. How upset were you?

Answer Choices

Items #1, #3, #5: never, rarely, sometimes, often, very often

Items #2, #4, #6: not at all upset, a little upset, somewhat upset, very upset

Scoring Methodology

1. Items #1, #3, and #5: Raw data are assigned values of 1-5 based on the numerical response; never=1, rarely=2, sometimes=3, often=4, very often=5
2. Items #2, #4, and #6: Raw data are assigned values of 1-4 based on the numerical response; not at all upset=1, a little upset=2, somewhat upset=3, upset=4, very upset=5
3. Items #1, #3, and #5 are summed and averaged into mean scale scores for *index frequencies*. Higher scores indicate greater level of weight-related teasing as a child.
4. Items #2, #4, and #6 are summed and averaged into mean scale scores for *emotional responses*. Higher scores indicate a higher degree of being upset from those that were teased about their weight as a child.

5. Take into account those that are not teased about their weight, as participants will skip the emotional response items if they were not teased about their weight as a child.

### **Part C: Maternal Depression**

Maternal depression is assessed using the 2-item Patient Health Questionnaire-2<sup>416</sup> for depression severity with some specificity added using questions modified from the National Health Interview Survey<sup>421</sup> to determine if previously diagnosed and when. Depression, as defined by the Centers for Disease Control and Prevention, is a mental illness that can adversely affect chronic diseases, including obesity. Postpartum depression is defined as depression that occurs within the first year after having a baby. Note that these questions do not diagnose depression, just potential depression severity and previous diagnosis.

Over the last 2 weeks, how often have you been bothered by any of the following problems?

1. Little interest or pleasure in doing things
2. Feeling down, depressed, or hopeless
3. Has a doctor ever told you that you were depressed?
4. If your answer to #3 is yes, was this when you were pregnant?
5. If your answer to #3 is yes, was this in the year after your child was born?

### **Answer Choices**

Items 1-2: not at all, several days, more than half the days, nearly every day

Items 3-5: yes/no

### **Scoring Methodology**

1. Raw data are assigned values of 1-4, based on the response; not at all=1, several days=2, more than half the days=3, nearly every day=4.
2. Items 1-2 can be averaged to assess the Patient Health Questionnaire-2 score; a higher score on the scale indicates more severe depression symptoms.
3. Items 3-5 indicate yes or no that the mother has had depression.
4. Item 4-5 indicate depression that occurred post-partum.

### **Part D: Maternal Stress**<sup>427</sup>

Maternal stress is assessed using the original 4-item Perceived Stress scale<sup>427</sup> which has lower internal validity than the original 14-item scale<sup>427</sup>, but is shorter, allowing for reduced participant burden. Stress is defined as a neural-stress response network is activated in the brain, causing previous automatic habits to be used instead of a more thoughtful approach and response to the situation.<sup>422</sup>

In the last month,

1. How often have you felt that you were unable to control the important things in your life?

2. How often have you felt confident about your ability to handle your personal problems?\*
3. How often have you felt that things were going your way?\*
4. How often have you felt difficulties were piling up so high that you could not overcome them?

#### Answer Choices

Never, almost never, sometimes, fairly often, very often

#### Scoring Methodology

1. Raw data are assigned values 1-5 based on the responses: 1= never, 2= almost never, 3= sometimes, 4= fairly often, 5=very often; items marked with an asterisk (\*) are reverse scored.
2. Items 1-4 can be averaged to assess the scale score, with a higher score indicating that the mother **feels higher stress**.

### **Part E: Maternal Social Support**

Maternal social support for healthy eating and participating in physical activity are adapted from two surveys of social support and sabotage by Sallis, Trost, and Ball,<sup>70,139,440</sup> with modifications to answer choices recommended by other researchers.<sup>436</sup>

Social support is intended to be helpful and includes expressions of empathy, providing of advice, suggestions and information.<sup>433</sup> Providing of social support is assessed with questions that mirror the receipt of social support and sabotage behaviors with other family members. The providing social support items are newly created and will undergo expert review, cognitive testing, and pilot testing to assess validity and reliability.

During the past month, how often has your family

#### ***Social Support-Healthy Eating***<sup>70,139,440</sup>

1. Eaten healthy foods with you.
2. Complained about eating healthy foods with you.\*
3. Offered you unhealthy foods\*
4. Eaten unhealthy foods in front of you.\*
5. Reminded you to eat healthy foods.

#### ***Social Support- Physical Activity***<sup>440</sup>

1. Participated in physical activity with you.
2. Complained about participating in physical activity with you.\*
3. Suggested we do things that are physically inactive, like watching TV.\*
4. Spent time being physically inactive around you.\*
5. Reminded me to be physically active.

During the past month, how often have you

#### ***Providing Social Support-Healthy Eating***<sup>70,139,440</sup>

1. Eaten healthy foods with your family
2. Complained about eating healthy foods to your family.\*
3. Offered unhealthy foods to your family.\*
4. Eaten unhealthy foods in front of your family.\*
5. Reminded your family to eat healthy foods.

***Providing Social Support- Physical Activity***<sup>440</sup>

1. Participated in physical activity with your family.
2. Complained about participating in physical activity to your family.\*
3. Suggested your family do things that are physically inactive, like watching TV.\*
4. Spent time being physically inactive around my family.\*
5. Reminded your family to be physically active.

Answer Choices

Almost never, rarely, sometimes, often, almost always

Scoring Methodology

1. Raw items are scored 1-5 based on responses: 1=almost never, 2=rarely, 3=sometimes, 4=often, 5=almost always. Items marked with an asterisk (\*) are reverse scored.
2. Items 1-10 can be averaged to obtain scale score; a **higher score on the scale indicates more family support for physical activity and eating healthy.**
3. Items 1-5 can be averaged to obtain scale score; a **higher score on the scale indicates more family support for eating healthy.**
4. Items 5-10 can be averaged to obtain scale score; a higher score on the scale **indicates more family support for physical activity.**
5. Items marked with an asterisk can be averaged to obtain a scale score for sabotage; a **lower score indicates more sabotage for physical activity and healthy eating.**

**Part F: Perceived Quality of Life/Health Status and Body Satisfaction**

Perceived quality of life, health status, and body satisfaction are operationalized using 3 original items from the Center for Disease Control and Prevention's Health-Related Quality of Life questionnaire.<sup>773,774</sup> and 1 item from the Eating Disorder Examination Questionnaire.<sup>604</sup>

***Health-Related Quality of Life***<sup>773,774</sup>

Health-related quality of life is a person's subjective assessment of his/her own physical and mental health.<sup>774</sup>

How would you rate your general health?

1. Think about your physical health, which includes physical illness and injury. How many days during the past 30 days was your physical health not good?
2. Think about your mental health, which includes stress, depression, and problems with emotions. How many days during the past 30 days was your mental health not good?
3. During the past 30 days, about how many days did poor physical or mental health keep you from doing your usual activities, such as self-care, work, or recreation?



Answer Choices

Item 1: excellent, very good, good, fair, poor

Items 2-4: # number of days, none, don't know-not sure

Scoring Methodology:

Item 1 can be used to assess self-identified health status.

Items 2-4 can be summed and averaged to obtain perceived physical and mental health status score, a **lower score indicates better physical and mental health status**.

***Body Satisfaction***<sup>604</sup>

Body satisfaction is a measure of an individual's contentment with his or her body shape.<sup>453</sup>

1. During the past 28 days, how dissatisfied have you been with your shape?

Answer Choices

0=not at all, 1, 2=slightly, 3, 4=moderately, 5, 6= a lot.

Scoring Methodology

1. 0=not at all, 1, 2=slightly, 3, 4=moderately, 5, 6= a lot.
2. Higher score indicates **greater body dissatisfaction**.

**Part G: Perceived Family Functioning**

Perceived family functioning is assessed with measures of household organization, and family conflict and cohesion. Household organizations items are adapted from the Confusion, Hubbub, Order, and Chaos<sup>465</sup> and the Household Chaos<sup>479</sup> Scales. These items have not been modified from their original format, but the scales have been combined and shortened. Conflict and cohesion items are original items from the Family Environment survey,<sup>470,471</sup> which has been shortened to reduce participant burden.

***Household Organization***<sup>465,479</sup>

Household organization is a measure of organization and use of routines in a home.

1. We can usually find things when we need them\*
2. We almost always seem to be rushed
3. We are usually able to stay on top of things
4. It's a real zoo in our home
5. No matter what our family plans, it usually doesn't seem to work out
6. You can't hear yourself think in our home

***Family Conflict and Cohesion***<sup>470,471</sup>

Conflict and cohesion measures how well a family "gets along."

1. We fight a lot in our family.
2. Family members often criticize each other.
3. Family members really help and support one another.

4. There is a feeling of togetherness in our family.
5. We really get along well with each other.

Answer Choices

Definitely untrue, untrue, not sure, true, definitely true

Scoring Methodology:

1. Raw data are assigned values 1-5 based on responses: 1=definitely untrue, 5=definitely true. Items marked with an asterisk (\*) are reverse coded.
2. Items can be summed and averaged to create a scale score; a **higher score indicates higher amount of chaos, disorganization and hurriedness in the home.**
3. Items in the family conflict and cohesion sub-scale can be summed and averaged to create a scale score; a **higher score indicates higher family conflict, a lower score indicates higher family cohesion.**

Part H: Need for Cognition<sup>481,482</sup>

The Need for Cognition scale includes the original 5-items that have been previously validated and tested.<sup>481,482</sup> Need for cognition measures an individual's desire to engage in "effortful cognitive activities"<sup>28,29</sup> and desire to have more intellectual engagement.

1. I like solving complex problems instead of simple problems.
2. I like dealing with situations that require a lot of thinking.
3. Thinking is not my idea of fun.\*
4. I like doing things that really make me think more than doing things that do not make me have to think.
5. I feel relief instead of satisfaction after finishing a task that required a lot of thinking.\*

Answer Choices

Strongly disagree, disagree, neither agree nor disagree, agree, strongly agree

Scoring Methodology

1. 1= strongly disagree, 2= disagree, 3= neither agree nor disagree, 4= agree, 5= strongly agree. Items marked with an asterisk (\*) are reverse coded.
2. Items 1-5 can be summed and averaged to create a scale score; a **higher score indicates a higher need for cognition.**

## CHILD PSYCHOGRAPHICS

This questionnaire assesses psychographics associated with weight- and health-related behaviors of children aged 2- to 5-years old as reported by their parents, including: child eating behaviors (fussiness, emotional eating, food responsiveness, satiety responsiveness) and child temperament. It was modified from existing, validated instruments to shorten it and reduce participant burden.

### **Part A: Child Eating Styles**

Preschool child eating styles are assessed using scales of fussiness, emotional eating, and food responsiveness/self-regulation. The 35-item Children's Eating Behavior Questionnaire<sup>504</sup> was adapted to include items with the highest factor loadings for constructs of fussiness, emotional eating, and food responsiveness. Two items from the 8-item Self-Regulation in Feeding questionnaire<sup>502</sup> were also included, with one modified slightly to focus on general eating behaviors.

#### ***Fussiness (food adventurousness/neophobia)***

Fussiness or picky eating/food neophobia assesses a child's acceptance of new or unfamiliar foods.

Please tell us about your child

1. My child enjoys tasting new foods.
2. My child refuses new foods at first.
3. My child is interested in tasting food the child hasn't tasted before.
4. My child refuses new foods at first.

#### ***Child Emotional Eating***

Emotional eating assesses how a child's emotions influence urge to eat or overeating.

1. My child eats less when feeling upset.
2. My child eats more when feeling nervous.
3. My child eats more when feeling worried.

#### ***Food Responsiveness/Self-Regulation*<sup>502,504</sup>**

Food responsiveness/self-regulation evaluates how well a parent perceives a child can responds to satiety signals to regulate eating.

1. Given the chance, my child would eat most of the time.\*
2. If I allowed it, my child would eat too much.\*
3. My child stops eating when he or she is full.
4. My child will not eat if he or she is full.\*

#### **Answer Choices**

Never, seldom, half of the time, most of the time, always

#### **Scoring Methodology**

1. Raw data are assigned values based on responses: 1 = never; 2 = seldom; 3 = half of the time; 4 = most of the time; 5 = always
2. Items 1-4: Mean scores are computed by summing and averaging recoded items from the sub-scale with a higher score indicating **more food-related fussiness**.
3. Items 6-10: items are averaged to create the sub-scale score; higher score indicates parent perceives child to be an **emotional eater**.
4. Items 11-12: items are averaged to create the sub-scale score; higher score indicates parent perceives child to have more **food responsiveness/self-regulation**.

### **PART B: Child Temperament**

Child temperament is assessed using the EAS Temperament Survey,<sup>500,501,775</sup> specifically items from the Emotionality sub-scale. Items were adapted based on factor analysis.<sup>775</sup> Emotionality of a child assesses the emotional temperament of a child.

#### **Please tell us about your child**

1. My child tends to be somewhat emotional.
2. My child often fusses and cries.
3. My child gets upset easily.

#### Answer Choices

Not at all like my child, like my child, somewhat like my child, like my child, very much like my child.

#### Scoring Methodology

1. Raw data are assigned values of 1-5: 1= not at all like my child, 5= very much like my child.
2. Items are summed and averaged from responses to create a scale score with higher scores indicating more **emotionality characteristic of the child**.

## **SOCIAL COGNITIVE THEORY**

This questionnaire assesses constructs of the Social Cognitive Theory among mothers of young children, including self-efficacy and outcome expectations and expectancies for preventing weight gain, eating healthy, and being physically active. It was modified from existing, validated instruments to shorten it and reduce participant burden

### **Scale 1: Self-Efficacy**

We could set it up this way based on previous surveys, or we could ask questions like these to get at each lesson: (I like this idea)

Be sure that your child gets enough active play time each day?

Be sure that your child doesn't spend too much time in front of screens?

Be sure that your child eats enough fruits and vegetables?

Be sure that your child eats portion sizes that are just right?

(Have a question that goes with each of the 12 lessons??)

How confident are you that you could do the following?

#### ***Preventing Weight Gain- self efficacy***<sup>440</sup>

1. Avoid putting on any extra weight over the next year?
2. Avoid putting on any extra weight over the next five years?
3. Help your child avoid weight gain?

#### ***Eating Healthy- self efficacy***<sup>440</sup>

1. Shop regularly for healthy nutritious foods over the next year?
2. Prepare/cook healthy nutritious meals regularly over the next year?
3. Stick to eating healthy nutritious food over the next year?

#### ***Physically Active-self efficacy***<sup>440</sup>

1. Exercise for 30 minutes most days of the week, for the next year?
2. Play organized sport regularly for the next year?
3. Go to the gym regularly for the next year?
4. Go for a walk for exercise regularly for the next year?

### **Answer Choices**

Not at all confident =1, not confident = 2, quite confident = 3, very confident =4

### **Scoring Methodology**

Items in the scale are averaged to create the scale score; higher scores indicate **more self-efficacy**. Self-efficacy for each behavior can also be determined.

## **Scale 2: Outcome Expectations and Expectancies**

### ***Preventing Weight Gain- outcome expectations/expectancies***<sup>440</sup>

Thinking about what has happened to your weight over the past 2 years, do you agree with the following statements?

1. I must do physical activity and eat a healthy diet to prevent weight gain
2. I must cut out fat in my diet to prevent weight gain
3. Walking 30 min/day would prevent me gaining weight

***Eating Healthy -outcome expectations/expectancies<sup>290</sup>***

Eating healthier foods will help me...

1. Feel less depressed.
2. Feel less anxious or tense.
3. Have more energy.
4. Lose weight.
5. Improve my appearance.
6. Be happier.
7. Feel better.
8. Improve my health.

***Physically Active- outcome expectations/expectancies<sup>290</sup>***

Increasing my level of physical activity will help me...

1. feel less depressed
2. feel less bored
3. meet new people
4. improve my fitness level
5. give me more energy
6. lose weight
7. improve my appearance
8. feel calmer
9. improve my health
10. Improving my level of physical activity will help me cope with my children

**Answer Choices**

Strongly agree (5), agree (4), neither (3), disagree (2), strongly disagree (1)

**Scoring Methodology**

1. Items are averaged to create the scale score; higher score indicates higher expectations.

**APPENDIX C:**  
**Final Home Obesogenicity Measure of EnvironmentS Survey**



Thank you for your interest in helping us learn more about families. This survey takes about 60 minutes to finish. You may start and stop it at any time and return to the page that you left within 48 hours of stopping. You must return to the survey from the same computer you started it with.

Your responses are confidential and accessible to only the study researchers and the Institutional Review Board at Rutgers University, except as may be required by law. At the end of the study in 7 years, we will destroy all records associated with it. No statements will be made that could link you to the study. Participation is voluntary, free of charge, and poses minimal risk. You may stop participating at any time.

Those who complete the survey will receive 300 points.

If you have any questions, contact Carol Byrd-Bredbenner at 732-932-2382 or [bredbenner@aesop.rutgers.edu](mailto:bredbenner@aesop.rutgers.edu). If you have any questions about your rights as a survey participant, contact Rutgers Institutional Review Board Administrator at 848-932-0150 or [humansubjects@orsp.rutgers.edu](mailto:humansubjects@orsp.rutgers.edu).

If you agree to participate in this study, click "I Agree".

- ☐ I agree  
☐ I disagree

This survey will help us learn  
more about families.

As you complete it, please remember

- there are no right or wrong answers
- all of your answers are confidential



CONTINUE



Note that the survey should be completed on a computer or tablet as it may be difficult to read on a smart phone.

To complete this survey, you will need a tape measure (any type **except** metal will do). Please get your measuring tape before proceeding. If you do not have a tape measure, you can download and print one to make with scissors and tape later in the survey.

When you have the tape measure, click Continue.



CONTINUE



	0 days	1 day	2 days	3 days	4 days	5 days	6 days	7 days
In the past <b>week</b> , how many days did you walk for at least 10 minutes at a time?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the past <b>week</b> , how many days did you do <b>moderate</b> physical activity? <i>Moderate physical activity includes things like bicycling at regular speed, sweeping, vacuuming the floor, raking leaves, or washing windows.</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the past <b>week</b> , how many days did you do <b>heavy</b> physical activity? <i>Heavy physical activity includes things like running, fast bicycling, aerobics, digging, or chopping wood.</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the past <b>week</b> , about how much time <b>each day</b> did you watch TV or movies, play games on computers or smart phones, or send emails or text messages? (Please report both hours and minutes; for instance, if you spent 4 hours and 0 minutes watching TV and playing games on your smart phone, select 4 hours in the first box, and 0 minutes in the second box)								
Hours <input type="text"/>								
Minutes <input type="text"/>								

In the past **week**, about how much time **each day** did you usually sleep? *This may be different than the number of hours spent in bed.*  
(Please report both hours and minutes; for instance, if you spent 9 hours and 15 minutes sleeping, select 9 hours in the first box, and 15 minutes in the second box)

Hours

Minutes

Think about your sleeping during the past month.

How would you rate your sleep quality overall?

- ☐ Very good
- ☐ Good
- ☐ OK
- ☐ Bad
- ☐ Very bad

When you **run errands**, how do you usually get there?

- ☐ Car
- ☐ Bike
- ☐ Motorcycle
- ☐ Bus
- ☐ Subway
- ☐ Train
- ☐ Other, specify

How many cars, vans, or trucks does your family own?

CONTINUE



	Almost never	1 day a week	2 days a week	3 days a week	4 days a week	5 days a week	6 days a week	Every day
<p>In the last month, how often did you play actively <b>indoors</b> for <b>at least 15 minutes</b> with your preschool kids?</p> <p><i>This could be dancing, jumping, horseplay, or "wrestling".</i></p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p>In the last month, how often did you play actively <b>outdoors</b> for <b>at least 15 minutes</b> with your preschool kids?</p> <p><i>This could be going for a walk together, playing on swings, or playing games like tag.</i></p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p>In the last month, how often did your preschool kids <b>see</b> you doing <b>moderate</b> physical activity?</p> <p><i>Moderate physical activity includes things like bicycling at a regular speed, sweeping, vacuuming the floor, raking leaves, walking the dog, or washing windows.</i></p> <p>Think only about the times you did these activities for <b>at least 10 minutes</b> at a time.</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p>In the last month, how often did your preschool kids <b>see</b> you doing <b>heavy</b> physical activity?</p> <p><i>Heavy physical activity includes things like running, fast bicycling, aerobics, or digging.</i></p> <p>Think only about the times you did these activities for <b>at least 10 minutes</b> at a time.</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p>In the last month, how often did your preschool kids <b>see</b> you using computers, tablets, smart phones, or video games played sitting down for <b>more than 2 hours daily</b>?</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p>In the last month, how often did your preschool kids <b>see</b> you watching TV or movies for <b>more than 2 hours daily</b>?</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

CONTINUE

Please tell us about your family



	Almost never	1 day a week	2 days a week	3 days a week	4 days a week	5 days a week	6 days a week	Every day
How many days each week do <b>most</b> household members eat <b>breakfast</b> together?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How many days each week do <b>most</b> household members eat <b>lunch</b> together?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How many days each week do <b>most</b> household members eat <b>dinner</b> together?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How many days each week do you have <b>family meals</b> at fast food restaurants like McDonalds or Burger King?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How many days each week do you eat <b>family meals</b> in front of the TV?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How many days each week do you eat <b>family meals</b> at the kitchen or dining room table?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How many days each week does your family eat meals in the car?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

In your family, who makes **most** of the decisions about which foods to buy and serve at meals?

- ☐ Me  
☐ My partner/spouse  
☐ My kids  
☐ Someone else, please specify

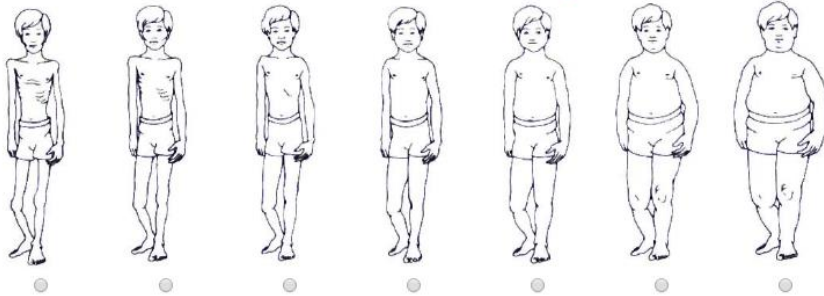
CONTINUE



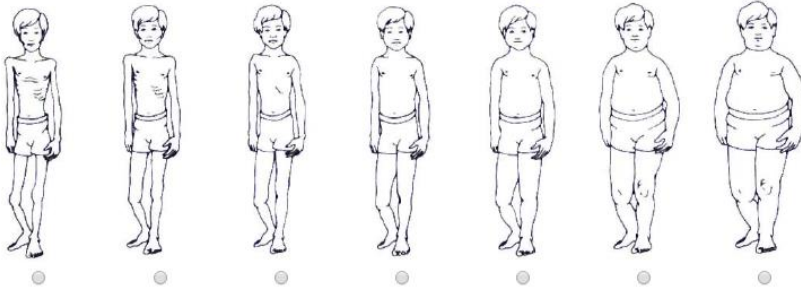
	Strongly disagree	Disagree	Neither	Agree	Strongly agree
I find time to cook meals for my children even when I am busy or tired.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Meals with my family are usually stressful.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eating together as a family is <u>not</u> worth the effort.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I enjoy eating meals with my family.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There are lots of arguments during family meals.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do <u>not</u> have enough time or energy to cook meals for my children.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We are all just too busy to eat dinner together.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I enjoy making meals.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do <u>not</u> have enough time or energy to feed my children "right".	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is important that my family eat meals together often.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A chubby baby is a healthy baby.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do not have the skills needed to prepare healthy foods.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

CONTINUE

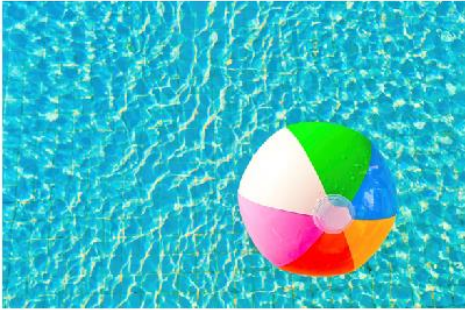
Select the **first** picture that shows a child that you think is **underweight**.



Select the **first** picture that shows a child that you think is **overweight**.



CONTINUE



	Strongly disagree	Disagree	Neither	Agree	Strongly agree
I enjoy planning for activities like vacation well ahead of time.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel sure about my parenting skills.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am often late for appointments.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I like dealing with situations that require a lot of thinking.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sometimes I am not as dependable as I should be.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I never seem to be able to get organized.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I get chores done right away.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do not worry much about the decisions I make as a parent.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Thinking is not my idea of fun.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Most chubby kids grow out of their chubbiness later in life.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Being a parent makes me tense and anxious.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

CONTINUE





*What do you think?*

	Strongly disagree	Disagree	Neither	Agree	Strongly agree
I eat foods that I want my preschool kids to eat.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do <u>not</u> let my preschool kids have second helpings.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I plan meals for my preschool kids at least 1 day in advance.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I let my preschool kids choose which foods to eat for dinner from foods already prepared.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I let my preschool kids choose which foods to eat for dinner from foods already prepared.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When my preschool kids are around, I try <u>not</u> to eat unhealthy foods like cookies and soda.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I allow my preschool kids to decide when they have had enough snacks to eat.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I plan meals for my preschool kids ahead of time when I know I am going to be busy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

CONTINUE



	Strongly disagree	Disagree	Neither	Agree	Strongly agree
My preschool kids should always eat everything on their plate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I let my preschool kids decide when to have meals.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I really have to pressure my preschool kids to eat vegetables.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I really have to pressure my preschool kids to eat fruit.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I really have to pressure my preschool kids to drink milk.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I decide when it is time for my preschool kids to have a snack.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I "go with the flow" and do not plan meals for my preschool kids or family.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My preschool kids learn to eat healthy foods from me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I keep food I do <u>not</u> want my preschool kids to eat, like soda and cookies, in places where they cannot see or reach them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

CONTINUE

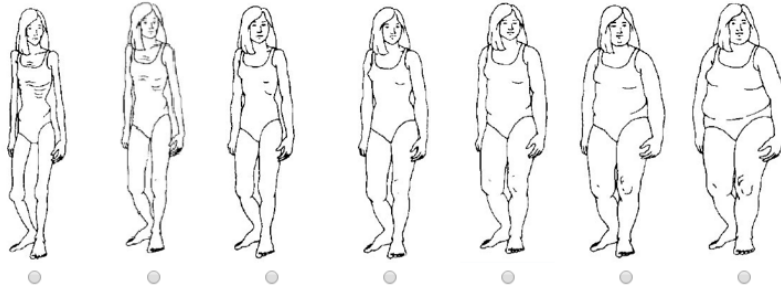
What do you think?



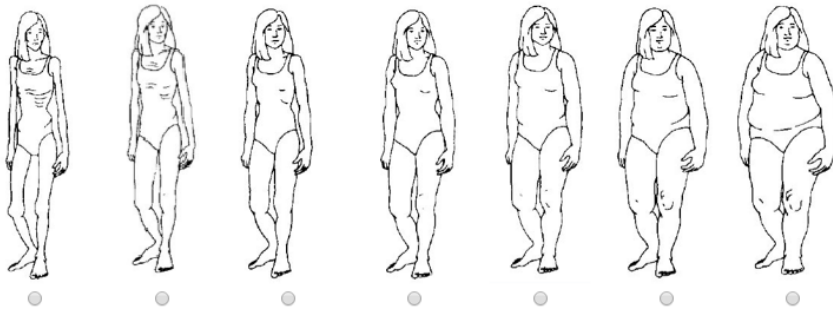
	Strongly disagree	Disagree	Neither	Agree	Strongly agree
I decide the amounts of food that my preschool kids eat at meals.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have to make sure my preschool kids do <u>not</u> eat too many salty snacks, like chips.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My family knows that I do <u>not</u> like it when food is not eaten and goes to waste.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My preschool kids see me eat junk foods.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I set rules for my preschool kids about the amount of fruits and vegetables they have to eat.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have to make sure my preschool kids do <u>not</u> eat too many sweets, like cookies and soda.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If my preschool kids do <u>not</u> like the foods served at meals, I make them something else to eat.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I decide what my preschool kids eat for snacks.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I avoid buying foods that I do <u>not</u> want my preschool kids to eat, like cookies, candy, and soda.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I keep foods that I want my preschool kids to eat in places that are easy for them to see and reach.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is healthy for young kids to be chubby.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

CONTINUE

Select the **first** picture that shows someone that you think is **underweight**.



Select the **first** picture that shows someone that you think is **overweight**.



CONTINUE

## Your Kids



*How often do you do this?*

	Never	Rarely	Sometimes	Most of the time	Always
I promise my preschool kids something <u>other</u> than food if they eat (for example, <i>If you eat your peas, we can play ball after dinner</i> ).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If my preschool kids misbehave, I do not let them have a favorite food.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
During the past month, <u>my family</u> complained about having to participate in physical activity.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I praise my preschool kids if they eat a new healthy food, like fruits or vegetables.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
During the past month, <u>my family</u> complained about having to eat healthy foods.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I talk with my preschool kids while doing chores around the house.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

CONTINUE

*How often do you do this?*

	Never	Rarely	Sometimes	Most of the time	Always
I warn my preschool kids that I will take away something <u>other</u> than food if they do not eat (for example, <i>If you do not eat your meat, there will be no TV time after dinner</i> ).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I encourage my preschool kids to eat something by using food as a reward (for example, <i>If you finish your vegetables, you will get a dessert</i> ).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
During the past month, I <u>complained</u> to my family about having to participate in physical activity.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I reward my preschool kids with something to eat when they are well behaved.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
During the past month, I <u>complained</u> to my family about having to eat healthy foods.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

CONTINUE



***In my home...***

	Strongly disagree	Disagree	Neither	Agree	Strongly agree
We can usually find things when we need them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I give my kids lots of hugs and kisses.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My family almost always seems to be rushed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It's a real zoo in our home.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
You <u>cannot</u> hear yourself think in our home.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We fight a lot in our family.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Family members often criticize each other.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Family members really help and support one another.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is a feeling of togetherness in our family.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My family really gets along well with each other.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am <u>not</u> one of those parents who is always holding and snuggling with my kids.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

CONTINUE



*Think about the things your preschool kids do to be active. This includes things that make you sweat and breathe harder than normal, like riding scooters or tricycles, running, jumping, and horseplay or "wrestling."*

**Where do you let your child play with balls, tricycles, bicycles, scooters, and other play things that help the child run around and burn off energy? (Check all that apply)**

- ☐ Inside our home
- ☐ In the yard or area right outside our home
- ☐ In the neighborhood and areas near where we live
- ☐ No where
- ☐ Other, please specify



**Now think about about your preschool kids and home.**

	Strongly disagree	Disagree	Neither	Agree	Strongly agree
My preschool kids have plenty of room to run around and burn off energy <b>inside</b> our home.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My preschool kids have siblings or friends who live nearby that they can run around and burn off energy with <b>inside</b> our home.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My preschool kids have video games that help them be <b>active</b> . <i>These are video games played standing up and require lots of moving like Wii Fit, Xbox Kinect.</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I put limits on the amount of time I allow my preschool kids to run around and burn off energy <b>inside</b> our home.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It's easy for my preschool kids to run around and burn off energy <b>inside</b> our home <u>without</u> help from adults.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Balls, tricycles, bicycles, scooters, and other play things that are used to run around and burn off energy <b>indoors</b> are stored where it is easy for my preschool kids to see and reach.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Think about all the balls, tricycles, bicycles, scooters, jump ropes, and other toys that help your child run around and burn off energy **inside** your home. How many of these does your child have?

- ☐ 0 to 4
- ☐ 5 to 10
- ☐ 11 to 15
- ☐ 16 to 20
- ☐ 21 to 25
- ☐ More than 25

Think about the areas **inside** home where your kids run around and burn off energy. How many somersaults or cartwheels could they do **in a row** without hitting furniture or walls?

CONTINUE



	Almost never	1 day a week	2 days a week	3 days a week	4 days a week	5 days a week	6 days a week	Every day
How often do your preschool kids run around and burn off energy <b>inside</b> your home?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often do your preschool kids play <b>indoors</b> with balls, tricycles, bicycles, scooters, and other play things that help the child run around and burn off energy?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often do your preschool kids run around and burn off energy <b>indoors</b> with siblings or kids who live nearby?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[CONTINUE](#)



Think about all the TVs, DVD players, computers, and smart phones in your home that work.

How many of each of these are in your home?

TV	DVD Player	Computer/Laptop	Smart Phone/Tablet/LeapPad	Video game devices played <i>standing up</i> and require lots of <i>moving</i> (like Wii Fit, XBox Kinect)	Video game devices that usually are played <i>sitting down</i> (like Nintendo DS, Playstation, XBox)
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Which of these do you allow your preschool kids use in their bedroom? *(Check all that apply)*

- ☐ TV
- ☐ DVD Player
- ☐ Computer/Laptop
- ☐ Smart Phone/Tablet/LeapPad
- ☐ Video game devices played standing up and require lots of moving (like Wii Fit, XBox Kinect)
- ☐ Video game devices that usually are played sitting down (like Nintendo DS, Playstation, XBox)
- ☐ Internet
- ☐ None of the above

Do you have Internet access in your home?

- ☐ Yes
- ☐ No

CONTINUE



	Strongly disagree	Disagree	Neither	Agree	Strongly agree
It's easy for my preschool kids to turn on the TV or DVD and watch shows or movies with little or no help.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It's easy for my preschool kids to turn on and play with computers and laptops with little or no help.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It's easy for my preschool kids to turn on and play with video games that are usually played standing up and require lots of moving (like Wii Fit, Xbox Kinect) with little or no help.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It's easy for my preschool kids to turn on and play with video games that are usually played sitting down (like Nintendo DS, Playstation, Xbox) with little or no help.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It's easy for my preschool kids to turn on and play with tablets, smart phones, or electronic educational devices (like LeapPads) with little or no help.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Almost never	1 day a week	2 days a week	3 days a week	4 days a week	5 days a week	6 days a week	Every day
How often is a TV on when meals and snacks are eaten at your home?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often is a computer, tablet, video game, smart phone, or electronic educational device (like LeapPad) used during meals and snacks at home?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

CONTINUE

**Each day**, how much time is the TV on when no one is watching it?  
Please indicate [both](#) hours and minutes.

hours

minutes

**Each day**, how much time do you usually allow your preschool kids to watch TV or movies at home?  
Please indicate [both](#) hours and minutes.  
(If you do not limit the time, please answer 24 hours and 0 minutes)

hours

minutes

**Each day**, how much time do you allow your preschool kids to play at home with computers, tablets, video games that usually are played [sitting down](#), smart phones, or electronic educational devices (like LeapPad)?  
Please indicate [both](#) hours and minutes.  
(If you do not limit the time, please answer 24 hours and 0 minutes)

hours

minutes

**Each day**, how much time do you allow your preschool kids to play at home with video games that are played [standing up](#) and require lots of moving (like Wii Fit, Xbox Kinect)?  
Please indicate [both](#) hours and minutes.  
(If you do not limit the time, please answer 24 hours and 0 minutes)

hours

minutes

CONTINUE



*What do you think?*

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I try to limit the number of TV commercials my preschool kids see.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I try to limit the TV shows and movies my preschool kids see to only those made for kids.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often talk with my preschool kids about advertisements on TV.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often talk with my preschool kids about TV shows, video games, or movies.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It does <u>not</u> matter to me how much time my preschool kids watch TV.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
TV programs teach my preschool kids useful skills, like how to share.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
TV programs teach my preschool kids a lot of things that help them do better in school.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I only let my preschool kids watch TV programs that are educational.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

CONTINUE

*Think about your yard or area right outside your home.*

- ☐ There are NO places right outside my home where my preschool kids can play actively
- ☐ There ARE places right outside my home where my preschool kids can play actively

CONTINUE



**Think about your yard or area right outside your home.**

Think about what your preschool kids usually do, even if it differs on certain days of the week or times of the year.

	Strongly disagree	Disagree	Neither	Agree	Strongly agree
The yard or area <b>outside</b> our home has plenty of room for my preschool kids to <u>actively</u> play games like tag or chase.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is a paved or flat area in the yard or area <b>outside</b> our home that is big enough for my preschool kids to safely ride a tricycle, bike, scooter, or other wheeled toy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My preschool kids have shoes and clothes for playing <u>actively</u> <b>outside</b> .	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The yard or area <b>outside</b> our home has plenty of swings, slides, or other <u>active</u> play equipment my preschool kids can use.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My preschool kids have plenty of toys for playing <u>actively</u> <b>outside</b> , like balls, jump ropes, skates, swimming or kiddie pool, hula hoops, or sleds.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My preschool kids have a tricycle, bike, scooter, or other wheeled toy to use <b>outside</b> .	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It's easy for my preschool kids to <u>actively</u> play in the yard or area right <b>outside</b> our home without my help.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often limit my preschool kids' <u>active</u> play in the yard or area right <b>outside</b> our home.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It's easy for my preschool kids to see and reach toys for playing <u>actively</u> <b>outside</b> .	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[illegible]



*Think about the size of parking spaces at the shopping mall.*

*Now, think about all the areas outside your home where you would allow your preschool kids to play actively - include grassy, paved, or other areas.*

If those areas became a parking lot, about how many parking spaces would there be?

CONTINUE



Think about your neighborhood and the area nearby where you live.

	Strongly disagree	Disagree	Neither	Agree	Strongly agree	Don't know
There are free or low-cost recreation centers or other indoor places where preschool kids can play actively.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There are outdoor areas, like parks, pools, and playgrounds, nearby my home where preschool kids can play actively.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The outdoor areas in my neighborhood have plenty of swing sets, slides, or other play equipment my preschool kids can use.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The outdoor areas in my neighborhood where my preschool kids can play actively are safe.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The outdoor areas in my neighborhood where my preschool kids can play actively are clean.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The outdoor areas in my neighborhood where my preschool kids can play actively are crowded with other people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

CONTINUE

	Strongly disagree	Disagree	Neither	Agree	Strongly agree
There is so much traffic near where I live that I do not feel safe walking in the area.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel safe from crime in my neighborhood and nearby.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel safe from biting insects, like mosquitos, ticks, and scorpions, and animals, like dogs running loose, in my neighborhood and nearby.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In my neighborhood, it's easy to get to outdoor areas where preschool kids can play actively.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is easy for me to get to a large supermarket ( <u>not</u> a corner store, deli, or convenience store) near my home.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

CONTINUE

Think about what your preschool kids usually do, even if it differs on certain days of the week or times of the year.

	Almost never	1 day a week	2 days a week	3 days a week	4 days a week	5 days a week	6 days a week	Every day
When the weather is good, how often do your preschool kids usually play <u>actively</u> in <b>outdoor</b> areas, like parks, pools, playgrounds, near your home?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often do your preschool kids usually play <u>actively</u> in free or low-cost recreation centers or other <b>indoor</b> places near your home?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Do you have a dog?

- ☐ Yes  
☐ No

CONTINUE



How often do your preschool kids go on walk with the dog or play with it outside (doing things like throwing balls)?

Almost never	1 day a week	2 days a week	3 days a week	4 days a week	5 days a week	6 days a week	Every day
-----------------	-----------------	------------------	------------------	------------------	------------------	------------------	--------------



CONTINUE

***You're doing great!***



**Take a virtual popcorn break!**

*Take a deep breath and think about the smell and taste of popcorn. Imagine it's crunchiness!*

*When you are ready...  
continue to the next page!*

CONTINUE

Think about your eating habits over the **past year or so**.

About **how often do you eat** each of the following foods? Remember breakfast, lunch, dinner, snacks and eating out.

	Less than once a WEEK	Once a WEEK	2 to 3 times a WEEK	4 to 6 times a WEEK	Once a DAY	2 or more a DAY
Any fruit, fresh or canned ( <u>not</u> counting juice)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Green salad	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Potatoes, any kind, including baked, mashed or french fried	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vegetable soup, or stew with vegetables	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Any other vegetables, including string beans, peas, corn, broccoli or any other kind	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fiber cereals like Raisin Bran, Shredded Wheat or Fruit-n-Fiber	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Beans such as baked beans, pinto, kidney, or lentils ( <u>not</u> green beans)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dark bread such as whole wheat or rye	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

CONTINUE

Think about your eating habits over the **past year or so**.

About **how often do you eat** each of the following foods? Remember breakfast, lunch, dinner, snacks and eating out.

*Please note the answer choices are different than the previous page.*

	1 time a MONTH or less	2 to 3 times a MONTH	1 to 2 times a WEEK	3 to 4 times a WEEK	5 or more times a WEEK
Hamburgers, ground beef, meat burritos, tacos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Beef or pork, such as steaks, roasts, ribs, or in sandwiches	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fried chicken	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hot dogs, or Polish or Italian sausage	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cold cuts, lunch meats, ham ( <u>not</u> low-fat)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bacon or breakfast sausage	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Salad dressings ( <u>not</u> low-fat)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Margarine, butter or mayo on bread or potatoes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Margarine, butter or oil in cooking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	1 time a MONTH or less	2 to 3 times a MONTH	1 to 2 times a WEEK	3 to 4 times a WEEK	5 or more times a WEEK
Eggs ( <u>not</u> Egg Beaters or just egg whites)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pizza	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cheese, cheese spread ( <u>not</u> low-fat)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Whole milk	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
French fries, fried potatoes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Corn chips, potato chips, popcorn, crackers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Doughnuts, pastries, cake, cookies ( <u>not</u> low-fat)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ice cream ( <u>not</u> sherbet or non-fat)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

CONTINUE



Think about your beverage habits over the **past year or so**.

About **how often do you drink** each of the following beverages? Remember breakfast, lunch, dinner, snacks and eating out.

	Less than 1 time a week	1 day a week	2 days a week	3 days a week	4 days a week	5 days a week	6 days a week	7 days a week	More than 1 time a day
<b>Milk to drink</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Real 100% fruit juice</b> (like orange, apple, grape, fresh, frozen or canned <u>not</u> sodas or other drinks)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Vegetable juice</b> (like tomato juice, V-8 or carrot)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Soft drinks and soda/pop</b> (like Coke or 7-up <u>not</u> diet soda)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Fruit drinks or other sugar sweetened beverages</b> (like Hawaiian Punch, Hi-C, Kool-Aid, Ocean Spray cranberry juice cocktail, Snapple, Sunny Delight, Country Time Lemonade, Sobe, Arizona Ice Tea, sugar sweetened tea <u>not</u> diet drinks)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Energy drinks</b> (like RockStar, Red Bull, Monster, Full Throttle <u>not</u> sugar-free)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Sugar-sweetened specialty coffee drinks</b> (like frappuccino, flavored latte/cappuccino)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

CONTINUE

## Think about the food in your home



Which of these foods do you allow your **preschool kids** to get for a snack **without** your help?  
(Check all that apply)

- ☐ potato chips, popcorn, crackers, corn chips, like Doritos, tortilla chips, Fritos
- ☐ doughnuts, pastries, cookies, cake (like Ho-Hos)
- ☐ ice cream
- ☐ candy or candy bars
- ☐ milk
- ☐ soft drinks and soda/pop like Coke or 7-Up
- ☐ fruit drinks or other sugary beverages
- ☐ Real 100% juice, like orange, apple, grape
- ☐ fruits or vegetables
- ☐ cereal
- ☐ breakfast bars, granola bars, protein bars
- ☐ my kids are not allowed to get any of these for a snack without my help

CONTINUE

Which of these are kept in places that are **easy** for your **preschool kids** to see and reach? (*Check all that apply*)

- ☐ potato chips, popcorn, crackers, corn chips, like Doritos, tortilla chips, Fritos
- ☐ doughnuts, pastries, cookies, cake (like Ho-Hos)
- ☐ ice cream
- ☐ candy or candy bars
- ☐ milk
- ☐ soft drinks and soda/pop like Coke or 7-Up
- ☐ fruit drinks or other sugary beverages
- ☐ Real 100% juice, like orange, apple, grape
- ☐ fruits or vegetables
- ☐ cereal
- ☐ breakfast bars, granola bars, protein bars
- ☐ none of these are kept in places that are easy to see and reach

CONTINUE



## True or False?

	Definitely false	Mostly false	Mostly true	Definitely true
I deliberately take small helpings as a way to control my weight.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the last year, I worried about whether our food would run out before we got money to buy more.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am always hungry, so it is hard for me to stop eating before I finish the food on my plate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sometimes when I start eating, I just <u>can't</u> seem to stop.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I feel lonely, I console myself by eating.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often try unfamiliar foods.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I feel sad, I often overeat.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I consciously hold back at meals in order to <u>not</u> gain weight.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am always hungry enough to eat at any time.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do <u>not</u> eat some foods because they make me fat.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I feel anxious, I find myself eating.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I avoid "stocking up" on tempting foods.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do <u>not</u> trust new foods.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am afraid to eat things I have never eaten before.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the last year, the food I bought just didn't last and we didn't have money to get more.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

CONTINUE



Think about **ALL** the meals and snacks eaten in your home this **PAST YEAR**.

Think about the number of meals and snacks each family member usually eats at your home.

(Do not count food eaten in restaurants, work, school, or other places.)

**Every week of the last year**, there was enough...

	Less than 1 serving a week	1 serving a week	2 servings a week	3 servings a week	4 servings a week	5 servings a week	6 servings a week	7 servings a week	More than 1 serving a day
<b>Every week of last year</b> , there was enough fruit (any type, including fresh, frozen, or canned [not juice]) in my house for <b>most</b> people at my house to have _____.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Every week of the last year</b> , there was enough green salad for <b>most</b> people in my house to have _____.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Every week of the last year</b> , there were enough potatoes (any kind, including baked, and mashed, <u>not</u> fried) in my house for <b>most</b> people at my house to have _____.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Every week of the last year</b> , there was enough vegetable soup, or stew with vegetables in my house for <b>most</b> people at my house to have _____.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Every week of the last year</b> , there was enough of any other vegetable (including string beans, peas, corn, broccoli or any other kind of vegetable) in my house for <b>most</b> people at my house to have _____.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Every week of the last year</b> , there were enough beans (such as baked beans, pinto, kidney, or lentils [not green beans]) in my house for <b>most</b> people at my house to have _____.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Every week of the last year</b> , there was enough dark bread such as whole wheat or rye in my house for <b>most</b> people at my house to have _____.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

CONTINUE

Think about **ALL** the meals and snacks eaten in your home this **PAST YEAR**.

Think about the number of meals and snacks each family member usually eats at your home.

(Do not count food eaten in restaurants, work, school, or other places.)

Every week of the last year, there was enough...



	Less than 1 serving a week	1 serving a week	2 servings a week	3 servings a week	4 servings a week	5 servings a week	6 servings a week	7 servings a week	More than 1 serving a day
<u>Every week of last year</u> , there were enough corn chips (like Doritos, tortilla chips, Fritos), potato chips, popcorn, or crackers in my <u>house</u> for <b>most</b> people at my house to have _____.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<u>Every week of last year</u> , there were enough doughnuts, pastries, cookies, or cake (like Ho-Hos) ( <u>not</u> low-fat) in my <u>house</u> for <b>most</b> people at my house to have _____.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<u>Every week of last year</u> , there was enough ice cream ( <u>not</u> sherbet or non-fat) in my <u>house</u> for <b>most</b> people at my house to have _____.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<u>Every week of last year</u> , there were enough candy or candy bars in my <u>house</u> for <b>most</b> people at my house to have _____.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

CONTINUE

Think about **ALL** the beverages consumed in your home this **PAST YEAR**.



Think about the number of meals and snacks each family member usually eats at your home.  
(Do not count beverages consumed in restaurants, work, school, or other places.)

Every week of the last year, how often was there enough...

[illegible]

**What kind of milk do you usually have in your house? (choose one)**

- ☐ Whole milk
- ☐ Reduced fat 2% milk
- ☐ Low fat 1% milk
- ☐ Fat-free milk
- ☐ Chocolate milk
- ☐ Soy milk (or almond or rice)
- ☐ Lactaid milk
- ☐ Don't know

CONTINUE





Think about **ALL** the food eaten in your home this **PAST YEAR**.

Think about the number of meals and snacks each family member usually eats at your home.

(Do not count food eaten in restaurants, work, school, or other places.)

Every week of the last year, there was enough...

	Less than 1 serving a week	1 serving a week	2 servings a week	3 servings a week	4 servings a week	5 servings a week	6 servings a week	7 servings a week	More than 1 serving a day
<p><u>Every week of last year</u>, there were enough plain or fiber cereals (like Corn Flakes, Special K, Rice Krispies, Wheaties, Oatmeal, Raisin Bran, Shredded Wheat, Fruit-n-Fiber, Plain Cheerios, Grape Nuts, Wheat Chex, Kix, All Bran, Granola, Kashi) in my <u>house</u> for <b>most</b> people at my house to have _____.</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p><u>Every week of last year</u>, there were enough sweet cereals (like Honey Nut Cheerios, Cap'n Crunch, Lucky Charms, Life, Golden Grahams, Frosted Mini Wheats, Frosted Flakes, Froot Loops, Apple Jacks, Trix) in my <u>house</u> for <b>most</b> people at my house to have _____.</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p><u>Every week of last year</u>, there were enough breakfast bars, granola bars, or protein bars in my <u>house</u> for <b>most</b> people at my house to have _____.</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

CONTINUE

When you were between the ages of 5 and 16, how often did people make fun of you because of your weight?

- ☐ Never
- ☐ Rarely
- ☐ Sometimes
- ☐ Often
- ☐ Very often

If you were made fun of because of your weight, how upset were you?

- ☐ Not at all upset
- ☐ A little upset
- ☐ Somewhat upset
- ☐ Very upset
- ☐ I was never teased because of my weight

When you were between the ages of 5 and 16, how often did people call you names that referred to your weight, like "fatso"?

- ☐ Never
- ☐ Rarely
- ☐ Sometimes
- ☐ Often
- ☐ Very often

If you were called names that referred to your weight, like "fatso", how upset were you?

- ☐ Not at all upset
- ☐ A little upset
- ☐ Somewhat upset
- ☐ Very upset
- ☐ I was never called names like "fatso"

When you were between the ages of 5 and 16, how often did people laugh at you because of your weight?

- ☐ Never
- ☐ Rarely
- ☐ Sometimes
- ☐ Often
- ☐ Very often

If you were laughed at because of your weight, how upset were you?

- ☐ Not at all upset
- ☐ A little upset
- ☐ Somewhat upset
- ☐ Very upset
- ☐ I was never laughed at because of my weight

CONTINUE

***Please tell us your thoughts***

	Strongly disagree	Disagree	Neither	Agree	Strongly agree
I make time to be physically active almost every day.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do <u>not</u> let things get in the way of keeping myself physically active.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is important for me to be physically active.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is important that my preschool kids do <u>not</u> see me spending a lot of time watching TV and movies.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I tell my preschool kids it is important <u>not</u> to spend too much time watching TV and movies.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I make it easy for my preschool kids to be physically active, such as by getting out play equipment, taking them to the park, or to classes like swimming, dance, or karate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I make sure my preschool kids are physically active almost every day.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do <u>not</u> let things (like the weather) keep my preschool kids from being physically active.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

CONTINUE



	Strongly disagree	Disagree	Neither	Agree	Strongly agree
It is important for my preschool kids to be physically active.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I tell my preschool kids that I enjoy being physically active.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is important for my preschool kids to see me being physically active.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often encourage my preschool kids to do something other than watch TV or movies, like play outside.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often encourage my preschool kids to do something other than play with computers, tablets, and smart phones, like play outside.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often make it easy for my preschool kids to do something other than watch TV or movies.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often make it easy for my preschool kids to do something other than play with computers and smart phones.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

CONTINUE



### Please tell us about your child

Think about your kids who are between 2 to 5 years old.  
We would like to know more about **1** of them.

*If you have more than 1 child this age, please tell us about the child born closest to 12 noon on June 7th.*

What is this child's name? (a nickname is fine)

CONTINUE

**(CHILD'S NAME) is a**

- ☐ Boy  
☐ Girl

**(CHILD'S NAME) was born in which month?**

**(CHILD'S NAME) was born in which year?**

- ☐ Before 2007  
☐ 2007  
☐ 2008  
☐ 2009  
☐ 2010  
☐ 2011  
☐ 2012  
☐ 2013

**What is (CHILD'S NAME)'s ethnicity/race? Choose all that apply.**

- ☐ Hispanic, Latino, or Spanish  
☐ White  
☒ Black or African American  
☐ American Indian or Alaskan Native  
☐ Asian Indian  
☐ Asian (e.g., Japanese, Chinese, Korean)  
☐ Pacific Islander  
☐ Other, please specify

**Did you give birth to (CHILD'S NAME)?**

- ☐ Yes  
☐ No

**Was (CHILD'S NAME) premature (born earlier than 38 weeks)?**

- ☐ Yes  
☐ No  
☐ Not sure

**How long did you breastfeed (CHILD'S NAME)?**

**(CHILD'S NAME) was born in**

- ☐ the United States
- ☐ another country (please specify)

**(CHILD'S NAME)'s father is:**

- ☐ Very thin
- ☐ Thin
- ☐ About right
- ☐ Heavy
- ☐ Very heavy
- ☐ Not sure

**(CHILD'S NAME)'s father was born in**

- ☐ the United States
- ☐ another country (please specify)

**Do others tease, joke, or make fun of (CHILD'S NAME)?**

- ☐ Yes
- ☐ No
- ☐ Not Sure

CONTINUE

Why do you think others tease, joke, or make fun of (CHILD'S NAME)?

CONTINUE



How much did (CHILD'S NAME) weigh when born?

Pounds

Ounces

How sure are you that you remember this weight correctly?

- ☐ Very sure
- ☐ Sure
- ☐ Not sure
- ☐ Not sure at all

What was (CHILD'S NAME)'s length when born?

Inches

How sure are you that you remember this length correctly?

- ☐ Very sure
- ☐ Sure
- ☐ Not sure
- ☐ Not sure at all

How would you describe (CHILD'S NAME)'s weight before (CHILD'S NAME) was 1 year old?

- ☐ Very thin
- ☐ Thin
- ☐ Average
- ☐ Slightly heavy
- ☐ Overweight

How would you describe (CHILD'S NAME)'s weight between age 1 and 2 years?

- ☐ Very thin
- ☐ Thin
- ☐ Average
- ☐ Slightly heavy
- ☐ Overweight

CONTINUE

How would you rate (CHILD'S NAME)'s general health?

- ☐ Excellent
- ☐ Very good
- ☐ Good
- ☐ Fair
- ☐ Poor

Think about (CHILD'S NAME)'s physical health, which includes physical illness and injury.  
During the past 30 days, how many days was (CHILD'S NAME)'s physical health not good?

Think about (CHILD'S NAME)'s mental health, which includes stress, depression, and problems with emotion.

During the past 30 days, how many days was (CHILD'S NAME)'s mental health not good?

I am concerned that (CHILD'S NAME) will become overweight

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neither
- ☐ Agree
- ☐ Strongly agree

I am concerned that (CHILD'S NAME) will have to diet to keep weight under control.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neither
- ☐ Agree
- ☐ Strongly agree

I do not worry that (CHILD'S NAME) will weigh too much.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neither
- ☐ Agree
- ☐ Strongly agree

CONTINUE

Think about **(CHILD'S NAME)**'s beverage habits over the **past year or so**.

About **how often** did **(CHILD'S NAME)** drink each of the following beverages?  
Remember breakfast, lunch, dinner, snacks and eating out.



	Less than 1 time a week	1 day a week	2 days a week	3 days a week	4 days a week	5 days a week	6 days a week	7 days a week	More than 1 time a day
<b>Milk to drink</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Real 100% fruit juice</b> (like orange, apple, grape, fresh, frozen or canned [not sodas or other drinks])	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Vegetable juice</b> (like tomato juice, V-8 or carrot)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Soft drinks and soda/pop</b> (like Coke or 7-up [not diet soda])	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Fruit drinks or other sugar sweetened beverages</b> (like Hawaiian Punch, Hi-C, Kool-Aid, Ocean Spray cranberry juice cocktail, Snapple, Sunny Delight, Country Time Lemonade, Sobe, Arizona Ice Tea, sugar sweetened tea [not diet drinks])	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

CONTINUE



Think about  
what your  
child did this  
past week

	0 days	1 day	2 days	3 days	4 days	5 days	6 days	7 days
In the past week, how many days did (CHILD'S NAME) walk continuously for at least 10 minutes at a time to do things like go for a walk, walk the dog, or walk to school?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the past week, how many days did (CHILD'S NAME) run, jump, or do other things that made him or her sweat or breathe a little harder than usual?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the past week, how many days did (CHILD'S NAME) run, jump, or do other things that made him or her sweat or breathe a lot harder than usual?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

In the past week, how much time each day did (CHILD'S NAME) spend watching TV or movies, or playing games on a computer or smart phone?  
(Please report both hours and minutes; for instance, if your child spent 8 1/2 hours watching TV and playing computer games, select 8 hours in the first box, and 30 minutes in the second box)

Hours

Minutes

In the past week, about how many hours of actual sleep did (CHILD'S NAME) usually get each night? This may be different than the number of hours spent in bed.  
(Please report both hours and minutes; for instance, if your child spent 9 hours and 15 minutes sleeping, select 9 hours in the first box, and 15 minutes in the second box)

Hours

Minutes

In the past week, how many hours did (CHILD'S NAME) usually nap each day?  
(Please report both hours and minutes; for instance, if your child spent 2 hours and 0 minutes napping, select 2 hours in the first box, and 0 minutes in the second box)

Hours

Minutes

During the past month, what was the overall quality of (CHILD'S NAME)'s sleep?

- ☐ Very good
- ☐ Good
- ☐ OK
- ☐ Bad
- ☐ Very bad

CONTINUE

*Please Tell Us More About (CHILD'S NAME)*

	Strongly disagree	Disagree	Neither	Agree	Strongly agree
(CHILD'S NAME) is more likely to watch TV than be physically active.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(CHILD'S NAME) is more likely to play inside, or do things like read or draw, than be physically active.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(CHILD'S NAME) just does <u>not</u> enjoy being physically active.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(CHILD'S NAME) is energetic and active.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

CONTINUE



Please tell us about (CHILD'S NAME)

	Strongly disagree	Disagree	Neither	Agree	Strongly agree
<u>(CHILD'S NAME)</u> enjoys tasting new foods.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<u>(CHILD'S NAME)</u> stops eating when full.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<u>(CHILD'S NAME)</u> refuses new foods at first.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Given the chance, <u>(CHILD'S NAME)</u> would eat most of the time.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If I allowed it, <u>(CHILD'S NAME)</u> would eat too much.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<u>(CHILD'S NAME)</u> eats more when feeling nervous.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<u>(CHILD'S NAME)</u> will <u>not</u> eat if full.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<u>(CHILD'S NAME)</u> decides to <u>not</u> like a food, without even tasting it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<u>(CHILD'S NAME)</u> eats less when feeling upset.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<u>(CHILD'S NAME)</u> is interested in tasting food <u>(CHILD'S NAME)</u> has <u>not</u> tasted before.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<u>(CHILD'S NAME)</u> eats more when feeling worried.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

CONTINUE

## Take a virtual beverage break

*Imagine the cool, refreshing taste  
and the soft sound of fizzing.*

*When you are relaxed, continue with  
the survey...*



CONTINUE



# About You



**When was the last time you were pregnant?**

- ☐ I am pregnant now
- ☐ Within the last year
- ☐ About 1 year ago
- ☐ About 2 years ago
- ☐ About 3 years ago
- ☐ About 4 years ago
- ☐ More than 4 years ago
- ☐ I was never pregnant

CONTINUE

Have you ever given birth to a child that weighed more than 9 pounds?

- ☐ Yes  
☐ No

Have you ever given birth to a child that weighed less than 5.5 pounds?

- ☐ Yes  
☐ No

How old were you when you gave birth to your first child?

Did a doctor tell you that you had high blood pressure when you were pregnant?

- ☐ Yes  
☐ No

Did a doctor tell you that you had low iron levels (anemia) when you were pregnant?

- ☐ Yes  
☐ No

Did a doctor tell you that you had diabetes when you were pregnant?

- ☐ Yes  
☐ No

Did a doctor tell you that you were depressed when you were pregnant?

- ☐ Yes  
☐ No

Did a doctor tell you that you were depressed any time during the first year after you gave birth?

- ☐ Yes  
☐ No

CONTINUE

**Now, count your heart beat.**

You will need a clock, watch, or timer that counts seconds. Many cell phones or computers have timers.

Or, open this website in a [separate](#) window:

[www.online-stopwatch.com/countdown-timer](http://www.online-stopwatch.com/countdown-timer)

Click 1 and 0 on the key pad to set it for 10 seconds.

Then click set.

Now, use your index and middle fingers to find the heart beat on the side of your neck.



Now, click start on the website and count the number of heart beats you have in 10 seconds.  
How many beats did you have in 10 seconds?

CONTINUE



How would you rate your **general health**?

- ☐ Excellent
- ☐ Very good
- ☐ Good
- ☐ Fair
- ☐ Poor

**Think about your physical health**, which includes physical illness and injury.  
**During the past 30 days**, how many days was your physical health not good?

**Think about your mental health**, which includes stress, depression, and problems with emotions.  
**During the past 30 days**, how many days was your mental health not good?

During the past 30 days, about how many days did poor physical or mental health keep you from doing your usual activities, such as self-care, work, or recreation?

On how many of the last 30 days did you smoke one or more cigarettes?

Has a doctor, nurse, or other health professional ever told you that you have these? (Check all that apply)

- ☐ depression
- ☐ high blood pressure
- ☐ high blood cholesterol
- ☐ heart disease
- ☐ polycystic ovarian syndrome
- ☐ diabetes
- ☐ thyroid problem
- ☐ gout
- ☐ none of these

Does anyone closely related to you by blood (your mother, father, brother, or sister) have these? (Check all that apply)

- ☐ diabetes
- ☐ problem with being overweight
- ☐ none of these

Is anyone in your home following a diet prescribed by a doctor or other health care professional?

- ☐ Yes
- ☐ No

CONTINUE

Who is following a diet prescribed by a doctor or other health care professional? *(Check all that apply)*

- ☐ Me
- ☐ My spouse/partner
- ☐ Other adult in the family
- ☐ Child, specify ages

Please specify type of diet prescribed *(Check all that apply)*

- ☐ low fat
- ☐ low salt
- ☐ diabetes
- ☐ weight loss
- ☐ gluten-free
- ☐ Other, please specify

CONTINUE

*Think about the last two weeks*

	Not at all	Several days	More than half the days	Nearly every day
In the last 2 weeks, how often did you have little interest or pleasure in doing things?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the last 2 weeks, how often did you feel down, depressed, or hopeless?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the last 2 weeks, how often did you feel unable to control the important things in your life?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the last 2 weeks, how often did you feel confident in your ability to handle your personal problems?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the last 2 weeks, how often did you feel that things were going your way?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the last 2 weeks, how often did you feel that difficulties were piling up so high that you could not overcome them?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

CONTINUE

Please tell us  
about you



	Very thin	Thin	Average	Slightly heavy	Overweight
How would you describe your weight when you were in 1st grade (about age 6)?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How would you describe your weight when you were in 6th grade (about age 12)?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How would you describe your weight when you were in 10th grade (about age 15)?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How would you describe your weight when you were around age 20?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How would you describe your weight now?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

During the past 28 days, how **dissatisfied** have you been with your **shape**?

- ☐ Not at all
- ☐ Slightly
- ☐ Moderately
- ☐ A lot

CONTINUE



What state do you live in?

Which are you?

- ☐ Male
- ☐ Female

How old are you?

What country were you born in?

- ☐ United States
- ☐ Other, please specify

What language do you speak at home?

- ☐ English
- ☐ Spanish
- ☐ Other, please specify

What is your ethnicity/race? (Choose all that apply)

- ☐ Hispanic, Latino, or Spanish
- ☐ White
- ☐ Black or African American
- ☐ American Indian or Alaskan Native
- ☐ Asian Indian
- ☐ Asian (e.g., Japanese, Chinese, Korean)
- ☐ Pacific Islander
- ☐ Other, please specify

What is your highest level of education?

- ☐ less than high school
- ☐ high school graduate
- ☐ some college
- ☐ associates degree/technical school graduate
- ☐ baccalaureate degree
- ☐ advanced college degree
- ☐ Other, please specify

What is your occupation?

---

How many hours of paid employment do you usually have each week?

- ☐ 0 hours
- ☐ 1 to 9 hours
- ☐ 10 to 19 hours
- ☐ 20 to 29 hours
- ☐ 30 to 39 hours
- ☐ 40 hours
- ☐ More than 40 hours

How many times did you travel away on vacation with your family during the past 12 months?

- ☐ Never
- ☐ 1 time
- ☐ 2 times
- ☐ 3 or more times

What is your current relationship status?

- ☐ single, never married
- ☐ single, living with domestic partner
- ☐ married
- ☐ divorced
- ☐ widowed

CONTINUE

## *Your Spouse or Partner*

What is your **spouse or partner's** highest level of education?

- ☐ less than high school
- ☐ high school graduate
- ☐ some college
- ☐ associates degree/technical school graduate
- ☐ baccalaureate degree
- ☐ advanced college degree
- ☐ Other, please specify

What is your **spouse or partner's** occupation?

How many hours of **paid** employment does your **spouse or partner** usually have each week?

- ☐ My spouse or partner does not work
- ☐ 1 to 9 hours
- ☐ 10 to 19 hours
- ☐ 20 to 29 hours
- ☐ 30 to 39 hours
- ☐ 40 hours
- ☐ More than 40 hours

CONTINUE



Do you have your own bedroom (for just you, or you and your partner/spouse?)

- ☐ Yes  
☐ No

How many children under age 18 live with you?

How old are the children who live with you? (Choose as many as needed)

- |   |  |
|---|--|
| <input type="checkbox"/> Less than 1 year old | <input type="checkbox"/> 10            |
| <input type="checkbox"/> 1                    | <input type="checkbox"/> 11            |
| <input type="checkbox"/> 2                    | <input type="checkbox"/> 12            |
| <input type="checkbox"/> 3                    | <input type="checkbox"/> 13            |
| <input type="checkbox"/> 4                    | <input type="checkbox"/> 14            |
| <input type="checkbox"/> 5                    | <input type="checkbox"/> 15            |
| <input type="checkbox"/> 6                    | <input type="checkbox"/> 16            |
| <input type="checkbox"/> 7                    | <input type="checkbox"/> 17            |
| <input type="checkbox"/> 8                    | <input type="checkbox"/> 18            |
| <input type="checkbox"/> 9                    | <input type="checkbox"/> Older than 18 |

CONTINUE



What is your height?

Feet

Inches

How much do you weigh?

Pounds

What is your bra band size?

What is your bra cup size?

Compared to your bra band size, is your waist

- ☐ Much smaller
- ☐ A little smaller
- ☐ About the same
- ☐ A little larger
- ☐ Much larger

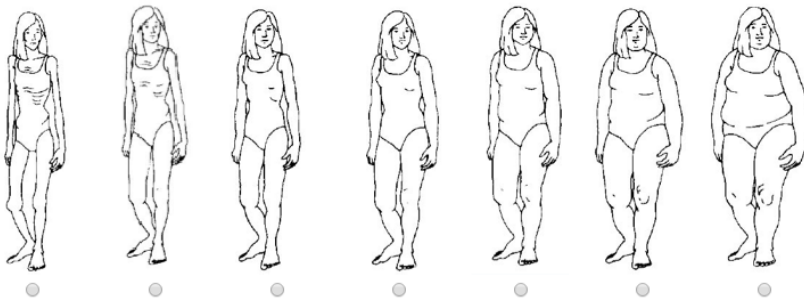
Compared to your bra band size, are your hips (at their fullest point)

- ☐ Much smaller
- ☐ A little smaller
- ☐ About the same
- ☐ A little larger
- ☐ Much larger

Compared to your hips, how big is your waist?

- ☐ Much smaller
- ☐ A little smaller
- ☐ About the same
- ☐ A little larger
- ☐ Much larger

Which picture is most like your figure?



CONTINUE

Now you need a measuring tape.

If you **DO NOT** have one, copy and paste this **black** link into a new window to download and print one.

<http://nutrisci.rutgers.edu/tape/MeasuringTapeInstructions.pdf>

Now, copy and paste the red link into a new window for assembling the measuring tape, and measuring your waist, hips, and neck measurements.

<http://tinyurl.com/measuretapemeasurements>

If you **DO** have a measuring tape (not metal), copy and paste the blue link into a new window for instructions on measuring your waist, hip, and neck measurements.

<http://tinyurl.com/112measures>

**Be sure to turn on your speakers.**

*Note that a warning message may pop up when you click the video- the video is safe to watch on your computer so please allow it to play.*

*Having trouble seeing the video?*

*If so, you can:*

*-try viewing it in another browser*

*OR*

*-you may need to download the latest windows media player <http://windows.microsoft.com/en-us/windows/download-windows-media-player>*

**To measure your waist:**

1. put tape measure around your waist so it covers your belly button. This might NOT be the narrowest part of your waist.
2. be sure the tape is flat against your skin and runs straight across your back
3. take a deep breath in and let it out
4. pull tape gently—do not pull it tight
5. look at the number and write it down to the nearest  $\frac{1}{2}$  inch
6. select the closest measurement below

What is your first waist measurement?

*If you don't see your measurement, use the wheel on your mouse or the down arrow to scroll down the measurements.*

Remove the measuring tape and measure your waist again.

What is your second waist measurement?





**To measure your hips:**

1. put tape measure around your hips at the fullest part of your hips
2. be sure the tape is flat against your skin and runs straight across your hips
3. take a deep breath in and let it out
4. pull tape gently—do not pull it tight
5. look at the number and write it down to the nearest  $\frac{1}{2}$  inch
6. select the closest measurement below

**What is your first hip measurement?**

*If you don't see your measurement, use the wheel on your mouse or the down arrow to scroll down the measurements.*

*Remove the measuring tape and measure your hips again.*

**What is your second hip measurement?**

**To measure your neck:**

1. put tape measure around the middle of your neck between your chin and collar bone
2. be sure the tape is flat against your skin and runs straight across your neck
3. take a deep breath in and let it out
4. pull tape gently—do not pull it tight
5. look at the number and write it down to the nearest  $\frac{1}{2}$  inch (use a mirror if that helps)
6. select the closest measurement below

What is your first neck measurement?

*If you don't see your measurement, use the wheel on your mouse or the down arrow to scroll down the measurements.*

Remove the measuring tape and measure your neck again.

What is your second neck measurement?

CONTINUE

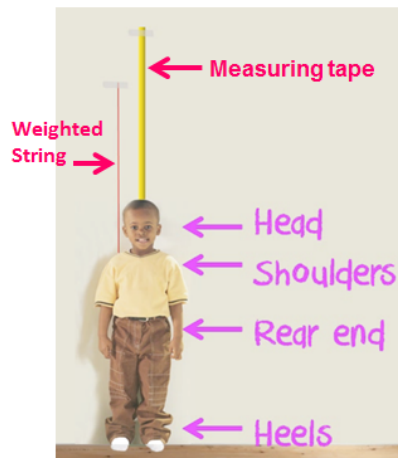
**\*\*It is BEST if you have (CHILD'S NAME) for this part\*\***

First, hang your measuring tape perfectly straight on a flat wall. Copy and paste the link below in another window to see how this should be done.  
<http://tinyurl.com/heightvideo1>

Now, measure your child's height and enter it below.

If (CHILD'S NAME) is not with you, stop the survey and come back when you are ready. You will be returned to this page.

But if you are SURE of (CHILD'S NAME)'s height and weight, please continue.



### *To measure your child's height:*

1. hang tape measure straight on a flat, smooth wall.
2. the bottom of the measuring tape **MUST** touch the floor.
3. make a weighted string by tying a heavy object, like a key, to a 2 foot long string. Hang the string next to the tape measure and use it to make sure the tape measure hangs straight.
4. take off shoes and any hats, ponytails, or hair decorations
5. have child look straight ahead and make sure the child's head, shoulders, rear end and heels touch the wall
6. have your child take a deep breath in and let it out
7. when breathing out, use a flat piece of cardboard placed flat on the child's head and mark where it meets on the tape
8. look at the number and write it down to the nearest 1/4 inch
9. enter the measurement below

How tall is (CHILD'S NAME) with shoes **OFF**?

Please select both inches and quarter of an inch.  
(For example, if your child is 30 1/4 inches tall, select 30 inches, and 1/4 from the quarters drop down box)

Inches

Quarters

How much does (CHILD'S NAME) weigh now?

Pounds

I actually measured (CHILD'S NAME)'s weight.

☐ Yes

☐ No

The top of (CHILD'S NAME)'s head is \_\_\_\_\_ the door knobs in my home.

☐ lower than

☐ the same height as the

☐ higher than

What is your zip code?

CONTINUE

**APPENDIX D:****Printable Measuring Tape**

To download, visit: [nutrisci.rutgers.edu/tape/MeasuringTapeInstructions.pdf](http://nutrisci.rutgers.edu/tape/MeasuringTapeInstructions.pdf)

## Measuring Your Neck, Waist & Hips



**APPENDIX E:****Recruitment Advertisement Verbiage***Recruitment Advertisement Verbiage*

Dear Parents of Preschoolers,

Researchers at Rutgers University are developing a program to help parents build healthier kids. We need your help!

Participants will spend about 60 minutes completing an online survey to help us learn more about families with young kids. Those completing the survey will receive \$25.

Interested? Please visit  
<http://tinyurl.com/parentsurvey54321>  
to learn more.