

UNDERSTANDING LESBIAN WOMEN’S RESTRAINED EATING IN THE
CONTEXT OF THEIR ROMANTIC RELATIONSHIPS

by

LINDZEE BAILEY

A thesis submitted to the

Graduate School-Camden

Rutgers, The State University of New Jersey

In partial fulfillment of the requirements

for the degree of Master of Arts

Graduate Program in Psychology

written under the direction of

Dr. Charlotte Markey

and approved by

Dr. Charlotte Markey

Dr. Courtenay Cavanaugh

Dr. Luis Garcia

Camden, New Jersey May, 2012

ABSTRACT OF THE THESIS

Understanding Lesbian Women's Restrained Eating in the Context of Their Romantic Relationships

By LINDZEE BAILEY

Thesis Director:

Charlotte Markey, Ph.D.

Although previous research has explored romantic partners' influences on eating and dieting behaviors (e.g., Markey & Markey, 2010) these effects have not been examined among lesbian romantic partners, and there have been no studies that address partners' effects on restrained eating behavior. The present research examined relationship quality, partner dietary restraint, and body mass index (BMI) as predictors of women's restrained eating behavior. Seventy-two lesbian couples (M age = 30 years) completed questionnaires assessing relationship quality and restrained eating, and researchers measured their heights and weights to determine BMI. Restrained eating was negatively correlated between partners, and individuals' emotional eating positively correlated with their uncontrolled eating. Furthermore, individuals' BMI predicted their overall eating practices. Actor-partner interdependence models showed significant actor, partner, and interaction effects of BMI on different components of restrained eating. The current research contributes to our understanding of lesbian relationships and subculture, and women's health within the context of their romantic relationships.

Key words: BMI, restrained eating, dieting, lesbian partners, romantic relationships.

Table of Contents

1. Title Page	i
2. Abstract	ii
3. Table of Contents	iii
4. Introduction	1
5. Method	10
6. Results	15
7. Discussion	17
8. Appendices	22
9. References	34

Introduction

Understanding Lesbian Women's Restrained Eating in the Context of Their Romantic Relationships

Many women experience social pressures to attain or maintain a thin ideal that is becoming increasingly unattainable (Thompson & Stice, 2001). While obesity rates rise, the generally-accepted ideal female form is becoming smaller, thus increasing the likelihood of psychological and social distress for women who simply cannot achieve this standard (Harrison, 2000). This distress often leads to unhealthy eating and dieting practices, which can facilitate restrained eating, and even eating disorders such as anorexia or bulimia (Stice et al., 1994). Restrained eating refers to a long-term pattern of dieting and overeating (Lowe, 1993). Although not considered a clinical eating disorder, it can serve as a precursor to disordered eating, which affects many women and carries negative consequences that warrant attention. Therefore, the ability to isolate exactly which factors contribute to or prevent these practices has critical implications for interventions, future research, and general public health.

The term “restrained eating” is distinct from dieting in the sense that it reflects a pattern of “frequent dieting and overeating in the past rather than from a current state of dietary or cognitive restraint” (Lowe, 1993, p. 100). Restrained eating refers to the long-term deliberate restriction of food intake for the purpose of losing, maintaining, or avoiding the gain of weight, typically characterized by alternating episodes of restraint and binging. Over time, these practices may facilitate unhealthy weight fluctuations. In other words, the distinction between the two terms is temporal; dieting refers to an individual period of time (or episode) characterized by the effort to alter or increase

dietary restrictions for the purpose of losing weight, while restrained eating reflects a long-term pattern or collection of dieting episodes which may involve goals of not only losing weight, but maintaining current weight or avoiding additional weight gain. Furthermore, Herman & Polivy (1980, p. 223) have noted that restrained eating “is defined more in terms of effort expended toward weight suppression than in terms of achieved success.”

Studies have shown that, aside from semantics, restrained eaters are physiologically different from dieters and nondieters. Over time, patterns of alternating restriction and overeating (collectively known as restrained eating) cause individuals to become habituated to sensations of both hunger and satiation (Herman & Polivy, 1984). In other words, restrained eaters’ efforts to consciously ignore their physiological hunger cues become less conscious over time, as their bodies adjust to their new eating patterns. This may cause restrained eaters to reduce or lose their physiological ability to assess their own hunger, and become less able to cognitively monitor their food intake through social or environmental cues (Herman, Olmsted, & Polivy, 1983). Furthermore, restrained eaters tend to salivate more than unrestrained eaters in response to the sight and smell of palatable food (Klajner et al., 1981), whereas dieters actually exhibit less salivation (Rosen, 1981), which indicates that the salivary responses of restrained eaters also becomes habituated to food cues as a result of their eating practices.

The majority of the literature regarding the influence of social relationships on eating behaviors discusses these issues among adolescents within the context of their relationships with parents and peers. However, there has been relatively little consideration of the effect of social relationships on the eating behaviors of adults.

Among the relatively few studies that have examined this effect, past researchers (Markey, Markey & Birch 2001; Markey & Markey 2006; Drigotas, Rusbult, Weiselquist & Whitton, 1999; Sanchez & Kwang, 2007; Yancey, Cochran, Corliss, & Mays, 2003) have found that influences from current romantic partners, such as relationship quality, partner BMI, and perceived attractiveness (the extent to which a person believes their partner finds them attractive), significantly affect weight concerns and eating behaviors among heterosexual women. Therefore, the present study aims to expand upon these findings by investigating whether or not partners' restrained eating, relationship quality, and one's partner's body mass index (BMI) predict restrained eating among lesbian women in romantic relationships, as this population has not yet been examined.

The idea that women are more affected by societal pressures to be thin than men has been established within the current literature (e.g., Levine & Smolak, 1998; Stephens, Hill, & Hanson, 1994; Groesz, Levine, & Murnen, 2002). It is possible, however, that concerns about eating and weight among lesbians is affected by different factors (or even the same factors, yet in different ways) than those affecting heterosexual women. For example, there may exist ideals of beauty within the lesbian community that differ from those of heterosexual women, and there may be something within lesbian subculture that promotes a healthier body image and encourages more healthy eating behaviors (Wagenblach, 2004). Although the present study does not directly examine body image, previous body image studies offer valuable insight and important implications for restrained eating research. In one study, body mass index predicted preferences of physical attractiveness among lesbians differently than preferences for heterosexual women, with lesbians preferring partners with higher body mass indexes (BMIs) and

heterosexual women preferring partners with lower BMIs (Swami & Tovee, 2006).

Furthermore, Wagenblach (2004) found that lesbian women were less preoccupied with improving and maintaining physical appearance, dieting, and thinness than heterosexual women and gay men.

Conversely, a collection of 20 transcribed interviews with members of the lesbian community, conducted by Kelly (2007), determined that lesbian women face stigmatization and criticism of their physical appearances from both popular culture and lesbian subculture. In particular, the interviews addressed beauty expectations within each culture, and suggested that lesbian women face *increased* pressure and mental distress resulting from their association with both groups (popular culture as well as lesbian subculture), and the expectations of women who are members of those groups. Essentially, the interviews indicated that lesbian women face two different sets of beauty ideals, which sometimes conflict with or contradict each other, whereas heterosexual women are only subject to one. This may be due to conflicting expectations and judgment within these communities regarding how sexuality is expressed, thus causing lesbian women to be unsure of how to feel about their bodies, or how to relate those feelings to others. Kelly (2007) has termed this phenomenon “body silence.” If this is true, then lesbian women are likely to have more difficulty coping with beauty expectations. However, the fact that current research is conflicting regarding whether or not identification with lesbian subculture is conducive to lesbian women’s healthy development of body image, or potentially detrimental thereto, clearly indicates a need for further investigation.

Among the many factors that contribute to negative eating behaviors and attitudes, social influences are of particular importance. This assertion is supported by social comparison theory (Festinger, 1954), which suggests that individuals tend to evaluate their own opinions, attitudes, and abilities in relation to those of others. Furthermore, this theory indicates that as the importance of a person's chosen reference group grows, pressure to conform to that group grows as well. Within the context of romantic relationships, it is then reasonable to hypothesize that partner dietary restraint would significantly affect individual restraint, as partners tend to play important roles in individuals' lives, and thus have a strong influence in terms of social comparisons. Markey and Markey (2011) explored this idea among heterosexual couples. Their study indicated that heavier men and women expressed more weight concerns, and that these concerns were most prevalent if their partner was relatively thin. This provides evidence supporting the existence of social comparisons in the context of romantic relationships (which they refer to as "partner comparison processes"; Markey & Markey, 2012), with specific regard to physical appearance. Such comparisons may cause or reinforce patterns of dieting and restrained eating.

The physiological and behavioral changes caused by restrained eating may have dire effects on an individual's health. Patterns of alternate bingeing and restraint can often slow down metabolism and actually promote weight gain (Polivy & Herman, 1985). Such practices can also interfere with romantic and other social relationships in the sense that they may make the individual prone to experiencing more negative mood disturbances and may cause tense interactions between the individual and others (Evans & Wertheim, 1998). Due to the fact that romantic partners interact more often and more

intimately with each other than they do with other social contacts, there may be a higher likelihood of friction and misdirected emotions among them when one partner is a restrained eater. Further, it is possible that one's restrained eating and dissatisfaction with her own body may cause an individual to criticize her partner's appearance and eating habits. This criticism might produce strain on the harmony in the relationship, and also promote restrained eating and higher personal dissatisfaction with said partner.

It is possible that the romantic relationship itself can have an effect on each partner's appraisal of their own, and their partner's, physical attributes. Markey, Markey, and Birch (2001) examined the connection between BMI and relationship quality on eating behaviors among heterosexual romantic partners. They found that higher BMI predicted more healthy dieting behaviors among both partners, while relationship quality was negatively associated with unhealthy eating practices among women only. Overall, the married women in this study tended to have higher weight concerns and utilize more dieting practices (both healthy and unhealthy) than their husbands. This is possibly due to the greater social pressures on women to conform to idealized body types, in addition to effects from their marital relationship. Past research by Weller and Dziegielewski (2004) has also established that female marital satisfaction is positively correlated with female body image. These findings produce compelling arguments for the importance of examining eating behaviors within the context of romantic relationships, as understanding associations between eating behaviors and romantic relationship experiences can have lifelong implications not only for healthy, committed relationships, but also for each of the individuals within those relationships.

Although extensive research is available concerning body image and restrained eating among adolescent and adult females, the amount of empirical knowledge becomes increasingly sparse when approaching the present topic of interest. There are abundant sources of information on restrained eating among women, fewer regarding eating practices among lesbians, fewer still regarding restrained eating within the context of romantic relationships, and nothing regarding eating practices among women in lesbian romantic relationships (Markey & Markey, 2012). There exists a need to identify whether or not the effects that have been found to influence heterosexual women in relationships may generalize to lesbian women in the context of their partnerships. This is especially relevant because the current body of research is unclear regarding whether or not lesbian women are affected differently (either more or less) than heterosexual women in terms of social pressures to achieve or maintain a thin ideal. Such an examination would be extremely beneficial, not only to our understanding of lesbian relationships and subculture, but to gain a better understanding of all kinds of romantic relationships and their dynamics.

As previously indicated, there may exist factors within lesbian subculture and/or lesbian relationships that promote fewer restrained eating practices among women. If researchers can isolate these factors, it may be possible to apply that knowledge to interventions, and public health policies in order to promote more healthy eating practices among both lesbian and heterosexual women. Identification of factors that may be specific to sexual orientation or romantic involvement would also provide researchers with a better understanding of the concept of restrained eating and the social and sexual dynamics that may promote or inhibit its practice.

Aims

The variables in this study, women's and their partners' body mass indexes (BMIs), reports of relationship quality, and reports of dietary restraint were first examined using correlational analyses. Due to the dependency in these data (i.e., this is all couples' data), the use of standard Pearson correlations is not appropriate. Thus, intra-class correlations were used to examine these relations.

Guided by the findings from the correlational analyses, the unique effects of relationship quality, body mass index (BMI), and partner restraint on individual dietary restraint were assessed using multi-level modeling to control for the dependency between romantic partners. This method allowed for examination of the relative contributions of each predictor variable, and a determination of the interactions between each of them in predicting individuals' dietary restraint (*Figures 1, 2, 3, and 4* present an illustration of the expected relationship among these variables as examined by the actor-partner interdependence model, described below). In addition to the above analysis, the individual subscales of relationship harmony (love and conflict) were evaluated independently in terms of their relationship with dietary restraint.

Guided by the above analyses and past research examining BMI as a predictor of romantic partners' weight concerns and body image (e.g., Markey & Markey, 2010; 2012), multilevel modeling examining relations between both partners' BMI and dietary restraint utilized actor-partner interdependence models (APIMs; Kenny, Kashy, & Cook, 2008). Each model measured the effect of each individual's BMI on her own restraint (actor effect), the effect of her partner's BMI on her restraint (partner effect), and the combined effect of both partners' BMIs on each partner's restraint (interaction effect).

Figures 1, 2, 3, and 4 illustrate this model. A separate APIM was used to measure each of the three subscales of the Three Factor Eating Questionnaire (TFEQ-18), as well as overall TFEQ-18 scores, for a total of four APIMs.

Hypotheses

Given the literature reviewed above and the aims of this research, I propose the following specific hypotheses.

- 1) Body mass index and partner restraint correlates positively with individual restraint, while relationship quality correlates negatively with restraint.
- 2) Love correlates negatively and conflict correlates positively with restraint levels.
- 3) A woman's BMI positively correlates with her responses to each subscale of the TFEQ-18, as well as the overall score (actor effect).
- 4) An individual's partner's BMI positively correlates with her responses to each subscale of and overall score on the TFEQ-18 (partner effect).
- 5) Each woman's BMI interacts with that of her partner when predicting TFEQ-18 scores (interaction effect). Specifically, women with higher BMIs who also have partners with relatively low BMIs are most vulnerable to restrained eating.

Method

Participants

One hundred and forty-four lesbian women (72 couples) with varying socio-economic and ethnic backgrounds were recruited from the Philadelphia, PA and Camden, NJ areas. Participation required that women were 18 years of age or older, and had been in their current relationships for at least six months. The sample included Euro-American (72.2%), African American (18.1%), Indian (1.4%), Asian American (1.4%), and Latina (2.8%) women between the ages of 18 and 65 years, with a mean age of 30.4 years. Personal income was reported in ranges consisting of “less than \$20,000” (22.2%), “\$20,000 to \$49,000” (45.8%), “\$50,000 to \$75,000” (19.4%), “\$76,000 to \$99,000” (9.7%), and “\$100,000 or greater” (2.8%). Highest levels of education completed included “9th to 11th grade” (1.4%), “12th grade, GED, or high school diploma” (8.3%), “some vocational/technical/or business school” (1.4%), “vocational/technical/or business school diploma” (2.8%), “some college/no degree” (26.4%), “Associate’s degree” (2.8%), “Bachelor’s degree” (26.4%), “some graduate/professional school” (11.1%), and “graduate/professional degree (Master’s, Ph.D., M.D., etc.)” (19.4%).

Length of romantic involvement was recorded in months, which ranged from 6 to 228, with a mean of 56 months (4.5 years). Number of months of cohabitation with one’s partner ranged from 0 to 224, with a mean of 41 months (3.4 years). Partners also reported whether they considered themselves to be “dating” (23.6%) or “committed (e.g., domestically partnered, civil union, married)” (76.4%). When asked whether they would like to be legally married, 60.4% indicated “yes”, 22.9% indicated “perhaps, someday”, and 4.9% indicated “no”.

Measures

The Marital Interaction Scale (Braiker & Kelley, 1979) was used to assess relationship quality, which is conceptualized as an independent variable in this study (i.e., the analyses are correlational, but models tested appoint relationship quality as an independent variable). The survey measures levels of love and conflict (i.e., harmony) in relationships. This is a 15-item scale (shown in Appendix A) of which 10 items address love, and 5 items address conflict. Scores from both subscales are combined to create an overall relationship quality score. The overall score was used in the main analysis, and the two subscales was used for exploratory analyses. Each item contains a question, such as “How attached do you feel to your partner?” to which participants respond on a 9-point Likert scale, where 1 indicates “not at all” and 9 indicates “very much”. The original scale asks questions in reference to one’s spouse, yet this was modified to appropriately address lesbian couples. Since marriage was not a legal option for lesbian women at the time of data collection, the word “spouse” was changed to read “partner.” The conflict subscale is reverse-coded to determine an overall measure of relationship harmony. The love subscale included questions such as “How close do you feel toward your partner?” and the Cronbach’s alpha reliability of this subscale was .65. The conflict/harmony subscale contained questions such as “How often do you feel angry or resentful toward your partner?”, and the Cronbach’s alpha reliability of this subscale was .73. The Cronbach’s alpha reliability of the Marital Interaction Scale (with both subscales combined) for this sample is .69.

Body mass index (BMI) was conceptualized as an independent variable, based on previous research, which confirmed BMI as a predictor of weight concerns (Markey &

Markey, 2010). Participants' BMIs were determined by measuring their height in centimeters using a stadiometer, and obtaining weight in kilograms via a standard medical scale. The metric BMI formula was used to determine weight in kilograms divided by squared height in meters. Weight and height were recorded three times for each participant, per the recommendation of Lohman, Roche, and Martorell (1988), and the average of the three measures was used. The mean BMI for the present sample was 29.38 (SD = 8.19, range = 17.79 - 56.47). One participant was underweight (BMI between 15 and 18.4, 0.7%), 56 were of normal weight (BMI between 18.5 and 22.9, 38.9%), 33 were overweight (BMI between 23 and 27.5, 22.9%), and 54 were obese (BMI between 27.6 and 40, 37.5%). The percentage of women who were overweight in this sample was lower than the national average, which is 34%, and the percentage of obese women in this sample slightly exceeded the national average, which is also 34% (CDC, 2007). BMI was significantly correlated between partners ($r = .38$).

Stunkard & Messick's (1985) Three-Factor Eating Questionnaire-R18 (TFEQ) was used to determine restrained eating among participants. Because both members of the couple complete this measure and associations among partners' restrained eating are examined, this measure is examined both as an independent variable (partner restrained eating) and a dependent variable (individual restrained eating). It should be noted that this measure is not designed to measure disordered eating behavior, and does not differentiate clinical and sub-clinical levels of restrained eating. Therefore, the measure does not designate a cutoff score that would indicate the threshold of clinical levels of restrained eating. The prevalence of restrained eating among the general population in America is estimated at 20.7% for women and 8.9% for men (Rand & Kulda, 1991).

This means that about 15% of the American population experiences restrained eating, which is a strong predictor of disordered eating, thus indicating that there exists a definite clinical problem. As shown in Appendix B, this is a shortened version of the original 50-item measure, which consists of 18 items and is assessed by responses to statements on a 1-4 Likert scale (1= definitely false, 4 = definitely true). The measure contains three subscales: cognitive restraint (addressing restraint of food intake), emotional eating (addressing feelings toward food and hunger), and uncontrolled eating (addressing episodes of binge eating). Raw scores are computed into a scale score for each subscale, where higher scale score indicates more of that particular behavior (such as cognitive restraint). Each of the three subscale scores are typically converted into a standardized score, ranging from 0 to 100 $((\text{raw score} - \text{lowest possible raw score})/(\text{possible raw score range}) \times 100)$, where 0 indicates no display of any of the subscale's behaviors (thus, extremely low cognitive restraint, high emotional eating, or high uncontrolled eating), while a score of 100 indicates complete display of such behaviors (high restraint, low emotional eating, or low uncontrolled eating). The main analyses of this study used the overall TFEQ score, but the exploratory analyses examines each subscale individually. The Cronbach's alpha reliability of the restraint subscale for the present sample is .72. Statements from the subscale that describe cognitive restraint include those such as "I deliberately take small helpings as a means of controlling my weight". The emotional eating subscale includes statements such as "I get so hungry that my stomach often seems like a bottomless pit" and has a reliability of .75. Finally, the uncontrolled eating scale contains statements such as "when I smell delicious food, I find it very difficult to keep

from eating even if I have just finished a meal”, and has a reliability of .63. The total reliability for all subscales combined is .70.

Procedure

Participants were recruited via advertisements and flyers, as well as a snowball sampling method (this method is often used with minorities and other samples within communities that might be hard to reach otherwise; Biernacki & Waldorf, 1981). A pre-screening procedure was implemented to determine whether or not couples had been in their respective relationships, monogamously, for at least 6 months directly prior to participation. Each couple spent approximately 1.5 hours in the Healthy Development Lab, responding to questionnaires, and providing height and weight information.

Participant data was obtained one couple at a time. Couples reported to the Healthy Development Laboratory at Rutgers University, Camden campus. Upon arrival, each member of the couple was designated as either “Participant A” or “Participant B” and assigned an identification number. Each participant was then given a short explanation of the tasks they were about to perform, and completed an informed consent form.

One member of the couple was asked to enter a separate room within the lab so that each participant would feel comfortable answering the subsequent questionnaires honestly (this was the purpose of the separation, but it was not stated directly to participants), as the measures required responses to questions about body image, partners’ body perceptions, and their relationship. After participants were separated, they were each given two questionnaire packets containing multiple measures addressing the

aforementioned factors, including the Marital Interaction Scale and the Three-Factor Eating Questionnaire.

After participants completed the questionnaires, researchers measured each participant's height (via stadiometer, in centimeters) and weight (via standard digital medical scale, in kilograms) three times to ensure accuracy. Finally, they completed an exit questionnaire, which requested that they provide their home address to receive correspondence regarding results of the study, and also to be contacted to participate in follow-up studies (if they so chose). At this time, participants were also asked to provide names and contact information of other eligible couples they knew who might want to participate in the study. Finally, each couple was compensated with \$100 (\$50 per participant) via check addressed to one member of the couple, thanked for their time, and then escorted from the lab.

Results

Intra-class correlations were used to examine associations among the variables investigated (Hypotheses 1 and 2), while controlling for the dependency in these dyadic data. The restrained eating subscale of the TFEQ-18 was negatively correlated between romantic partners ($r = -.33$), which was opposite of the expected effect, but no other significant partner correlations were found. Furthermore, a participant's emotional eating was positively correlated with her uncontrolled eating ($r = .64$), but no other correlations between subscales of the TFEQ-18 and BMI or relationship quality were significant. Please see *Table 1* and *Table 2* for a complete list of intra-class correlations that were performed. These correlational analyses indicated no significant associations between partners' relationship quality and restrained eating. However, past research (Markey & Markey, 2010; 2012) indicates reliable links between partners' BMIs and eating concerns, thus partners' BMIs and dietary restraint were analyzed using APIMs.

Multi-level modeling was used to test actor-partner independence models (APIMs), which measured main effects (actor and partner effects), as well as the interaction of these effects among the variables tested. There were a total of four APIMs tested. BMI was examined as a predictor for all four of the models, and each subscale of the TFEQ-18 (as well as the total TFEQ-18 score) was used individually as an outcome variable to address Hypotheses 3 through 5. The APIM examining individual and partner BMI as a predictor of uncontrolled eating produced a significant actor effect only (Hypothesis 3; see *Figure 1* and *Table 3*). An APIM that examined BMI as a predictor of the restrained eating subscale of the TFEQ-18 did not produce any significant actor, partner, or interaction effects (see *Figure 3* and *Table 4*). The APIM examining BMI as a

predictor of emotional eating produced a significant actor effect and a marginal (though not statistically significant) partner effect (Hypotheses 3 and 4; see *Figure 2* and *Table 5*).

An analysis of the effects of BMI on the TFEQ-18 as a whole (all subscales of the eating measure combined) produced a significant actor effect (Hypothesis 3), a nearly significant partner effect (Hypothesis 4), and a significant interaction effect (Hypothesis 5; see *Figure 4*; *Figure 5*; *Table 6*). This interaction is graphed in *Figure 5*, which displays women's BMIs as the mean ("Self BMI – Moderate"), one standard deviation above the mean ("Self BMI – High"), and one standard deviation below the mean ("Self BMI – Low"). As can be seen in this figure, when women have relatively low BMIs, their partners' BMIs seem to have relatively little effect on their restrained eating. However, when women have relatively high BMIs and their partners have relatively low BMIs, they seem to be most at-risk of participation in restrained eating behaviors.

Discussion

The pressures that women in Western society face, which encourage them to pursue exceedingly unrealistic thin ideals, are an unfortunate reality. Side effects of these pursuits are myriad and include negative self-perception, unhealthy dietary restraint, and even disordered eating behaviors. The goal of the present study was to determine a link between BMI, relationship quality, partner dietary restraint, and individual restrained eating among lesbians in romantic relationships. A clear understanding of associations among these variables has the potential to provide us with information that may prove invaluable for effectively treating negative and potentially dangerous eating behaviors.

Contrary to my expectations (Hypothesis 1), BMI and relationship quality (Hypothesis 2) did not significantly correlate with individual restraint, and partner restraint (the partner's score on the restraint subscale of the TFEQ-18) actually correlated negatively with individual restraint. These results are similar to previous research examining heterosexual couples (Markey, Markey & Birch 2001; Markey & Markey 2006; Drigotas, Rusbult, Weiselquist & Whitton, 1999; Sanchez & Kwang, 2007; Yancey, Cochran, Corliss, & Mays, 2003), which found that interpersonal influences from romantic partners affect eating behaviors among women. A positive correlation of restrained eating between partners (i.e., if one partner exhibits more restrained eating, so will the other) was expected, but the opposite was found, indicating that if one partner experienced more restrained eating, the other tended to exhibit less. This may indicate that, in accordance with social comparison theory, each partner is using the other as a reference for restrained eating practices, but that the two individuals have different conceptions about what the other partner's behavior means. It is possible that the partner

with lower BMI sees the other partner's restrained eating as unhealthy or unattractive, and may attribute such practices to the other partner's higher BMI; therefore, she chooses to restrain less. Conversely, the partner with higher BMI may attribute her partner's low BMI to more restrained eating, and attempt to practice restrained eating herself, in hopes of lowering her own BMI.

An examination of intra-class correlations was used to guide my subsequent investigations of actor-partner interdependence models, as the purpose of the APIMs was to investigate individual and partner effects on dietary restraint. The actor-partner interdependence models that used BMI as a predictor of the TFEQ-18 subscales showed that a woman's BMI positively predicted her tendency toward emotional and uncontrolled eating (Hypothesis 3, actor effect). A woman's partner's BMI did not significantly predict that woman's emotional, uncontrolled, or restrained eating individually (Hypothesis 4, partner effect). However, when I examined the overall combination of a woman's emotional, uncontrolled, and restrained eating (overall TFEQ-18 score), I found that a woman's BMI did predict her restrained eating behaviors (Hypothesis 3, actor effect; *Figure 4*), a woman's partner's BMI positively predicted that woman's restrained eating behaviors (Hypothesis 4, partner effect; *Figure 4*), and that the relationship between a woman's BMI and that of her partner also predicted that woman's restrained eating behaviors (Hypothesis 6; *Figure 5*). With specific regard to the interaction effect, the present results indicated that as the difference between a woman's BMI and that of her partner increased, the woman with the higher BMI became more likely to practice restrained eating. These results do support my conception of social comparison theory (Festinger, 1954) within the context of romantic relationships, which

suggests that individuals tend to feel pressure to conform to the eating behaviors of close reference groups (romantic partners), although not to the extent that was originally expected. The practice of social comparison seems to generally affect restrained eating behaviors as a whole, but does not significantly affect any specific restraint practice alone (i.e., cognitive restraint, emotional, or uncontrolled eating).

Expanding upon previous studies examining heterosexual couples (Markey, Markey & Birch 2001; Markey & Markey 2010), the present results suggest that one's own BMI, and that of her partner both predict restrained eating practices among lesbian women as well as heterosexual women. These results specifically suggest that lesbian women tend to exhibit more restraint when their BMIs are higher in general, when their BMIs are higher than that of their partner specifically, and that levels of restraint tend to increase as the difference between a woman's BMI and that of her partner increases. Outside of the context of romantic relationships, these findings suggest that lesbian subculture does not eliminate pervasive media and pop-culture influences on women, in terms of attaining extremely unrealistic thin ideals, as indicated in previous research (Wagenblach, 2004; Swami & Tovee, 2006; Kelly, 2007). However, the extent to which lesbian women may be more or less affected by media influence on physical appearance than heterosexual women remains unclear.

Contrary to prior research (Markey, Markey, & Birch, 2001; Drigotas, Rusbult, Weiselquist & Whitton, 1999; Sanchez & Kwang, 2007; Yancey, Cochran, Corliss, & Mays, 2003; Weller & Dziegielewski, 2004), relationship quality was not associated with an individual's BMI, her partner's BMI, or individual restrained eating in the present study. This important finding suggests lesbian individuals' restraint practices and body

image may be less influenced by the quality of their romantic relationships than those of heterosexual women. Such a lack of influence could be inherited, indicating that lesbian and heterosexual women operate on mechanisms that are biologically dissimilar, or they may be societal, indicating that there are, in fact, facets of lesbian subculture that protect women's eating behaviors. Furthermore, it is possible that lesbian romantic relationships are inherently different from heterosexual relationships in a way that prevents their body image and their relationship quality from interacting with each other, and is not measurable by the Marital Interaction Scale. Future research would benefit from testing different relationship quality measures among lesbian couples to determine which ones most accurately capture the characteristics of such relationships.

The Three-Factor Eating Questionnaire was a useful tool for measuring restrained eating among this sample, but future research may benefit from the use of additional measures, or of another, more precise restrained eating questionnaire. As previously stated, the TFEQ-18 does not distinguish between clinical and sub-clinical levels of restrained eating, which could affect the quality of results in important ways. The present study did not examine hypotheses in the context of whether or not restrained eating met the clinical threshold, but this distinction is worth exploring, as the actor, partner, and interaction effects of restrained eating among clinical versus sub-clinical samples is likely to be useful. Furthermore, the TFEQ-18 also does not distinguish between healthy and unhealthy methods of restrained eating. Unhealthy restrained eating methods (for example, smoking cigarettes or drastic reductions in caloric intake that deprive the body of vitamins and nutrients) may be more likely to have dire health outcomes, and may also have different effects on relationship quality or the restrained eating of one's partner, as

opposed to healthy restrained eating methods (for example, choosing low-fat, low-calorie snacks such as vegetables instead of cake or cookies).

Although this sample provided novel and useful information about the eating behaviors of lesbians in the context of their romantic relationships, an investigation into the similarities and differences among lesbian versus heterosexual women (and even gay men) is warranted. I have determined that a relationship between BMI and restrained eating among lesbian women does exist, but the extent to which these data are different from that of heterosexual women or gay men using the same analytic approach (i.e., APIM analyses) would provide a more accurate picture of trends in eating behaviors. This information would help answer questions related to whether or not lesbian sub-culture does actually promote a more positive body image for women. Since there has been no investigation of restrained eating among heterosexual women (or gay men) within the context of their romantic relationships, there is not currently a basis for direct comparison.

Furthermore, the present sample provided data that was correlational and cross-sectional in nature, which limits the applicability of these findings. Many factors such as participant's age, length of time in their present relationship, and length of time than an individual has been "out" (if they are gay or lesbian) could significantly affect their dietary restraint, as well as their reactions to the dietary restraint of their partners. Cross-sectional data can give us a snapshot of these practices among multiple participants at different life stages, but a longitudinal study would more accurately portray the ways in which individuals' concerns change throughout their lives.

Since I cannot completely account for direction of effects, I am unable to say with certainty whether one variable causes the other. I chose BMI as the predictor variable in the actor-partner interdependence models because previous research (specifically, Markey & Markey, 2010; 2012) indicated that BMI positively predicted weight concerns among heterosexual women in romantic relationships. Further research that exemplifies the possible causal relations between BMI and restrained eating would provide more certainty, as well as a better basis for future directions.

Although many questions still remain concerning whether or not lesbian sub-culture promotes more healthful body image and dietary practices for women, the present study provides an important contribution toward future answers to these questions. Through comparisons of restraint practices and related factors between heterosexual and lesbian women, and longitudinal investigations, future research can begin to identify whether important differences exist among these groups. Identification of such differences would provide an opportunity for changes in public policy, media regulations, social practices, or even marriage equality laws that would benefit the overall health of our society. As of the 2000 U.S. Census, homosexual couples constituted approximately 1%, or 37,000 of American households (U.S. Census Bureau, 2000). Although this is a relatively low proportion, the percentage has likely increased substantially due to legislation that permits same-sex marriages in certain states, which had not occurred as of 2000. As this proportion increases, the relevance of incorporating research on gay and lesbian relationships into public health policy will also increase. Furthermore, due to the high prevalence of obesity among Americans, and the fact that eating disorders are a distinctly Western phenomenon, research leading to effective prevention methods of

these problems is highly important. For example, intervention methods for eating practices do not currently target couples, but this research provides support for the implementation of couples' interventions among practitioners. This is especially relevant to cohabitating romantic partners, as their eating practices are most likely to affect each other.

Women in Western society often equate thinner body types with increased health and sexual attractiveness, which may be erroneous, and cause misconceptions about how to obtain a healthy body type (Stevenson, et al., 2007). These conceptions may, in turn, promote unhealthy dieting and restrained eating practices. The importance of extricating exactly which factors may affect such eating practices cannot be overstated. I have here identified that a connection between BMI and restrained eating exists among lesbian women, but further clarification of the reason for such variations, and the direction of causality is crucial in order to effectively identify and address certain public health concerns. When these variations are recognized and causality is properly understood, then researchers and practitioners can begin to devise more effective prevention and treatment methods, in addition to generally promoting more healthy eating behaviors among women and men alike.

Appendices

A. Figures

Figure 1. Actor-Partner Interdependence Model of body mass index and uncontrolled eating.

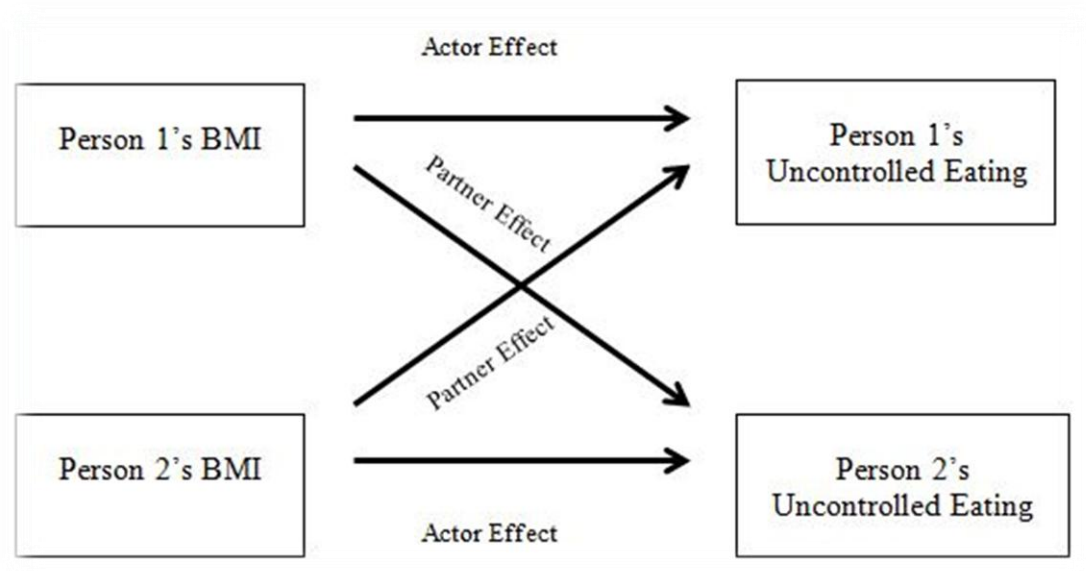


Figure 2. Actor-Partner Interdependence Model of body mass index and emotional eating.

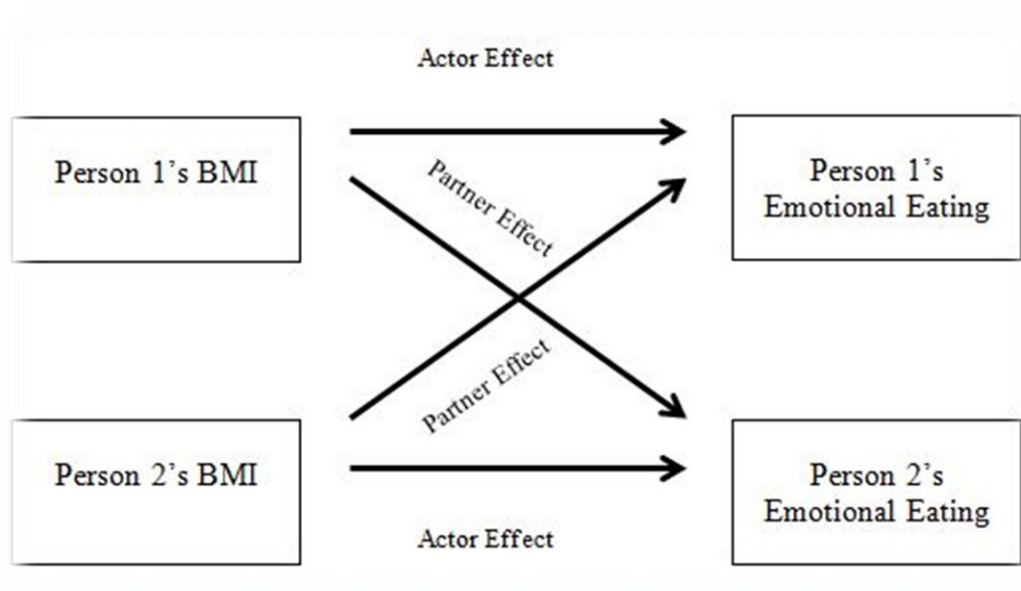


Figure 3. Actor–Partner Interdependence Model of body mass index and restrained eating.

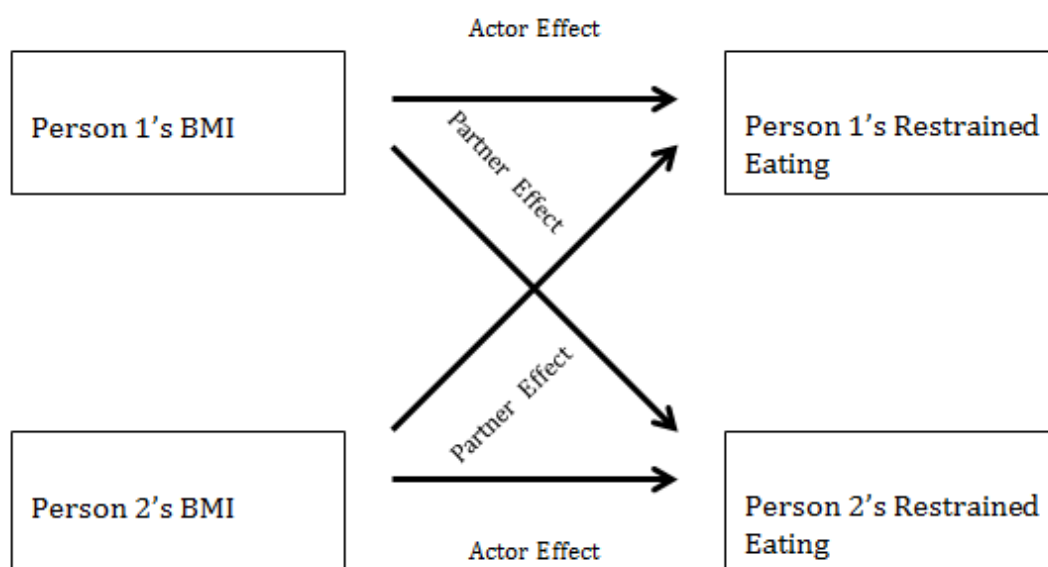


Figure 4. Actor–Partner Interdependence Model of body mass index and total TFEQ-18 score.

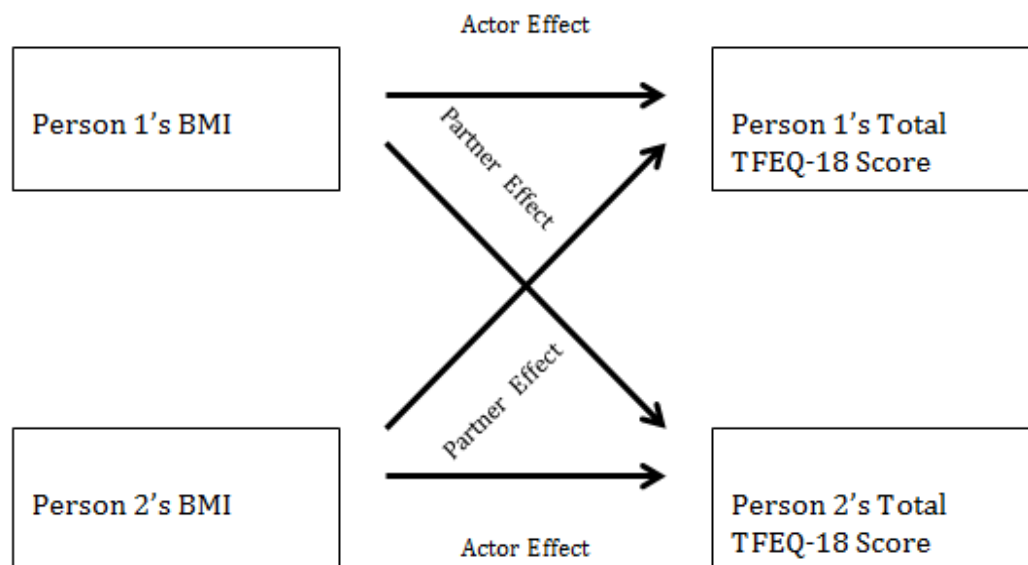
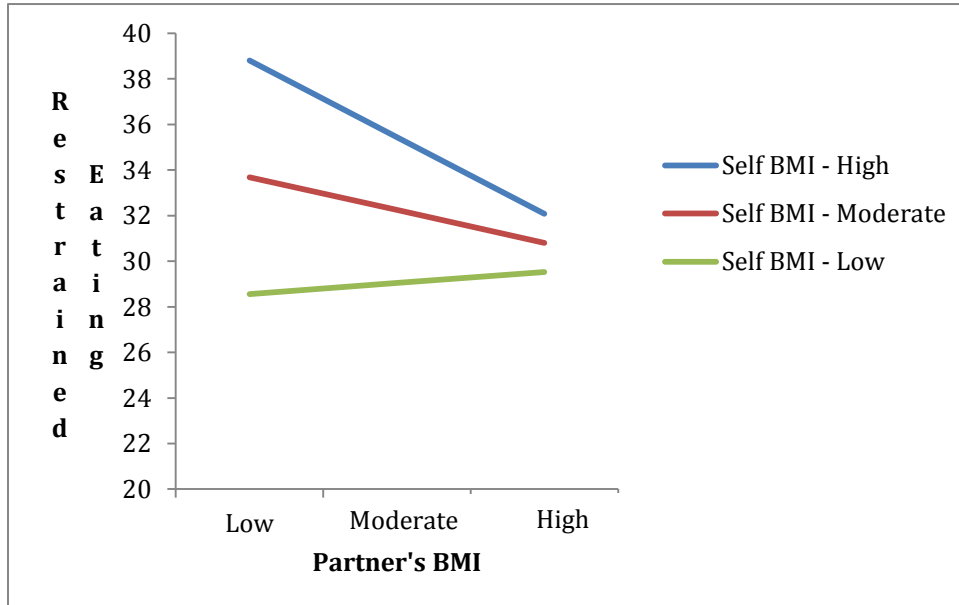


Figure 5. Interaction Effect of Actor-Partner Interdependence Model.



B. Tables

Table 1. Summary of Intra-Class Correlations Between Partners

	<i>RestrainedA</i>	<i>EmotionalA</i>	<i>UncontrolledA</i>	<i>TotalEatA</i>	<i>RelQuality</i>	<i>Love</i>	<i>Conflict</i>	<i>BMI</i>
<i>RestrainedB</i>	-.331*	-.037	-.176	.041	.1	.001	.185	-.107
<i>EmotionalB</i>	-.037	-.01	-.005	-.016	-.07	-.105	-.014	-.111
<i>UncontrolledB</i>	-.176	-.005	.019	-.061	-.149	-.021	-.025	-.019
<i>TotalEatB</i>	.041	-.016	-.061	-.014	-.065	-.16	.066	-.127
<i>RelQuality</i>	.084	-.06	-.101	-.052		.84*	.806*	-.034
<i>Love</i>	-.006	-.041	-.067	-.062	.84*		.354*	.072
<i>Conflict</i>	.157	-.069	-.115	-.027	.806*	.354*		-.13
<i>BMI</i>	.011	.178	.164	.151	-.034	.072	-.13	

* $p > .303$

Table 2. Summary of Intra-Class Correlations Within Partners

	<i>RestrainedA</i>	<i>RestrainedB</i>	<i>EmotionalA</i>	<i>EmotionalB</i>	<i>UncontrolledA</i>	<i>UncontrolledB</i>	<i>TotalEatA</i>	<i>TotalEatB</i>
<i>RestrainedA</i>		-.331*	.012	-.037	-.081	-.176	.433*	.041
<i>RestrainedB</i>			-.037	.012	-.176	-.081	.041	.433*
<i>EmotionalA</i>				-.01	.636*	-.005	.841*	-.016
<i>EmotionalB</i>					-.005	.636*	-.016	.841*
<i>UncontrolledA</i>						.019	.751*	-.061
<i>UncontrolledB</i>							-.061	.751*
<i>TotalEatA</i>								-.014
<i>TotalEatB</i>								

* p > .303

Table 3. Actor-Partner Interdependence Model of BMI and Uncontrolled Eating

	<i>Estimate</i>	<i>SE</i>	<i>t</i>
<i>Level 1 Variables</i>			
<i>Actor Effect - BMI</i>	.42	.21	2.02*
<i>Partner Effect - Uncontrolled Eating</i>	-.1	0.202	-.49
<i>Level 2 Variable</i>			
<i>Actor BMI x Partner Uncontrolled Eating</i>	-.06	.205	-.312

* $p < .05$

Table 4. Actor-Partner Interdependence Model of BMI and Restrained Eating

	<i>Estimate</i>	<i>SE</i>	<i>t</i>
<i>Level 1 Variables</i>			
<i>Actor Effect - BMI</i>	-.001	.215	-.005
<i>Partner Effect - Restrained Eating</i>	-.178	-.21	-.848
<i>Level 2 Variable</i>			
<i>Actor BMI x Partner Restrained Eating</i>	-.035	.037	-.941

* $p < .05$

Table 5. Actor-Partner Interdependence Model of BMI and Emotional Eating

	<i>Estimate</i>	<i>SE</i>	<i>t</i>
<i>Level 1 Variables</i>			
<i>Actor Effect - BMI</i>	0.639	0.27	2.378
<i>Partner Effect - Emotional Eating</i>	-0.443	0.263	-1.687*
<i>Level 2 Variable</i>			
<i>Actor BMI x Partner Emotional Eating</i>	-.051	.032	-1.607

* $p < .05$

Table 6. Actor-Partner Interdependence Model of BMI and Total TFEQ-18 Score

	<i>Estimate</i>	<i>SE</i>	<i>t</i>
<i>Level 1 Variables</i>			
<i>Actor Effect - BMI</i>	.342	.159	2.156*
<i>Partner Effect - Total TFEQ-18</i>	-.232	.155	-1.495+
<i>Level 2 Variable</i>			
<i>Actor BMI x Partner Total TFEQ-18</i>	-.036	.018	-2.027*

+ Nearly significant effect

* $p < .05$

C. Marital Interaction Scale (Braiker & Kelley, 1979)

Please read the following questions and circle the number that best describes your feelings about your romantic partner. [The following items were measured on a nine point Likert scale with one being “not at all” and 9 being “very much so”.]

1. To what extent do you have a sense of “belonging” with your partner?
2. How often do you and your partner argue with one another?
3. How much do you feel you “give” to the relationship?
4. To what extent do you try to change things about your partner that bother you (behaviors, attitudes, etc)?
5. To what extent do you love your partner at this stage?
6. To what extent do you feel that things that happen to your partner also affect or are important to you?
7. How often do you feel angry or resentful toward your partner?
8. How committed do you feel toward your partner?
9. How close do you feel toward your partner?
10. How much do you need your partner at this stage?
11. How sexually intimate are you with your partner?
12. How attached do you feel to your partner?
13. When you and your partner argue, how serious are the problems or arguments?
14. To what extent do you communicate negative feelings toward your partner (e.g., anger, dissatisfaction, frustration, etc.)?
15. To what extent do you feel your relationship is special compared to other relationships you’ve been in?

D. Three-Factor Eating Questionnaire (Stunkard & Messick, 1985)

Please put an X in the box that is the best answer for each question below. [The following items were measured on a four point Likert scale with 1 being “definitely false” and 4 being “definitely true”.]

1. When I smell a delicious food, I find it very difficult to keep from eating, even if I have just finished a meal.
2. I deliberately take small helpings as a means of controlling my weight.
3. When I feel anxious, I find myself eating.
4. Sometimes when I start eating, I just can't seem to stop.
5. Being with someone who is eating often makes me hungry enough to eat also.
6. When I feel blue, I often overeat
7. When I see a real delicacy, I often get so hungry that I have to eat right away.
8. I get so hungry that my stomach often seems like a bottomless pit.
9. I am always hungry so it is hard for me to stop eating before I finish the food on my plate.
10. When I feel lonely, I console myself by eating.
11. I consciously hold back at meals in order not to weight gain.
12. I do not eat some foods because they make me fat.
13. I am always hungry enough to eat at any time.

Circle the item that is the best answer to each question.

- 14 How often do you feel hungry?
 - 1 - Only at meal times
 - 2 - Sometimes between meals

3 - Often between meals

4 - Almost always

15. How often do you avoid "stocking up" on tempting foods?

1 - Almost never

2 - Seldom

3 - Usually

4 - Almost always

16. How likely are you to consciously eat less than you want?

1 - Unlikely

2 - Slightly unlikely

3 - Moderately likely

4 - Very likely

17. Do you go on eating binges though you are not hungry?

1 - Never

2 - Rarely

3 - Sometimes

4 - At least once a week

18. On a scale of 1 to 8, where 1 means no restraint in eating (eating whatever you want, whenever you want it) and 8 means total restraint (constantly limiting food intake and never "giving in"), what number would you give yourself?

References

- Biernacki, P., & Waldorf, D. (1981). Snowball sampling: Problems and techniques of chain referral sampling. *Sociological Methods & Research*, 10(2), 141-163. Retrieved from http://columbiauniversity.us/itc/hs/pubhealth/p8462/misc/biernacki_lect4.pdf.
- Braiker, H. B., & Kelley, H. H. (1979). Conflict in the development of close relationships. In R. Burgess & T. Houston (Eds.), *Social exchange in developing relationships* (pp. 135-168). New York: Academic Press.
- Buunk, B., Dijkstra, P., Fetchenhauer, D., & Kenrick, D. (2002). Age and gender differences in mate selection criteria for various involvement levels. *Personal Relationships*, 9, 271-278. Retrieved from <http://www.psych.ndsu.nodak.edu/colloquia/fall2009documents/nov13docs/Buunk%20Dijkstra%20Kenrick%202002%20Age%20gender%20ST%20LT%20matin g.pdf>.
- Center for Disease Control and Prevention. (2007). Life Stages & Specific Populations. In *Center for Disease Control and Prevention*. Retrieved July 10, 2011.
- Cook, W., & Kenny, D. (2005). The Actor–Partner Interdependence Model: A model of bidirectional effects in developmental studies. *International Journal of Behavioral Development*, 29(2), 101-109. Retrieved from <https://mywebspace.wisc.edu/rlbrown3/web/dyad/Cookandkenny.pdf>.
- Drigotas, S., Rusbult, C., Wieselquist, J., & Whitton, S. (1999). Close partner as sculptor of the ideal self: Behavioral affirmation and the Michelangelo phenomenon. *Journal of Personality and Social Psychology*, 77(2), 293-323. Retrieved from http://www.carylrusbult.com/documents/69_DrigotasRusbultWieselquistWhitton1999_JournalOfPersonalityAndSocialPsychology.pdf.
- Evans, L., & Wertheim, E. H. (1998). Intimacy patterns and relationship satisfaction of women with eating problems and the mediating effects of depression, trait anxiety and social anxiety. *Journal of Psychometric Research*, 44(3), 355-365.
- Groesz, L., Levine, M., and Murnen, S. (2002). The Effect of Experimental Presentation of Thin Media Images on Body Satisfaction: A Meta-Analytic Review. *Int. J. Eat. Disord.* 31: 1-16.
- Grote, N. K., Clark, M. S., and Moore, A. (2004). Perceptions of injustice in family work: The role of psychological distress. *J. Fam. Psychol.* 18(3): 480–492. doi: 10.1037/0893-3200.18.3.480.
- Harrison, K. (2000). The Body Electric: Thin-Ideal Media and Eating Disorders in Adolescents. *Journal of Communication*, 119-143. Retrieved from

<http://deepblue.lib.umich.edu/bitstream/2027.42/75586/1/j.1460-2466.2000.tb02856.x.pdf>.

- Herman, C., Olmsted, M., & Polivy, J. (1983). Obesity, externality, and susceptibility to social influence: An integrated analysis. *Journal of Personality and Social Psychology*, 45, 926-934. doi: 10.1037/0022-3514.45.4.926.
- Herman, C., & Polivy, J. (1980). Restrained eating. In A. J. Stunkard (Ed.), *Obesity* (pp. 208-225). Philadelphia: W. B. Saunders.
- Herman, C., & Polivy, J. (1984). A boundary model for the regulation of eating. In A. J. Stunkard & E. Stellar (Eds.), *Eating and its disorders* (pp. 141-156). New York: Raven Press.
- Kelly, L. (2007). Lesbian body image perceptions: The context of body silence. *Qualitative Health Research*, 17(7). doi: 10.1177/1049732307306172.
- Kenny, D.A., Kashy, D.A., & Cook, W.L. (2008). A guide for the estimation of gender and sexual orientation effects in dyadic data: An actor-partner interdependence model approach. *Pers. Soc. Psychol. Bull.*, 34 (3), 321 – 336. doi: 10.1177/0146167207311199.
- Klajner, F., Herman, C., Polivy, J., & Chhabra, R. (1981). Human obesity, dieting, and the anticipatory salivation to food. *Physiology and Behavior*, 27, 195-198. doi: 10.1016/0031-9384(81)90256-0.
- Levine, M.P., & Smolak, L. (1998). The mass media and disordered eating: Implications for primary prevention. In W. Vandereycken & G. Noordenbos (Eds.), *The prevention of eating disorders* (pp. 23-56). London: Athlone Press. doi: 10.1002/eat.10005.
- Lohman, T. G., Roche, A. F., and Martorell, M. (1988). *Anthropometric Standardization Reference Manual*. Human Kinetics, Champaign, IL.
- Lowe, R. (1993). The effects of dieting on eating behavior: a three-factor model. *Psychological Bulletin*, 114 (1), 100-121. doi: 10.1037/0033-2909.114.1.100.
- Markey, C., & Markey, P. (2006). Romantic relationships and body satisfaction among young women. *Journal of Youth and Adolescence*, 35(2), 256-264. doi: 10.1007/s10964-005-9013-6.
- Markey, C., & Markey, P. (2010). Romantic partners, weight status, and weight concerns. *Journal of Health Psychology*, 20 (10), 1-9.
- Markey, C., & Markey, P. (2012). *Lesbian partners' weight status and weight concerns*. Manuscript submitted for publication.

- Markey, C., Markey, P., & Birch, L. (2001). Interpersonal predictors of dieting practices among married couples. *Journal of Family Psychology*, 15 (3), 464-475. doi: 10.1037/0893-3200.15.3.464.
- Polivy, J., & Herman, C.P. (1985, February). Dieting and bingeing: a causal analysis. *American Psychologist*, 40(2), 193-201. doi: 10.1037/0003-066X.40.2.193.
- Rand, C., & Kulda, J. (1991). Restrained eating (weight concerns) in the general population and among students. *International Journal of Eating Disorders*, 10(6), 699-708. doi: 10.1002/1098-108X(199111)10:6<699::AID-EAT2260100608>3.0.CO;2-0.
- Rosen, J. (1981). Effects of low-calorie dieting and exposure to diet-prohibited food on appetite and anxiety. *Appetite: Journal of Intake Research*, 2, 366-369. doi: 10.1016/S0195-6663(81)80023-2.
- Sanchez, D., & Kwang, T. (2007). When the relationship becomes her: revisiting women's body concerns from a relationship contingency perspective. *Psychology of Women*, 31(4), 401-414. doi: 10.1111/j.1471-6402.2007.00389.x
- Stephens, D.L., Hill, R.P., & Hanson, C. (1994). The beauty myth and female consumers: The controversial role of advertising. *The Journal of Consumer Affairs*, 28, 137-153. doi: 10.1111/j.1745-6606.1994.tb00819.x
- Stevenson, C., Doherty, G., Barnett, J., et al. (2007). Adolescents' views of food and eating: Identifying barriers to healthy eating. *J. Adolesc.*, 30, 417-34. doi: 10.1016/j.adolescence.2006.04.005.
- Stice, E., Schupak-Neuberg, E., Shaw, H. E., & Stein, R. I. (1994). Relation of media exposure to eating-disorder symptomatology: An examination of mediating mechanisms. *Journal of Abnormal Psychology*, 103, 836-840. doi: 10.1037/0021-843X.103.4.836.
- Stunkard, A., & Messick, S. (1985). The three-factor eating questionnaire to measure dietary restraint, disinhibition and hunger. *Journal of Psychosomatic Research*, 29(1), 71-83. doi: 10.1016/0022-3999(85)90010-8.
- Swami, V., & Tovee, M. (2006). The influence of body mass index on the physical attractiveness preferences of feminist and nonfeminist heterosexual women and lesbians. *Psychology of Women*, 30(3), 252-257. doi: 10.1111/j.1471-6402.2006.00293.x.
- Thompson, J. K., & Stice, E. (2001). Thin-ideal internalization: Mounting evidence for a new risk factor for body-image disturbance and eating pathology. *Current*

Directions in Psychological Science, 10(5), 181-183. doi: 10.1111/1467-8721.00144.

U. S. Census Bureau. (2000). Profile of selected social characteristics: Allegany County, N.Y. Retrieved May 3, 2012, from <http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml>.

Wagenbach, P. (2004). Lesbian body image and eating issues. *Journal of Psychology & Human Sexuality*, 15(4), 205-227. doi:10.1300/J056v15n04_04.

Weller, J. E., and Dziegielewski, S. F. (2004). The relationship between romantic partner support styles and body image disturbance. *J. Hum. Behav. Soc. Environ.* 10(2): 71–92. doi:10.1300/J137v10n02_04.

Yancey, A., Cochran, S., Corliss, H., & Mays, V. (2003). Correlates of overweight and obesity among lesbian and bisexual women. *Preventive Medicine*, 36. doi: 10.1016/S0091-7435(03)00020-3.