THE MEDIATING ROLE OF RISK PRONENESS

ON THE ECOLOGY OF ADOLESCENT HEALTH RISK BEHAVIOR

BY

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ABSTRACT OF THE DISSERTATION

The Mediating Role of Risk Proneness
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The co-occurrence of sexual behavior and substance use among adolescents–both licit and illicit–is well substantiated in the socio-medical literature. However, limited studies have been published which focus on the context and psychosocial relationships which predispose youth to engage in risk behavior. The interaction between environment and health risk behavior during teen years can set the stage for later-life deleterious health outcomes. Thus, this research examines how adolescent self-rated risk proneness in conjunction with underlying psychosocial mechanisms predicts the likelihood of engaging in concurrent sexual behavior and alcohol use.

The current literature has demonstrated the strong association between the co-occurrence of illicit drug use and sexual behavior. However, tantamount to this

relationship are, psychosocial factors which, when examined concomitant with health risk behaviors grouped by maternal educational attainment, will help elucidate differences between categories of youth at risk for compromised mental and physical well-being. The Bronfenbrenner ecological framework is utilized to substantiate the relevance of health risk behaviors, environment and the importance of studying psychosocial factors in multivariate models.

The data selected for analysis to both demonstrate these relationships and identify risk profiles originate from the National Longitudinal Survey of Youth (NLSY), Young Adult 1998 cohort. Partitioning the NLSY 1998 cohort by mother's education tests how risk proneness as a mediator differs by maternal highest grade completed, as it affects adolescent deleterious behavior. These data are renowned for an oversampling of African Americans and are nationally representative of other ethnic groups such as Hispanics and Asians, requiring the application of an algebraic weight to normalize against the US population. Therefore, the key findings discovered in this study are: (1) the mediational effect in the pathway to health risk behaviors is risk proneness; (2) reported depressive illness symptoms are the underlying mechanism of risk proneness; (3) the path model is robust when tested among different groups using the Bronfenbrenner ecosystem paradigm; and (4) the weighting technique is vital to preserving the original distribution of the population, since the study sample needs to reflect the actual proportion of racial/ethnic groups in the US population.

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Dedication

This dissertation is dedicated to my beloved parents, father, Eli Whitney Agre (1907-1982) and mother, Grace Samantha Salser Agre, as well as my siblings, Steven Myles Agre, Barbara Ruth Agre Mongiardo and brother-in-law Honorable Bruno Mongiardo for their inspiration and mentorship. Additionally, I dedicate this thesis to my nephew, Evan Andrew Mongiardo and my niece, Rebecca Lynne Mongiardo and all the other children who have blessed my life with their energy, love and laughter.

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CHAPTER ONE: STATEMENT OF THE RESEARCH PROBLEM

Few studies examining the relationship between simultaneous sexual behavior and alcohol use among adolescents investigate the role of maternal educational attainment in attenuating the proclivity to engage in risk behavior. Moreover, little research on risk perception among youth has been conducted evaluating the interplay of risk proneness (likelihood to engage in risk) with psychosocial variables such as neighborhood quality, perceived closeness between parents and depressive illness symptoms. This study will consist of two parts: first, does self-rated risk perception (risk proneness) influence health behaviors, such as substance use and sexual risk taking; and second does self-rated risk perception (risk proneness) mediate the effects of health behavior and social environmental factors, which include depression, parenting and neighborhood quality on health behaviors? While peer pressure could be a measure of influence, little research has explored the effect of parental education, and in particular maternal education as a protective factor in determining health behavior outcomes. It is necessary, then, to examine maternal education as a key factor in elucidating the process of adolescent health risk decision making. In this analysis, mother's educational attainment is conceptualized as a proxy for social support, specifically the dimensions of appraisal and informational support as asserted by House, (1981). With respect to the four dimensions of social support as defined by House (1981), i.e. emotional, instrumental, informational and appraisal, the latter two in particular involve increased educational attainment, leading to better decision making. Social support has been demonstrated to improve health outcomes (Uchino, 2004) and may also decrease the likelihood of engaging in deleterious health risk behaviors among adolescents.

1.1 Description of the Current Study

        With the rise in STD transmission rates (YRBSS, 2007) and teen pregnancy

(YRBSS, 2007), the propensity toward early initiation of sexual behavior coupled with

alcohol and licit/illicit drug use has generated concern about the welfare of our youth and

later-life outcomes associated with these social health problems. Previous research has

demonstrated that sociodemographic characteristics including race, gender, income and

low income neighborhoods predispose youth at an early age to initiate sexual behavior.

However, these characteristics only explain a portion of the variance associated with

these risk profiles. Based on the Bronfenbrenner Ecological framework and using the

1998 National Longitudinal on Youth Young Adult Survey, this study will examine

psychosocial and environmental factors among youth ages 14 to 21 years at the

individual and familial level that predispose teens to self-identify as high versus low risk.

Multivariate analysis of covariance (MANCOVA) will be used to investigate the mean

differences of low and high risk proneness scores among adolescents on multiple

outcomes or dependent variables i.e. alcohol use and sexual activity based on the

covariates of neighborhood quality, perceived closeness between parents and depressive

illness symptoms.   Self-rated risk proneness, in conjunction with the psychosocial and

environmental factors, will be assessed in path analysis as a mediating step to engaging in

alcohol and tobacco use and sexual behavior. Corresponding risk profiles will be

developed that predict likelihood of combined sexual initiation and drug and alcohol use,

applying MANCOVA and discriminant analysis (Aneshensel, 2005).

        Adolescents have always been a vulnerable population. Adolescence marks a

particularly fragile and sensitive period as a child makes the passage to adulthood socially, physiologically, and psychologically. Arnett views adolescence as emerging adulthood, in which youth may not only experiment but establish patterns that can result in a life long trajectory of synergistic mental and physical health problems (Arnett 1996; 2001; Arnett and Taber, 1994). Caught between child and adult, protective or disruptive forces from the environment acting in concert with the biopsychological characteristics (i.e. inherent) often predispose youth to deleterious later-life outcomes. Political Scientist Charles Murray (2006) identifies those at-risk youth as potential purveyors of poverty– i.e. low educational attainment coupled with teenage childbearing. Sociologist William Julius Wilson (2009) describes vulnerable teens as the possible rising urban underclass, economically relegated to ghettos, victims of social anomie and racial and ethnic segregation. Nevertheless, recent evidence from national surveys has shown that substance use among adolescents in rural areas of the US now exceeds the rate of reported use in urban areas (Shears, Edwards & Stanley, 2006). However, none of these data examine how these youth perceive their own risk proneness.

It is vital, then, to examine from the youth's perspective whether teens view themselves as risk adverse versus risk prone. One issue that has not been studied is the likelihood of a detrimental health outcome and their own personal estimation of that risk. Further, few studies have examined high risk proclivity versus low risk proclivity. Biologists, psychologists and sociologists often discuss the invincibility of youth in relation to sensation seeking or risk proneness. However, risk proneness as a type of invincibility has not been examined from the youths' viewpoint. Risk as a social, mental and physical construct has rarely been examined from the perspective of a teen in the

form of sensation seeking (Roth, Hammelstein, & Brahler, 2007). Moreover, youth underestimate or distort their susceptibility. Thus, the benefits and rewards associated with engaging in health risk behaviors (i.e. immediacy vs. deferral) may reinforce the utility derived from risk behavior–such as pleasure (Roberti, 2004). Offsetting pervasive sense of hopelessness, operationalized in these data as depressive symptoms, has been offered as one hypothesis underlying the basis for the proclivity to engage in risk (Hollander, 2006). This and other suppositions will be examined, probing how self-rated risk assessment or risk proneness influences behaviors that subsequently affect health status even in later-life adulthood (Idler and Benyamini, 1997).

Limited studies have explored how family environment, peer influence and neighborhood quality affect youth risk proneness in relation to health risk behavior, such as alcohol use and sexual activity. For example, does a youth's own self-rating of risk (risk proneness) predict potentially harmful health behaviors such as illicit alcohol use and unprotected sexual behavior? Thus, using the National Longitudinal Survey on Youth (NLSY) 1998 Young Adult Cohort, this study based on the youth's attitudes and beliefs, will examine how teens, view their neighborhoods, the relationship quality between parents, and rate their depression and how these personal and environmental contexts influence their own perception of their risk propensity. This self-rated risk proneness will then be examined as a predictor for alcohol use and sexual behavior. Discriminant analysis will be applied to distinguish differences in underlying sociodemographic, psychosocial proclivities and health behaviors (alcohol use and sexual risk taking) among high, middle and low risk proneness groups. MANCOVA will then test the mean difference between (Kachigan,1991) high and low risk with multiple outcomes of alcohol

use and sexual activity. Partitioning groups by mother's educational attainment will investigate how mother's educational attainment as a protective factor is linked to preventing deleterious health risk choices. Highest grade completed as reported by the mother will be explored within the context of individual, family and neighborhood assessments akin to contexts of Bronfenbrenner's micro meso exo and macro systems (Bronfenbrenner, 1979; 2005). Within these four dimensions of an ecosystem, the protective effect of education can shield the environmental influence. These four domains identified by Bronfenbrenner (1979; 2005) interact as concentric circles nested within each other, constituting the ecosystem of an adolescent.

The predominate theories of health behavior focus on internal locus of control measured as discrete stages captured as inputs, with a mediating stage of throughput with the output or resulting external locus of control. These frameworks, such as the social learning theory (Bailey, Flewelling, Rachal, 1992), the Ajzen-Fishbein theory of reasoned action (Bailey, Flewelling, Rachal, 1992) and health decision making models (Langer and Warheit, 1992), emphasize internalizing negative or positive feedback from the network ties in the environment (i.e. peer pressure), and whether or not to follow these behavior patterns. Langer and Warheit (1992) assert that the limitations of all these health behavior models as applied to adolescent health-risk decision-making preclude a much-needed multidimensional approach to health behavior modification. Unlike the previous health models, Bronfenbrenner integrates person-process-context and time in his Ecological Model eventually integrated into a bio-psycho-social context as a paradigm for explaining health behavior. Previous health behavior paradigms contrast the fluid dynamic of the Bronfenbrenner model incorporating person, process, time and context,

laying the groundwork for the bioecological model (Bronfenbrenner, 1979; 1999; 2005).

1.1 Research Questions

This research examines the influence of psychosocial behaviors on adolescent risk assessment and in turn the effect of risk perception on health risk-taking decision-making such as alcohol and sexual behavior. The specific aims of this research are:

I. Does self-rated risk proneness predict health behaviors?

II. Does self-rated risk proneness mediate the effects of health behavior inputs on health behaviors?

III. Are the mediational effects of self-rated risk perceptions different among members of different groups?

1.2 Relevance of the Study

This study intends to utilize a national representative sample, the National Longitudinal Survey of Youth, 1998 Young Adult cohort to demonstrate the mediational role of risk proneness – how environment influences cognition – in safeguarding against adolescent deleterious health choices. Other nationally representative data sets such as the National Longitudinal Survey of Adolescent Health (Add Health) concentrate primarily on youth relationship dyads in the context of school settings. Moreover, the Centers for

Disease Control and Prevention, Youth Risk Behavior Risk Surveillance Survey

(YRBSS) focuses on epidemiological incidence and prevalence trends of alcohol, tobacco

and other drug use while engaging in sexual practices associated with concomitant risk

behaviors. While the YRBSS does examine the co-occurrence of alcohol and drug use

concomitant with sexual behavior, this survey does not assess psychosocial profiles of

adolescents (Santelli, Robin, Brener et al, 2001; Valois, Oeltmann, Waller & Hussey,

1999). Data from these other adolescent surveys have not been analyzed to reveal the

relationship between mother's education as a preventive measure against detrimental

adolescent health risk decision making. Previous studies do not address the concept of

adolescent self-rated risk and deleterious health outcomes. Further, the NLSY has been

used primarily to address the impact of psychosocial characteristics on both economic

and cognitive outcomes, but not on health behaviors, such as licit and illicit substance use

and sexual behavior (MaCurdy, Mroz, Gritz, 1998; Shillington & Clapp, 2000; Rashad,

& Kastner, 2004).

1.3 Structure of the Dissertation

The dissertation begins with the theoretical framework for the research plan, i.e

the Bronfenbrenner model, setting the stage for a bioecological approach to the life

course. A comprehensive survey of the literature relevant to adolescent risk and

protective factors is then introduced. Next, adolescent risk proneness in association with

adolescent risk and protective factors, such as perceived parental closeness, depressive

illness symptoms, and maternal education are then examined. The chapter continues with

the influence of adolescent social environments evaluated at the individual, family, and neighborhood levels. The chapter components include discussion on adolescent depression, substance use, and sexual behavior with a focus on co-occurrence of drug/alcohol use, culminating into implications for adolescent later-life outcomes. The following chapter then describes the data source, data collection methodology, the variables and factors determining the outcomes, concluding with a description of the analytic methods to be employed in model testing and mock tables for reporting the results. The final chapter of the dissertation focuses on discussion of the findings, support for the theoretical paradigm, implications for policy, practice, and future research. Limitations of the research study are also presented, relevant to inferences that can be made based on these data.

CHAPTER TWO: THEORETICAL FRAMEWORK AND LITERATURE

REVIEW

2.1   Ecological Framework Measuring Three Levels of Influence on Risk Proneness

Applying the ecological perspective, the Bronfenbrenner approach views behavior

as a consequence of interactive exchange between environments (Obeidallah, Brennan,

Brooks-Gunn, et al, 2004). Strain in one environment can infiltrate another environment,

through acting out behavior which permits the release of the stress (Pearlin, 1981). In

this study, the effect on health risk behavior is based upon a self-rated perception of risk

or risk proneness in conjunction with the influence of multiple environments.

Bronfenbrenner's ecological paradigm considers role expectations of the individual in

different environments in contrast to the internal-external locus of control model simply

viewing impulse control as total reliance on inhibition of self (Rotter, 1966). Moreover,

divergent from the internal-external locus of control, the Bronfenbrenner paradigm does

take into account how multiple environments and the influence of the behavioral

exchange within those environments can temper the individual's capacity to engage in

behavior detrimental to physical and mental well-being.

In Bronfenbrenner's seminal work *The Ecology of Human Development*

(1979), he presents six definitions which explain the main principles of an ecosystem, as

quoted directly from his text.

Definition 1: The ecology of human development involves the scientific study of the
progressive, mutual accommodation between an active, growing human being and the
changing properties of the immediate settings in which the developing person lives, as
this process is affected by relations between these settings, and by the larger context in

which the settings are embedded.

Definition 2: A microsystem is a pattern of activities, roles, and interpersonal relations experienced by the developing person in a given setting with particular physical and material characteristics.

Definition 3: A mesosystem comprises the interrelations among two or more settings in which the developing person actively participates (such as, for a child, the relations among home, school and neighborhood peer group; for an adult, among family, work and social life).

Definition 4: An exosystem refers to one or more settings that do not involve the developing person as an active participant, but in which events occur that affect, or are affected by, what happens in the setting containing the developing person.

Definition 5: The macrosystem refers to consistencies, in the form and content of lower-order systems (micro-, meso-, and exo-) that exist, or could exist at the level of the subculture as a whole, along with any belief systems or ideology underlying such consistencies.

Definition 6: An ecolglical transition occurs whenever a person's position in the ecological environment is altered as a result of a change in role, setting or both.

The interaction, then, between the person and the environment–depending upon personality–dictates how different persons respond to the environment or what would constitute a genetic-environmental exchange (Crockett and Crouter, 1995).

Thus, the Bronfenbrenner model views the individual as both the decision maker and the operator, neither placing the blame on the self, nor viewing another as blameworthy. Rather, the change in behavior is dependent upon the fluid process of one environment influencing another with the individual at the center of this total milieu, functioning in relation to the total dynamic of these systems. Consequently, the protective factor of maternal education in these different contexts—micro- meso and exo-systems— act as buffers when disruptions occur in each of these domains. An ecosystem, then, is defined as interacting environments–i.e. individual (micro) peers, family, relatives

(meso), school system, the community (exo) , and the social welfare/criminal system (macro) (Ginther, Haveman, & Wolfe, 2000.)   The Bronfenbrenner ecological model encompasses the individual, family, and extra-familial level which includes assessments at the individual level, parenting, and neighborhood quality levels (Small and Luster, 1994).

2.2   Bronfenbrenner Ecosystem in Evaluating Risk Likelihood

Figure 2.1 illustrates the framework selected for assessing the multiple interacting environments based on the Bronfenbrenner ecological approach (1979), comprised of the individual, family, and extra-familial level (Small and Luster, 1994) contained in the ecosystem (Ginther, Haveman, and Wolfe, 2000). In this study, the effect on health risk behavior is based upon an adolescent's self-rated perception of risk proneness in conjunction with the influence of multiple environments. The ecosystem of Bronfenbrenner establishes the relationship between internalizing and externalizing problems (internal-external locus of control) lodged in a set of nested environments. Within these contexts, self-salience—total reliance on self versus the collective— emerges as an interactive process between the individual and the environment, where intensive internalizing yields depression and extensive externalizing promotes substance use, as studied in female and male adolescents (Rosenfield, Lennon and White, 2005).

Figure 2-2 shows how disruption of an adolescent's environment (macro-system) consisting of sub-components neighborhood quality (exo-system) as measured by poorer

neighborhood ratings, lower perceived closeness between parents (meso-system) and increased depressive symptoms (micro-system) can promote risk proneness (Wheaton & Clarke, 2003). Figure 2-3 portrays the adolescent health risk decision making process as it moves from altered state (Bronfenbrenner's ecological transition) to presaged intention (propensity to engage in risk) and finally to the manifestation stage, measured as outcomes such as alcohol and sexual behavior (Rosenberg, 2004). The presence of maternal education introduced as a buffer or moderator (interaction term) may offset the tendency to engage in risk, implemented and tested instead by dividing the adolescent sample into groups by mother's highest academic grade completed. Figure 2-2, then, depicts effect of maternal characteristics on adolescent health behaviors, through inter-generational transfer, since groups will be partitioned by maternal education (Serbin & Karp, 2004). Family, during childhood, are indeed persuasive but later peers replace and subsequently supplant their importance in health risk decision-making.

Figure 2.1 Bronfenbrenner's *Macrosystem/Ecosystem and Health Risk Behaviors*

Adapted from:
- (1) Bronfenbrenner, U. (1979). *The Ecology of Human Development*. Cambridge, MA: Harvard University Press.
- (2) Small, S.A. & Luster, T. (1994). Adolescent sexual activity: an ecological risk-factor approach. JMF, 56:1, 181-192.

Figure 2.2 Effect of Altered Ecosystem and Risk Perception on Adolescent Health Behaviors

2.3 Perceived Neighborhood Quality

Concurrent with the monitoring quality of parent-child relationship, researchers

have explored the neighborhood as a foci for festering social problems, such as substance

use among adolescents (Schaefer-McDaniel, 2008). Neighborhoods replete with social

disorganization plagued by economic deprivation and lack of residential stability, appear

to be targeted as milieu for transmitting the contagion of substance abuse among

adolescents (Chuang, Ennett, Bauman, et al, 2005). Low social cohesion, that is a community lacking resources, including affordable housing, general safety and commitment and respect to the environs, has also been offered as one explanation for high prevalence of drug and alcohol among youth in these settings (Chuang, Ennett, Bauman, et al, 2005). Social norms are transferred from one cohort of teens to another, with schools in certain neighborhoods reflecting these values. However, Chuang et al (2005) discovered that lower population density neighborhoods historically have higher rates of alcohol and cigarette use, in spite of their more affluent socioeconomic climate and low residential turnover. Youth originating from higher income homes may have greater available disposal income permitting them access to cigarettes, drugs and alcohol, perhaps employed as a substitute for emotional support in some instances. Adolescent substance use arises out of a complicated web of interactive environmental forces, including family, school and neighborhood, tempered by influences from parents/guardians, educators and peers alike (Small and Luster, 1994).

Likewise, neighborhood context with high level of social disorganization, such as poverty and idle youth, can also influence early initiation of sexual behavior (Cubbin, Santelli, Brindis, et al, 2007). Parental involvement in the form of monitoring can further delay sexual behavior, as observed by Roche et al, 2005.   Yet, these studies did not include both measures of both neighborhood rating and parent-child relationship quality assessment in their models. Thus, using neighborhood evaluation and parenting in the same analysis, and its association with both sexual risk taking and alcohol, can extend the literature creating linkages between youth and their socio-environment, informing practitioners where and how to target intervention programs.

2.3.1 Neighborhood Influence

In addition to spatial analysis of disease clusters and the development of epidemiological catchment areas designed to target treatment and prevention, how individuals perceive the quality of their neighborhoods and the impact of their perception on their behavior in determining health and well-being needs to be considered (Cubbin, Santelli, Brindis, et al., 2005). The context of environment quality may reflect how residents view their mental health and well-being in conjunction with other physical health behaviors such as substance use, and level of depressive symptoms. Moreover, residents' beliefs, attitudes and feelings about their community may influence their social conduct within that milieu. The teen years are critical in ascertaining how the role of the neighborhood contributes toward health and well-being outcomes in later-life.

Low collective efficacy (mutual trust and expectation of prosocial behavior) and social disorganization in neighborhoods with single parent households (particularly female) can contribute to poor physical health through low physical activity and inducement of stress hormones such as adrenalin (Browning and Cagney, 2003; Ross and Mirowsky, 2001). Moreover, neighborhood physical conditions such as decay of structures is associated with morbidity, such as sexually transmitted diseases like gonorrhea and premature mortality from heart diseases, cancers, diabetes, homicide and suicide (Cohen, Mason, Bedimo, et al, 2003). Adolescents who originate from communities plagued with financial hardship, structural disarray and low norms for healthy lifestyle, may be more inclined toward risk-proneness behavior (Kruger, Reischl

& Gee, 2007). Indeed, Latkin and Curry (2003) found poorer mental health as measured by depressive symptoms is associated with neighborhoods displaying high social disorder such as abandoned buildings, litter, vandalism and theft. Consequently, depression could be an underlying mechanism underscoring risk-proneness in adolescents or sensation seeking—a counterbalance to displace mood (Agre, 2006; Longmore, Manning, & Giordano, 2004).

2.3.2 Environmental Contexts: Neighborhood and Parenting

Building on existing applications of Bronfenbrenner, co-authors Aneshensel and Sucoff (1996) incorporate measurement of neighborhood quality into their study--a context integral to the ecological paradigm. How adolescents perceive the quality of their neighborhoods and the impact of their perception on their behavior can lead to a feeling of disconnectedness, lack of a sense of community and individualism (Aneshensel and Sucoff, 1996; Gary, Stark, & LaVeist, 2007). Social isolation can manifest in the form of depression or even low social conduct. Normative standards in a neighborhood can encourage or discourage either positive or negative social conduct simply by the community ambience like garbage, decaying buildings, graffiti and cohesiveness such as crime, drugs and alcohol (Aneshensel and Sucoff, 1996; Echeverria, Diez-Roux, Shea, et al, 2008).

Moreover, Keegan Eamon (2001) examined when the neighborhood quality is perceived as low, parenting practices can offset the environmental influences that may

predispose younger adolescents to antisocial behavior. Authoritative parenting defined as setting reasonable limits appears to promote prosocial behavior. Parenting practices can shape antisocial behavior in the mesosystem, which can be reinforced by peer values, who share antisocial delinquent behavior in the exosystem (Browning, Leventhal, Brooks-Gunn, 2005). On the other hand, authoritarian parenting practices can be perceived as dictatorial by the adolescent within the family mesosystem context. This interaction, in turn, may encourage adolescents to act out, which could lead them to associate with peers who also reinforce antisocial behavior. Youth who are exposed to abberant normative and aggressive behavior, who value social deviance in the neighborhood, and react to stressors such as violence and vandalism in conjunction with economic pressure (Wilson, 1991), will themselves endorse antisocial activities, which include substance use and sexual intercourse at an early age.

Within the exosystem context, the study of adolescent risk proneness requires an examination of friendship culture in shaping health risk decision making. Psychologists traditionally associate friendship with development (Crosnoe & Elder, 2004a). Piaget and Vygotsky promulgated the symbolic interactionist approach to development where behavior defines reality (Crosnoe, 2000; Crosnoe & Elder, 2004b). Trait and state remain distinctly separate but where actions in situ reflect genetic predisposition. Bronfenbrenner's (1979) ground breaking work in conjunction with Elder's (1995; Bronfenbrenner, 2005) life course approach still encompasses reality constructed through behavior, but those realities are now defined as dynamic fluid systems. The cybernetic feedback loop between self and other extending beyond Rotter's (1966) internal and external locus of control becomes a trajectory lodged within social contexts. The life

course approach of Elder (1995) integrated with Bronfenbrenner's ecosystem (1979; 1999; 2005) views friendship development as a process-context interaction, measured as role transitions (Crosnoe, 2000; Crosnoe & Elder, 2004a). The separateness of childhood, adolescence and adulthood are now tied, where patterns emerge in one period of life that may predict well-being in later life (Crosnoe & Elder, 2004b). Therefore, it is necessary to examine the interactive effect of individual , family, and community environment influence on adolescents, in order to understand how the confluence of these dynamics contribute to health risk behaviors or the macrosystem (Browning, Leventhal, and Brooks-Gunn, 2004).

2.3.3 Ecological Transition and the Vulnerability to Deleterious Health Behaviors

Throughout the life course, human beings experience role changes, based on new environments, new exchanges in those environments and interactions (Pearlin, Schieman, Fazio et al, 2005). The ever-changing dynamic of transition between the different macrosystem levels is a fluid process, where the micro, macro and exo systems can predominate at different phases of the life course. Adapting Bronfenbrenner's ecological model as the basis for a cumulative risk model, showing the interconnectedness between the individual, family, peers and neighborhood (Perkins, Luster, Villarruel, et al, 1998; Small & Luster, 1994), Small and Luster's study in 1994 of 2,168 adolescents enrolled in the 7th, 9th and 11th grades demonstrated that low parental monitoring, using a multi-item scale, significantly predicted early sexual activity for youth of European white ancestry.

2.4 Influence of Adolescent Social Environments on Risk Proneness

2.4.1. Perceived Parenting: Quality of Parent-Child Relationship

The quality of parent-child relationship has been measured through direct communication concerning risk-taking behaviors such as substance use and sexual activity (Velleman, Templeton, & Copello, 2005). While adolescents are more inclined to discuss such potential detriments to health with their peers (Holtzman & Rubinson, 1995), adolescents whose parents openly discuss risk proneness or sensation seeking experimentation report lower intention to commence sexual activity before completion of high school (Blake, Simkin, Ledsky, et al, 2001). Family support can offset peer pressure (Rodgers-Farmer, 2000). For example, parental support versus dominance or control can deter teens from engaging in higher risk sexual activity, which encourages making responsible choices about their behavior, such as condom use (Boyce Rodgers, 1999). In the second half of the twentieth century, drug prevention has focused primarily on cocaine, hallucinogens and opiates such as heroin. However, fewer adolescents use illicit drugs as compared to alcohol and tobacco use (YRBSS, 2007). Parental monitoring of these legal substances through open communication appears to attenuate likelihood to pair alcohol use with such actions as drinking and driving (Bogenschneider, Wu, Raffaelli, et al, 1998).

Parental supervision may not only imbue personal values but convey normative behavioral expectations through intergenerational transfer, thus serving as a role model

for lifestyle and healthy behaviors (Wickrama, Conger, Wallace & Elder, 1999; Bronfenbrenner, 1995; 1999; Elder, 1995). While peers may exert a dominating influence on teens with parental control presenting conflicting choices about risk behavior, parental and family interaction can still act as a countering force to the pressure from other youth (Aseltine, 1995). Gerard and Buehler (1999) show in an additive, independent regression model that poor parenting, as measured by youth ratings of negative reinforcement and authoritarian monitoring in conjunction with financial hardship, does predict externalizing behavior or acting out for both male and female youth, i.e. stealing, aggression and cruelty.

In the NLSY, perceived parental closeness and agreement on rules can be considered parental monitoring. Concordance between parents on rules can influence such child outcomes as smoking initiation for example (Harakeh, Scholte, Vries, et al, 2005). Indeed, youth's perception of inter-parental communication and agreement on rules predicts child behavior better than parental reports (Dalton, Adachi-Mejia, Longacre, et al, 2006). Teen's self-reports of how often parents argue and/or how well they get along denotes the child's interpretation of required obedience (Darling, Cumsille, Caldwell, et al, 2006). The triangulation of child's perception of parenting behaviors reveals how youth conceive of parental closeness (Schum and Stolberg, 2007). According to Amato (2005), children, who experience cooperative parenting, defined as parents who communicate and agree on rules, internalize these norms and thus model this behavior in interactions with peers. Therefore, co-parenting and inter-parental communication serve as a type of parental monitoring, measured as perceived closeness between parents in the NLSY Young adult cohorts.

2.5 Bioecological Model Vulnerability of the Adolescent Life Stage to Risk Proneness

2.5.1 Adolescence In Life Course Context - Process-Person-Context-Time (PPCT)

Invoking and integrating the sociological perspective in the Bronfenbrenner framework, the process-person-context-time (PPCT) concept is essential in understanding how youth have become marginalized on some level–in particular urban youth (Wilson, 2009). Yet, youth in rural settings can also experience similar social isolation and lack of empowerment, due to a dearth of economic opportunity and limited access to informational resources. For example, in a mixed methods (quantitative-qualitative) study assessing health risk behaviors and access to health care among 15-to-17 year olds residing in rural Minnesota, youth in this study who reported concomitant alcohol use, sexual behavior and deleterious sensation seeking activities, still perceived themselves as invincible and with excellent health status (Elliott & Larson, 2005). The model of micro, meso and exosystem which comprises the macrosystem, then, can be applied to adolescents across urban and rural domains, and is best described as spheres within a sphere (Small and Luster, 1994) (see figure 2-1). Bronfenbrenner (1999; 2005) in later work revises the ecological model to the bioecological model to incorporate a life course view consistent with a broader bio-psycho-social view. Bronfenbrenner (1999; 2005) delineates contexts and examines the processes within the separate milieu vis-a-vis personal characteristics.

These enduring forms of interaction, then, are referred to as proximal processes.

In examining an ecosystem, i.e. the micro, meso, exo and macro components, Elder (1995) offers that process-person-context-time (PPCT) must be considered. He applies these concepts to social class and birth weight, for example, protective or disruptive forces from the environment in association with the biopsychological or inherent characteristics. Elder describes low birth weight outcome as a set of nested systems from the micro to the macro involving an interactive effect between individual health behaviors and environment acting in concert over time, harkening toward detrimental later-life outcomes--socioemotional, neurocognitive and behavioral. Bronfenbrenner's ecological model essentially underscores: (i) the basic life course principals of historical context; (ii) the timing of biological and social transitions in relation to culturally defined age, role expectations and opportunities available; (iii) the existence of all family members interdependent (cross-generational linked lives); and (iv) that human beings influence their own development through decisions and behavior (Elder, 1995). Adolescence is not simply a transition between childhood and adulthood but is a portion of the total life span trajectory. This study examines the Bronfenbrenner paradigm from a life course perspective through embeddedness and connectedness to social milieu, and appraisal of risk proneness as a sense of planfulness about an adolescent's trajectory, with implications for mid and later-life adulthood (Pearlin, Schieman, Fazio et al, 2005).

2.6 Adolescent Psychosocial Assessments and Risk Proneness

2.6.1 Adolescent Depression

Adolescent depression has been identified as the underlying mechanism for many harmful health behaviors, including suicide ideation and substance abuse. According to the Youth Risk Behavior Surveillance Survey of ninth through twelfth grade students (CDC, 2007), depression rates are higher among females (35.5%) than males (21.9%), particularly White (33.3%) and Hispanic (44.9%) adolescent females. Moreover, depressive symptoms as measured by the Center for Epidemiological Studies of Depression (Radloff, 1977) have been linked to poorer ratings of health status, both as physical fitness and overall self-rated health (Mechanic and Hansell, 1987). Research in the past twenty years has demonstrated not only a socioenvironmental intergenerational link between parents with depression and their children (Harrington, 2001), mediated in part by parenting behavior, (Ge, Conger, Lorenz, Simons, 1994), but distinct differences between male and female adolescents in the display of their depressive symptoms (Nash, McQueen & Bray, 2005). Using discriminant analysis with two different scales, i.e. the Beck Inventory of Depression and the Reynolds Adolescent Depression Scale, Baron and Campbell (1993) revealed males and females ages 14 through 16 years exhibit gender-specific behaviors. Females express their depression through body image distortion, loss of appetite, weight loss, sadness and discontent. In contrast, males display sensitivity, work disruption, social isolation and interference with sleep patterns.

2.6.2 Adolescent Gender Differences and Depression

Gender differences among adolescents with depressive symptoms arise out of the need for approval from peers in the face of self-critical concerns, triggered by a fear of failure and excessive need for autonomy and control (Schettini, Evans & Frank, 2004). Indeed, both male and female adolescents seek acceptance by peers but internalize their influences differently and thereby manifest depressive symptoms dissimilarly (Meadows, Brown and Elder, 2006). Male adolescents act out their depression through externalizing behaviors such as alcohol use; female adolescents turn inward through behaviors such as suicide ideation and in extreme cases suicidal attempts (Stanard, 2000). Moreover, Schettini, Evans and Frank (2004) demonstrate the high interaction effect between externalizing behavior, depression and alcohol use, as well as reactance, anger, social conduct problems, depression and externalizing behavior. Olssen, Nordström, Arinell, et al (1999) also find that cooccurrence between social conduct disorder and depression among male and female adolescents ages 16-17 years in Upsala, Sweden is also associated with more illness, and conflict and changes in family compared to their controls. One hypothesis offered as a basis for gender differences among adolescent depressive symptoms ages 12 to 17 is that females are differently affected by first-time romantic involvements than males when measured over different waves of the National Longitudinal Survey of Adolescent Health (Joyner & Udry, 2000). Onset of puberty and initiation of sexual behavior are associated with self-reported depression, with prevalence higher among female adolescents versus male adolescents (Kaltiala-Heino, Kosunen & Rimpela, 2003; Longmore, Manning, Giordano, et al, 2004). Depressive symptoms also

vary among racial/ethnic groups and even among different socioeconomic strata.

2.6.3 Race/Ethnicity Differences in Adolescent Depression

When controlling for race/ ethnicity differences, adolescents at greater risk for depression originate from lower income households whose parents have lower educational attainment (Goodman, Slap, & Huang, 2003). However, the expression of depression among various ethnic and racial groups differs widely (Choi, 2002). Choi (2002) describes wide variation among ethnocultural backgrounds in their manifestation of symptoms. These behaviors range from isolation in Asian Americans to self-hatred in African Americans to a sense of hopelessness or fatalism among Hispanic American adolescents. While these indicators have not been tested empirically comparing multiple groups in context, it is important to understand how cultures operate in situ, and how normative behavioral expectations differ among clusters, including an examination of the stress buffering effects of personal resources to offset depressive feelings (Turner, Taylor & Van Gundy, 2004).

2.7 Adolescent Risk Proneness and Effect on Deleterious Health Behaviors

Though the Bronfenbrenner model is applied to illustrate how different levels of human interaction affect adolescent health behaviors, risk proneness is the mediating process through which these inputs, such as depressive symptoms, operate (Hollander, 2006). In the National Longitudinal Survey on Youth (NLSY) Young Adult 1998 survey,

youth answered questions about likelihood to engage in risk behavior, or risk proneness (Raffaelli & Crockett, 2003). The risk proneness concept originates from the seminal work of Zuckerman (2007) and the sensation seeking index developed to assess this proclivity. Sensation seeking is defined as novelty, complexity and intensity of stimuli (Zuckerman, 2007). High risk-proneness then corresponds to greater likelihood to having a presaged intention to engage in activity that will increase dopamine, but synergistically inhibit serotonin and norepinephrine, based on the sensitivity of receptor cells, according to Zuckerman (2007). Molecular-biological models in animal studies have been offered to explain the euphoria experienced with risk behaviors. The predilection for such gratification induced by stressful or risky situations has been attributed to elevated levels of the hormone corticosterone in rats—a glucocorticoid secreted at the hypothalomo-pituitary-adrenal axis (Piazza, Deroche, Deminiere, et al, 1993). This corticosterone reinforced by psychostimulant drugs of abuse (such as opiates and glutamatergins) induces dopamine at the neuron level which can sustain and prolong feelings of euphoric pleasure.

In human behavior studies, examining human biological propensity and social control among adolescents ages 13 to 16 (mean age 14), Udry (1988) ascertained that androgenic (male) hormones are the basis for teen sexual behavior when increased at puberty, which promote libido. This physiological reaction thereby encourages rejection of conventional societal bonds and violation of normative standards leading to health risk behavior such as sexual activity, particularly for male youth. However, the interactive effect of social control and androgens more highly influences and therefore suppresses sexual activity for females than for males.

Similarly, Greene, Krcmar, Walters et al (2000) correlate measures of personal fable or susceptibility (comprised of three subscales i.e. omnipotence, uniqueness and invulnerability), risk taking personality (Likert scale rating of very unlike me to very like me) to sensation seeking behavior like tobacco, alcohol, sexual activity, reckless driving such as speeding and drinking and delinquent behavior among adolescents (ages 11-18) and college students (ages 18-25). The results reveal that higher personal fable (invincibility), higher sensation seeking and risk taking personality are related to risk behaviors. Analysis of Variance and t-test also demonstrate consistent mean difference scores between low risk-taking and high risk-taking personality and personal fable regardless of age, associated with drinking and other deleterious health behaviors, consistently highest among males. However, higher parental educational attainment is associated with less risky sexual behavior.

2.8 Adolescent Substance Use and Association with Risk Perception

Accordingly, it has also been demonstrated in the existing literature that parental support, depending upon the type, can negatively or positively enhance both mental and physical adolescent health behaviors, including substance use. For example, adolescent-family stressors and strains, specifically conflict between parent and child, adversely affect both male and female teen health risk decision making. Greater parent-child conflict appears to promote the use of alcohol, cigarette and marijuana (McCubbin, Needle & Wilson, 1985). Adolescence marks the period when youth assert their individuality, develop independence and form an identity separate from the family

structure (Bray, Adams, Getz et al, 2001). Equally as important as family cohesion, is the level of conflict which the adolescent experiences in the home, which may also lead to association with peers who may encourage deviant behaviors such as alcohol use (Bray, Adams, Getz et al, 2001; Getz & Bray, 2005).

2.9 Adolescent Sexual Behavior in Association with Risk Proneness

Consequently, health risk behavior including smoking does not usually happen without other concomitant substance use including drinking. In that vein, Mott, Fondell, Hu et al (1996) found a co-occurrence between the use of legal substances, such as alcohol and cigarettes and early initiation of sexual behavior before the age of fourteen. Using event history analysis, Rosenbaum and Kandel (1990) predict the log odds of a change in explanatory variables such as biological maturity and early onset of substance use, which predispose youth to early onset of sexual behavior. In this study, intact household structure, i.e. presence or absence of two biological parents exerts more influence on delayed debut of sexual behavior for Latino and White adolescents more than for Black youth. Male and females regardless of race/ethnicity, whose parents have higher educational attainment, higher aptitude test scores, and who reside in two biological parent-household, and have low participation in delinquent acts are more likely to postpone sexual experimentation until after the age of sixteen. Substance use during intercourse also appears to increase the likelihood of a greater number of partners as identified in the 1992 Youth Risk Behavior Surveillance Survey (Santelli, Robin, Berner et al, 2001). Further, multiple substance use is also associated with lower condom use

(Santelli, Robin, Berner et al, 2001).

However, Mott, Fondel, Hu, et al (1996) found that maternal education as a protective factor did not determine the age that a sample of high risk adolescents age 14 and less first had sex. High risk is defined as mother who had first sexual intercourse at an early age (before age 14) and who worked extensive hours. In multivariate model, low maternal education did not reduce the likelihood of adolescent's first intercourse before the age of fourteen (Mott, Fondell, Hu et al, 1996). While the mother's educational attainment did not affect the delay of sexual behavior initiation, the long number of hours reported working could correspond to a need for increased income, stemming from a lower wage and more hours needed to compensate for less pay. Since lower educational attainment is often correlated with lower income, perhaps the number of hours worked reflects jobs which require less formal education, therefore resulting in less time available for the mother to supervise the child. This study, while examining mother's education, did not assess the role of substance use and concurrent first time sexual activity. Thus, the two deleterious health behaviors working synergistically can promote other contemporaneous sensation seeking or risk proneness.

2.10 Co-morbidity Drug/Alcohol Use and Sexual Behavior Among Adolescents in Conjunction with Risk Proneness

Just as drug use impairs decision making, it has been demonstrated that alcohol myopia can distort cognitive processes involved with instigation versus inhibition of sexual behavior and whether to practice safe sex in conjunction with condom use

(Dermen & Cooper, 2000). In a meta analysis of the literature conducted by Donovan and McEwan (1995), alcohol use increased the likelihood of engaging in sexual behavior, which subsequently decreased the likelihood of using condoms during sexual activity. Moreover, adolescents with alcohol use disorders as defined by the Diagnostic Statistical Manual-IV are more likely to have more frequent sexual encounters and a greater number of sexual partners (Bailey, Pollock, Martin, et al 1999; Tubman, Wagner & Langer, 2003). Further, alcohol use is correlated with early introduction into sexual activity (Bailey, Pollock, Martin et al, 1999).

From a behavioral approach, drug use combined with risky sexual activity may simply be a mask for other psychosocial problems (such as depression, low mastery and self-esteem) which could also predispose these youth to HIV/STD exposure (Tubman, Wagner & Langer, 2003). The study of causes and consequences of drug use differ widely, ranging from the deleterious immunological effects to impaired cognitive ability, to compromised emotional well-being, to the lack of assets necessary for basic living expenses (Johnson & Kaplan, 1990; Hansell & White, 1991). Some research may not be controlling for the selection factor of poor health status which could lead to drug use, or the reverse where drug use results in poor health status (Hansell & White, 1991). Drug use can compound preexisting physical and psychological symptoms. Indeed, some adolescents may not view their substance use as a coping mechanism during that life stage, i.e. the reason for their initiating drug use in adolescence in conjunction with sexual behavior. Yet, teens may recognize the phenomenon in later-life adulthood, with alcohol use, for example, as a reason to attenuate depression, and/or anxiety (Tubman, Wagner & Langer, 2003). During adulthood, mental health behaviors manifest in

alternate forms. Even if adults in later life abandon certain detrimental health practices such as excessive alcohol and tobacco use, they may shift their psychosocial pressure to a different tangible substance, such as food. Depression appears to be associated with these manifestations of risk, but likelihood is decreased with increased maternal education and higher socioeconomic status (Barrett & Turner, 2005).

2.11 Maternal Educational Attainment

Thus, a myriad of positive outcomes is associated with higher educational attainment among adults, including skilled employment, higher income, better health status and increased life expectancy (Mirowsky & Ross, 2000; Power, Manor & Matthews, 1999; Ross & Wu, 1995). Education not only furnishes individuals with a credential signifying competence to perform a certain occupation, but also equips them with the mental capacity for more informed and therefore better decision making with respect to health practices (Mirowsky & Ross, 2005). Further, education denotes a sense of deferral, that is an individual is willing to subject himself/herself to a process, which may further promote his/her likelihood for continued enhancement of self through lifestyle choices. Adolescents residing in a household where education is valued will benefit not only from the knowledge of their parents and guardians but are more likely to incorporate that model into their own future aspirations.

In summary, then, the aforementioned literature does not incorporate maternal educational in the model assessing the mediational effect of risk proneness on sexual risk taking and concomitant alcohol use. While measures of parenting and neighborhood

have been analyzed in conjunction with combined sexual risk taking and substance use,
few models include mother's education as determinant in attenuating adolescent health
risk behavior. In this dissertation research, education as such is not included in the
analysis, because mother's educational attainment as a discrete variable violates the
assumption of independent observations. In the NLSY 1998 young adult data set,
multiple children have been interviewed of the same mother, with the same level of
education. Because the primary sampling unit is by household, often, more than one child
(i.e. siblings) living in the home with the mother were interviewed. Therefore, in lieu of
using educational attainment as a moderator, the path model will be tested in groups
partitioned by mother's education (Baron & Kenny, 1986). The self-rated risk proneness
scale used in the Young Adult portion of the National Longitudinal Survey on Youth in
the 1998 wave evaluates how discerning adolescents are in their planfullness and
proclivity toward sensation seeking. It is postulated that those adolescents who identify
as more risk prone versus risk adverse are more likely to engage in alcohol and drug use,
in addition to sexual behavior, particularly in early adolescence. Further, it is also
hypothesized that youth who originate from households of mothers with higher
educational attainment, as a protective factor, will be less likely to engage in health risk
behaviors, such as substance use and early onset of sexual behavior (Rosenbaum &
Kandel 1990). The role of maternal educational attainment needs to be assessed in the
different contexts that shape adolescent health decision making. The Bronfenbrenner
framework provides a model for examining the relationship between mother's education
as a protective factor and sensation seeking or risk proneness in the different
environments that shape adolescent health risk behaviors.

CHAPTER THREE: RESEARCH DESIGN AND METHODOLOGY

Despite accounts of reduced teenage pregnancy rates, the highest incidence of

HIV and other concomitantly sexually transmitted diseases as reported by the Centers for

Disease Control and Prevention remains steadfast among teenagers and young adults

(Henrich, Brookmeyer, Shrier, et al, 2006). While youth may perceive themselves as

invincible and impervious to the perils of health risk behavior, they remain ever

vulnerable to the social pressures associated with substance use and sexual activity.

Encompassed within this purview of social pressure is the co-occurrence of alcohol and

sexual behavior, emerging as co-risk factors for disease transmission with implications

for later-life co-morbid mental and physical health conditions. Psychosocial and

environmental pressures can contribute to this outcome. This study using MANCOVA

and path analysis, then, will: (1) aim to elucidate how self-perceived risk proneness as

mediator predicts likelihood to engage in health behaviors; and (2) to examine the

underlying psychosocial factors divided into groups by maternal educational attainment,

which predispose youth to risk proneness leading to substance use and sexual behavior.

3.1 Sample

The data source for this analysis is the 1998 National Longitudinal Survey on

Youth (NLSY). The NLSY, which began in 1979, was originally designed to examine

the labor market behavior of young adults between the ages of 14 to 21 years in the

United States. Male and female youth have been followed over time since 1979. Both mothers at ages 21 to 29 in 1986, and their children, from birth to eighteen years, have been interviewed every two years since 1986 through 2006 resulting in a total of 10 waves to date. An extensive set of developmental assessments, ranging from cognitive to socio-emotional to physiological, as well as assessments of the home environment, have been administered to the children of the female respondents in the 1986, 1988, 1990 and 1992 and 1994 cohorts. However, in 1994 a new questionnaire was developed, "Young Adult Survey" which was administered to the children in the original 1986 cohort who had now attained the age of fourteen. The current analysis then is limited to the cross-sectional data from the 1998 wave of young adults (n ~ 1500), due to high attrition rate, difference in demographic distribution and calculation of the raw weights in subsequent years 2000, 2002, 2004 and 2006, ranging in ages from 14 through 21 years (MaCurdy, Mroz & Gritz, 1998). The variables in the NLSY Young Adult sample encompass sociodemographic information on both the teen and the mother, health behaviors such as substance use and sexual behavior of the teen, self-evaluated psychosocial measures collapsed into scale form as in neighborhood quality, perceived closeness between parents, and depressive illness symptoms ratings.

3.2 Sampling, Data Collection Methodology and Data Weight Calculation Procedures

The NLSY Young Adult Survey is renowned for over-sampling economically disadvantaged and minority groups and thus is not a nationally representative sample of children. Some components of the questionnaire (i.e. the CESD short form depressive

symptom index and other psychosocial, behavioral assessments) are administered as part of an intensive in-person interview of the respondent conducted by a trained interviewer from the National Opinion Research Center. The largest portion of the survey is self-administered as a confidential questionnaire (regarding risk behavior, teenage sexual behavior, and substance use). Data then need to be weighted against race distribution of the United States utilizing the raw data weight variable provided for each case record (Hahs-Vaughn & Lomax, 2006). In order to normalize the sample against the US population demographics (Hahs-Vaughn & Lomax, 2006), an algebraic weight formula is then calculated in SPSS for use with these data, applying the post-stratification algorithm developed by Oh and Scheuren (1983). (See Appendix A).

From a review of the literature, it appears that most studies using various components of the NLSY Mother-Child cohorts or Young Adult data sets to conduct analyses do not employ the raw data weights, let alone a transformed data weight, in conjunction with an algebraic formula if at all (Crockett, Raffaelli & Shen, 2006; Pachter, Auinger, Palmer, et al 2006). Thus, the application of the weighted approach extends the illustration of weighting procedures beyond the econometric and or demography literature into the broader behavioral sciences (Horowitz & Manski, 1998; MaCurdy, Mroz & Gritz, 1998). The NLSY data weights have been used to examine employment and wage trends, but not the relationship between underlying psychosocial mechanisms and health-related outcomes (MaCurdy, Mroz, & Gritz, 1998). A post-stratification procedure is necessary to reduce bias in standard error estimates (Rubin, 1983). This research makes an important contribution by using a weighted case approach in testing different samples of youth by race/ethnicity and mother's educational attainment.

Indeed, Lang (2001) asserts that not using weights may introduce heteroskedasticity (different variances among the variables). Therefore, it is necessary to examine and compare the standard errors when performing analyses, using a weight formula. Horowitz and Manski (1998) explain the application of the weight formula from Rubin (1983; 1987), as applied to econometric analysis. Moreover, MaCurdy et al (1998) discuss why and how the raw weights in each of the NLSY survey years differ, accounting for the non-response rate and attrition. Since the weights differ in each year and particularly since the calculation of the weight changed in 2002 (NLSY 79 Child & Young Adult Users Guide, 2006; available: http://www.nlsinfo.org/pub/usersvc/Child-Young-Adult/2004ChildYA-DataUsersGuide.pdf), MaCurdy et al (1998) assert that longitudinal analysis using weighted data from the NLSY is not accurate. Finally, regarding techniques to control for oversampling of certain under represented groups in large population data sets, Stapleton (2002) suggests using design weights in the calculation of the covariance matrices in multi-level and structural equation models. Alternatively, she recommends using the design weight variables as covariates in the hypothesized model. She compares the results of the normalization versus non-normalization procedures in a structural equation model. Moreover, both Stapleton (2002) and Hahs-Vaughn and Lomax (2006), strongly recommend that ignoring weights leads to serious bias in parameter estimates, with the underestimation of standard errors. Finally, Stapleton et al (2002) declares, "when modeling with effective sample size weights, care must be taken in developing syntax to be submitted to the SEM software program. Using traditional SEM software, the analyst must provide the scaling factor for the between group covariance model (the square root of the common group size)."

3.3 Hypotheses

        This project seeks to investigate the relationship between self-assessed risk

perception or risk proneness and how that perception affects the likelihood of an

adolescent to engage in deleterious health behaviors, such as substance use and sexual

behavior, in groups partitioned by mother's educational attainment. The purpose of using

MANCOVA and discriminant analysis is to study how profiles of adolescents inclusive

of environmental factors like parenting and neighborhood characteristics impact social

problems such as alcohol and sexual behavior. Groups will be partitioned by mother's

educational attainment (high school and less versus bachelor's degree and above).

Differences within groups and between groups will be examined by adolescent

demographic and psychosocial characteristics, including neighborhood ratings and

perceived closeness between parents. Results will be reported based on identified path

models. The three main hypotheses are: (1) Does self-assessment of risk proclivity

predict deleterious health behaviors (as outcomes)? (2) Does risk perception act as an

intervening step in gauging the effects of underlying psychosocial mechanisms on health

risk behaviors? (3) Does risk perception differ for groups of adolescents by maternal

educational attainment? Table 4 displays the variables in relation to the three hypotheses

cited in Chapter 1, using MANCOVA and path analysis.

Table 3.1 *Hypothesis with Independent and Dependent Variables and Analysis Methods*

Research Question	Predictor Variable(s)	Criterion Variable(s)	Covariates/Moderators/Mediators	Analysis
1. Do youth with lower and higher levels of risk pronenenss differ on the basis of health behaviors after controlling for health behavior determinants?)	Risk Proneness (trichotomized)	Health behaviors: • Alcohol use • Sexual risk taking	Covariates (Health Behavior Inputs): • Age • Gender • Race/ethnicity (dichotomized) • Depressive symptoms • Perceived closeness between mother and bio-father/step-father • Neighborhood quality	Multivariate Analysis of Covariance (MANCOVA)/ Discriminant Analysis
2. Does risk proneness mediate the effects of mental health behavior determinants on physical health behaviors?	Predictor variables (Health Behavior Inputs): • Age • Gender • Race/ethnicity (dichotomized) • Depressive Symptoms • Perceived closeness between parents • Neighborhood quality	Health behaviors: • Alcohol use • Sexual risk taking	Mediator: • Risk Proneness	One path model using observed variables (one model for both outcome variables)
3. Are the meditational effects of risk proneness different among members of different groups?	Predictor variables (Health Behavior Inputs): • Age • Gender • Depressive symptoms • Perceived closeness between parents • Neighborhood quality	Health behaviors: • Alcohol use • Sexual risk taking	Mediator: • Risk Proneness Moderators Used for Grouping: • SES (Mothers' Income, Mothers' Education) • Race-Ethnicity	Path models using observed variables (one model for two outcome variables) for each group Groups: • African American Youth from Families with Lower Educational Attainment • African American Youth from Families with Higher Educational Attainment • White Youth from Families with Lower Educational Attainment • White Youth from Families with Higher Educational Attainment

3.4 Scale Development Section

The individual items for each of the six scales, i.e. neighborhood quality, perceived closeness between parents, depressive symptoms, risk proneness, alcohol use, and sexual risk taking before formulated for this study, have been tested for inter-item correlation and reliability, according to standard scale construction protocol (DeVellis, 2003). The reliability of the scales is contingent upon the internal consistency of the items, measured by inter-item correlation. A summary statistic in the form of Cronbach's coefficient alpha has also calculated to capture the degree to which the items are correlated, defined as "proportion of a scale's total variance that is attributable to a common source, as a true score of a latent variable." Therefore, threshold for use of the constructed scale based on the measures in the NLSY is 0.7. The 0.7 alpha reliability suggests that the items are measuring a similar phenomenon (DeVellis, 2003).

3.5 Measures

3.5.1 Neighborhood Quality

This scale essentially evaluates the neighborhood environment from the adolescent respondent's point of view using Likert scale format ranging from a (1) bigger problem to (3) not a problem. The variables have been distilled from eight variables through addition into one summary variable. In your neighborhood: (i) people don't respect rules/laws; (ii) crime/violence is a problem; (iii) abandoned/run-down buildings;

(iv) not enough police protection; (v) not enough public transportation; (vi) too many unsupervised kids; (vii) people don't care about things; and (viii) people can't find jobs. This scale taken from the National Commission on Children Parent and Child Study, 1990 Parent Questionnaire (NLSY Users Guide, 2004; available: ftp://www.nlsinfo.org/pub/usersvc/Child-Young-Adult/2004ChildYA-DataUsersGuide.pdf), has not been analyzed with respect to NLSY teens, only mothers of the NLSY child cohort ages 6 to 9 years (Pachter, Auinger, Palmer, et al 2006). These data in this study produced an alpha reliability of .89.

3.5.2 Perceived Closeness Between Parents

The perceived closeness between parents scale consists of six measures collapsed into one variable. Respondents were asked to answer questions using a Likert scale rating about how often biological parents (i) get along well together; (ii) agree on rules about the respondent; (iii) argue (reverse coded); how often respondent hesitates (iv) to talk about biological father in front of the mother (reverse coded); (v) to talk about mother in front of biological father (reverse coded); and (vi) how often respondent feels caught between biological parents (reverse coded). Buchanan, Maccoby and Dornbusch (1991) applied this parenting index when investigating the relationship between adolescents' feeling caught in the middle of both parents and self-rated depression and anxiety, reporting a Cronbach's Alpha of .70. Buchanan, Macccoby and Dornbusch (1991) in their same study assessing how caught adolescents ages 10.5 to 18 years feel in relation to parents who are divorced were posed the same questions cited above, reporting an

alpha reliability of .64 based on their data. The Cronbach's Alpha in these data was .70.

3.5.3 Depressive Symptoms Index

CESD Depression Scale (Radloff, 1977) - Short Form

The full CESD scale (Radloff, 1977) consists of a twenty-item instrument in which respondents indicate on a four-point scale (0 to 3) how often they have experienced symptoms of depression during the past week. However, only 6 measures have been selected for use from these NLSY data: (i) respondent did not feel like eating; (ii) respondent had trouble keeping mind on things; (iii) respondent felt depressed; (iv) sleep was restless; (v) respondent felt sad; and (vi) respondent could not get going. Scores range from a possible 0 to 18. The CSED has been widely used since its introduction (Radloff, 1977). The alpha reliability for this depressive symptoms index scale in the NLSY Young Adult 1998 data is .72.

3.5.4 Risk Proneness Scale (Reverse Coded) (Zuckerman, 1979; 2007)

The risk proneness scale contains four reverse-coded items where a higher score means greater willingness to engage in risk behavior as follows: (i) planning takes the fun out of things; (ii) enjoys taking risks; (iii) enjoys new/exciting experiences; and (iv) feels life w/o danger is dull. Originally conceived by Zuckerman, (1979, 2007) as sensation seeking, these measures have been combined as an index measuring risk proneness

(Raffaelli & Crocket, 2003; Crocket, Raffaelli & Shen, 2006). Similarly, Crocket, Rafaelli and Shen (2006) created a composite measure of these same items yielding a Cronbach's Alpha of .67, using the full six items (the aforementioned four items together with, "how often respondent gets into a jam because s/he does things without thinking," and "has to use a lot of self control to keep out of trouble."). These measures in the NLSY 1998 Young Adult cohort data yielded a Cronbach's Alpha of .68, using only four items.

3.5.5 Alcohol Use

To maximize variability and range, the measures of: (i) age first began to drink one time per month; (ii) number of times drank in the past thirty days; (iii) number of drinks per day in the past thirty days; (iv) on how many occasions drank five or more drinks in the past thirty days; (v) most had to drink in one day; and (vi) when drank that amount on how many days did this occur, have been recoded 0 to 3 according to magnitude of use. Subsequently, they have been summed to capture a severity index of alcohol use in the past thirty days (Cronbach's alpha = .76).

3.5.6 Sexual Risk Taking

Using the Crocket, Raffaelli and Shen (2006) precedent, the items of (i) ever had sex; (ii) number of sexual partners in past year; (iii) condom use at last intercourse and (iv) age first had sex, and condom use at last intercourse are recoded categorically (0 =

no, 4 = yes; re: number of partners 0 = 0; 1 = 1; 2 = 2; 3 = 3 or more partners; re: age first

had sex 4 = 13 years or less; 3 = 14 years; 2 = 15 years; 1= 16 years; 0 = 17 years or

more) and are then summed to comprise an index of sexual behavior (alpha reliability not

applicable). Using structural equation modeling, Raffaelli and Crocket (2003)

demonstrated with the NLSY 1994 10-14 year old cohort and 1998 Young Adult 16-17

year old sample the association between self-regulation (behavioral problems index) and

risk proneness (sensation seeking) and high risk sexual behavior. These investigators did

not report alpha reliability for sexual activity index in either paper, however. Thus, these

data from the 1998 NLSY-Young Adult sample have been coded in a way to simulate the

procedure as previously reported in the literature.

3.6 Analytic Approach

3.6.1 Mean Substitution as Missing Data Technique

Missing data technique is mean substitution (Little & Rubin, 1987). It is well

established that the various NLSY waves have missing data (MaCurdy, 1998), due to

high attrition between biennial survey administration years. Therefore, using the

technique called total mean substitution or TMS which entails replacing missing

observations with the mean of the item, increases the n but decreases variability

(Raaijamker, 1999). As a result, lower estimates of the variance and covariance matrix

compromise the path model and raise issues of validity, especially since the algebraic

weight is applied to the variance-covariance matrix before it is analyzed in AMOS.

Therefore, Raaijmaker (1999) proposes that relative mean substitution (RMS) method in Likert-type scales calculates the mean for the missing item within the case, not within the variable (Huisman, 2000). Jonsson and Wohlin (2004) explain that RMS is based upon a nearest neighbor substitution method, which reduces distance in Euclidian space, by selecting the lowest default response span by case in SPSS. Thus. the missing value for that particular observation is calculated by taking the two numerical responses to the left and right, for a mean score based on the surrounding answers.

3.6.2 Risk Proneness as Mediator

Baron and Kenny (1986) define a mediator as a significant indirect relationship between an independent and dependent variable via a causal path. The correlation between the independent and dependent variables must be significantly reduced in the presence of the mediator (Muris et al, 2005). Indeed, previous studies have examined the role of cognition in inhibition, often as a dynamic between affect and cognition mediated by behavior (Riggs, Greenberg, Kusché et al, 2006). Moreover, other research has examined the relationship between environment and health behavior as mediated by cognition. For instance, Muris et al (2005) explored the mediational role of rumination and worry in the linkage between neuroticism and depression. Similarly, Lambert et al (2004) tested how neighborhood view of violence, safety and drugs impacts beliefs about drugs in conjunction with perceived control-related feelings about self, leading to substance use among male and female African American adolescents. In these examples, cognition is construed as a type of self-regulation mediating the pathway between internal

behavior and external behavior, according to Bandura (2005). However, this study

investigates if risk proneness with depressive symptoms as an underlying mechanism, as

a type of self-regulation (Crocket, Raffaelli & Shen, 2006), now mediates the relationship

between environmental influences, such as neighborhood quality and perceived parental

closeness in the link to health risk behavior outcomes, i.e. alcohol use and sexual risk

taking.

3.7 Descriptive Statistics and Data Transformation

For replication purposes, means, standard deviations, item-to-item correlations

and Cronbach's Alpha for each index are presented below in Table 3-1.

Table 3.2 (n = 4648)

Descriptive Results and Psychometric Properties of NLSY Young Adult Data 1998

Domain/Item	Mean	SD	Item-to-Total Correlation	Cronbach's Alpha
Perceived Closeness Between Mother and Biological Father 1998				.70
How often do mother and biological father get along well together?	3.59	1.08	.52	
How often do mother and biological father agree on rules about R?	3.43	1.16	.51	
How often do mother and biological father argue? **(reverse coded)**	3.31	1.07	.54	
How often does R hesitates to talk about biological father in front of mother? **(reverse coded)**	3.39	.88	.21	
How often does R hesitate to talk about mother in front of biological father? **(reverse coded)**	3.31	.84	.37	
How often does R feels caught between mother and biological father? **(reverse coded)**	3.53	.76	.42	

Domain/Item	Mean	SD	Item-to-Total Correlation	Cronbach's Alpha
Perceived Closeness Between Mother and Step-Father 1998				.48
How often do mother and step-father get along well together?	3.15	.53	.22	
How often do mother and step-father agree on rules about R?	2.68	.56	.19	
How often do mother and step-father argue? **(reverse coded)**	2.02	.40	.13	
How often does R hesitate to talk about step-father in front of mother? **(reverse coded)**	1.51	.48	.34	
How often does R hesitate to talk about mother in front of step-father? **(reverse coded)**	1.55	.57	.35	
How often does R feels caught between mother and step-father? **(reverse coded)**	1.44	.43	.22	
Neighborhood Quality 1998				.87
In neighborhood people do not respect rules/laws	2.38	.67	.69	
In neighborhood crime and violence is a problem	2.49	.68	.72	
In neighborhood problems with abandoned/run-down buildings	2.67	.57	.64	
In neighborhood not enough police protection	2.67	.57	.63	
In neighborhood not enough public transportation	2.56	.64	.43	
In neighborhood parents do not supervise their children	2.33	.70	.64	
In neighborhood people do not care to keep to themselves	2.52	.61	.61	
In neighborhood many people cannot find jobs	2.46	.65	.70	

Domain/Item	Mean	SD	Item-to-Total Correlation	Cronbach's Alpha
Depressive Symptoms Index 1998				0.72
R did not feel like eating	.46	.80	.37	
R has trouble keeping mind on tasks	.70	.87	.44	
R feels depressed	.40	.73	.54	
R sleeps restlessly	.73	.95	.46	
R feels sad	.46	.75	.55	
R could not get going	.61	.82	.40	
Risk Proneness 1998				.67
R thinks planning takes the fun out of things.	2.10	.69	.25	
Enjoys taking risks	2.55	.77	.57	
Enjoys new/exciting experiences even if they are frightening	2.92	.67	.48	
Life with no danger in it would be too dull for R	2.50	.84	.55	
Alcohol Use 1998				.71
Age when first began to drink alcohol once a month or more	15.6	1.06	-.212	
When was most recent time R had drink of alcohol	2.02	.86	-.152	
On how many different days did R drink in past 30 days	4.66	3.21	.672	
When R drank in past 30 days, how many drinks per day	3.53	2.16	.629	
In past 30 days, on how many did R have 5+ drinks on the same occasion	2.24	2.59	.736	
What is most R had to drink in any 1 day of past 30 days	5.42	3.34	.645	
In past 30 days, number of days R drank this amount	2.10	1.62	.315	
Sexual Risk Taking 1998				N/A
Ever had sexual intercourse	1.98	1.90	.07	
No. of people had sex with in past 12 mo	1.74	.85	.18	
Age when first had sex	2.08	.91	.09	
During most recent sex use condom	.87	.97	.02	

A measurement table describing survey question/variable, the original coding, re-coding and level of measurement according to hypothesis is included in Appendix B.

3.8 Analysis Plan

This study employs MANCOVA and path analysis to assess whether self-rated risk perception influences health behaviors. MANCOVA (like an ANOVA or the simple t-test) evaluates if groups differ based on means and if there is a link between the independent and dependent variable (Aneshensel, 2005). Prior to conducting MANCOVA analyses, the purpose of using discriminant analysis is to allow health behaviors to form a composite which may then differentiate the group based on these characteristics (Kachigan, 1991). Then path analysis will be applied to test the mediating role of risk proneness in influencing sexual risk taking concomitant with alcohol use (Baron & Kenny, 1986; Olobatuyi, 2006). Path analysis is chosen over regression not only to illustrate temporal sequencing but also to demonstrate a causal relationship among independent variables, identify the associations among the independent variables, and configure a model grounded in theory (Schumaker & Lomax, 1996), evaluated according to a preponderance of evidence, including fit indices.

When evaluating path analysis models, fit indices values, and Chi-square are the standard tools for assessing model viability. Licensed software packages produce several fit indices, most of which have a range from 0 to 1. AMOS, the software selected for this analysis, provides values for Chi-Square, Comparative Fit Index, Adjusted Goodness of Fit, Root Mean Square Error of Approximation and Tucker-Lewis Index. Chi-square

compares the sample covariance and the fitted covariance matrices. Therefore, a smaller

value is considered a good fit, with values closest to zero interpreted as perfect fit. Unlike

Chi-Square, the other aforementioned fit indices have no reference table to check for

significance. Rather, models with fit indices closer to .9 and above but less than 1.0 are

considered suitable model for the data, as explained in Table 3-5. Thus, according to each

of the three hypotheses, covariance matrices for each of the sample groups from the main

data set are produced and input into an SPSS file. The covariance matrix file in SPSS will

then be used as the source file. Covariance matrices are generated for weighted data, by

applying the transformed weight variable using the "on-off" command respectively in

SPSS.

Table 3-3 Fit Index Measure, Criterion Level for Model Fit, Explanation

Fit Index Measure	Criterion Level for Model Fit	Explanation
Chi-Square χ^2	Chi-Square χ^2 Table Value Non-significant Chi-Square According to df (small value good fit; 0 perfect fit)	Compares sample covariance matrix and the fitted covariance matrix
Comparative Fit Index (CFI)	Range 0 to 1, <.90 unacceptable fit	Compares tested model to null, i.e. no paths between variables and therefore independent
Adjusted Goodness-of-fit (AGFI (Goodness-of-fit) (GFI)	Range 0 to 1, i.e. no fit to perfect fit	Measures the amount of variance and covariance in observed and reproduced matrices
Root Mean Square Error of Approximation (RMSEA)	Values < .08 adequate; values <.05 good	Parsimony in the model – simplest and fewest number of variables
Tucker-Lewis Index (TLI)	Range 0 to 1, i.e. no fit to perfect fit	Use Chi-Square χ^2 (Null/dfNull-Proposed/dfProposed/Null/Null dfProposed-1)

Fit indexes are reported for each of the path analysis models in Chapter 4 (see Table 4-5)

3.8.1 Univariate Statistics

Frequencies are run on the sociodemographic variables and the scales created for the total sample size of n = 4,648, as described in Chapter 4 (see Table 4-1). All the individual measures in the scales are correlated to determine how strongly associated the variables are with each which other. Correlations are also applied to ascertain the relationships among the descriptive as well as scale indicators used in the analyses.

3.8.2 Bivariate Methods and Correlation

Pearson correlation coefficients are calculated for measures used in the analysis to determine bivariate strength of association. Results are displayed in Chapter 4 Table 4.2.

3.8.3 MANCOVA

Thus, these hypotheses test how adolescent risk proneness (sensation seeking) in conjunction with psychosocial factors (depressive symptoms) and environmental influences (neighborhood quality and perceived closeness between parents) predict likelihood to engage in deleterious health risk behaviors, i.e. alcohol use and sexual risk taking. Using the NLSY 1998 young adult cohort (ages 14-21), scales based on CES-D

depressive illness measures are formulated, together with neighborhood quality and parent-child relationship assessments, and Zuckerman risk proneness self-evaluation (all with Cronbach's alpha reliability =.7) to test the multivariate relationship on the outcome severity indexes of alcohol utilization, and sexual behavior. Findings are presented in Chapter 4, Tables 4-3 and 4-4.

In preliminary models, discriminant and MANCOVA analyses are applied to elucidate profiles of adolescents at higher and lower risk of early substance use and sexual behavior initiation. These statistical classification methods, then, reveal that younger white males with higher self-esteem, higher mastery, higher depressive symptoms, but poorer parenting and lower quality neighborhoods, have higher self-rated risk proneness scores, indicating they are more likely to engage in conduct detrimental to health (with significance less than .05). Similarly, younger black females with higher self-esteem, lower mastery, lower depression and poorer parenting and lower neighborhood quality also have greater propensity to appraise themselves as risk prone. Indeed, interaction between socio-emotional environment and sensation seeking (risk proneness) during teen years can set the stage for later-life deleterious health outcomes. Thus, risky behavior patterns established in adolescence into early adulthood have implications for a life course trajectory of co-morbid mental and physical conditions in middle and older adulthood (Pearlin, Schieman, Fazio, et al, 2005).

3.9 Model Testing

The fully saturated model (Figure 3-1) depicts the posited relationships between

the underlying psychosocial mechanisms, mediated by risk proneness and their effect on health risk behaviors, like alcohol use and sexual risk taking. Based on the research of Hill, Ross and Angel (2005), demonstrating the link between neighborhood quality, psychological distress and self-assessed health, the model in this study postulates that perception of neighborhood behavioral norms in conjunction with low perceived closeness between parents and depressive mood symptoms predisposes teens to risk proneness. Risk proneness or sensation seeking is then tested as the mediating influence in the pathway to alcohol use and sexual risk taking. In another model, Husler, Blakeney, and Werlon (2005) similarly extend the association between mental and physical health, by examining depressive symptoms and interactions with peers as mediator and their impact on substance use and illness.

Figure 3.1 Fully Saturated Model

In addition to analyzing health as an endowed trait inherited from parents through genetic predisposition, well-being can also be conceptualized as an intergenerational transfer of values and decision making skills passed from parent to child. This study, then, compares groups of adolescents by maternal educational education attainment (high school or less versus bachelor's and above) in the temporal sequence of context (neighborhood quality), environmental influence (perceived parenting) and psychosocial factors (depression), in determining risk proneness (proclivity to engage in sensation seeking), and how this self-rated risk propensity in turn leads to co-morbid substance use and risky sexual activity in adolescence. Mother's education is controlled for by partitioning adolescents into groups in a structural equation model based on the Bronfenbrenner paradigm. Education is then evaluated as a protective or detrimental factor in shaping prosocial or antisocial health behavior among adolescents. Thus, using data from the National Longitudinal Survey on Youth, Young Adult Cohort 1998 (ages 14-21, with mean 16.5 years), preliminary analyses in AMOS reveal that neighborhood quality has a direct effect on depression scores among adolescents with mothers who have lower educational attainment versus higher educational attainment. Therefore, the mechanism through which risk proneness operates affecting health risk decision making differs for adolescents whose mothers have lower versus higher educational attainment levels. This research makes an important contribution to the literature by using a weighted case approach (normalized against the US population) in path analysis, when testing different samples of youth from the NLSY 1998 Young Adult cohort.

In preliminary analyses with these 1998 NLSY Young Adult data, using simple models with groups partitioned by quality of neighborhood rating, in these nine clusters,

controlling for sociodemographic characteristics, maternal education had a significant effect on adolescent depression and also on alcohol use. Moreover, both mother's education and depression had a significant impact on sexual behavior and on risk proneness scale. Parenting and maternal educational attainment also had a positive association with alcohol use. It is anticipated that use of alcohol together with reported sexual behavior will remain highly significant as evidenced in previous studies (Shrier, Emans, Woods et al, 1997) in different groups.

Since these preliminary analyses on the 1998 NLSY Young Adult cohort were conducted based on groups created by clusters using similar neighborhood quality scale appraisal, the between group variations were non-randomized, confounding results (Campbell & Stanley, 1966; Trochim, 2001; Black, 1999). This selection effect of groups, results in regression to the mean with little variation within the groups and between groups (Campbell & Stanley, 1966; Trochim, 2001; Black, 1999). In order to offset this violation of construct validity, it is necessary then to use the NLSY geocoded data, which permits examination and comparison of study subjects within a group and between groups by region—reducing bias (Campbell & Stanely, 1966; Trochim, 2001; Black, 1999). However, due to geographic dispersion of the data, and household as primary sampling unit, data are clustered by state (Parcel & Dufur, 2001). Therefore, NLSY is not suited for hierarchical linear modeling (Parcel & Dufur, 2001). Consequently, path analysis was employed to test mediational effects in models examined for differences between groups partitioned by mother's educational attainment, i.e. high school and less, or college and more. Results are reported in Chapter 4 with separate diagrams for each sub-group of the data set.

CHAPTER 4: RESULTS OF THE DATA ANALYSIS

4.1 Univariate Statistics

The sample size for the analysis was 4,648 study participants (with percent

imputed for each variable and item in the scales displayed in Appendix C). As depicted in

Table 4-1, average age of the sample was 16.7 years, with 51.4% male and 48.4% female.

In this study population, 69.9% were white, 19.8% were black and 7.2% considered other

i.e. Hispanic and Asian (3.1% missing data). The range on the neighborhood quality,

comprised of eight variables was 8 to 24 based on a Likert scale rating of 1 to 3, with a

mean of 20.1 . The range on the parenting scale was 6 to 24, comprised of six variables

also with sequential categorical Likert scale of 1 to 4, yielding a mean score of 12.4 for

the biological parents and 16.4 for the step-parents. Similarly, the depressive illness index

had a range of 0 to 18, based on a Likert categorical rating of 0 to 3 for each of the

individual variables comprising the scale (mean = 3.4). Further, risk proneness, also an

index with a range of 4 to 16 derived from Likert scale rating of 1 to 4, had a mean 10.

Additionally, alcohol use (severity index) had a range of 0 to 18 with 6 individual items,

each with a Likert Scale rating of 0 to 3, and average value of 9.4. Last, sexual risk taking

scale, with range of 0 to 4 and comprised of 4 variables with mixed coding on the

variables, (dichotomous, continuous and categorical) had an average score of 7.3.

Table 4.1: Demographic Characteristics of the Sample (n = 4,648)

Variable Name/Scale	Range or Score	n	%	Mean	Standard Deviation
Age	**14-15 yrs**	1,455	31.4	16.7	1.8
	16-17 yrs	1,657	35.6		
	18-21 yrs	1,535	33.0		
Gender	**Male**	2,394	51.5	0.5	NA
	Female	2,251	48.4	(MALE)	
Race	**White**	3,249	69.9	NA	NA
	Black	920	19.8		
	Other	333	7.2		
	(Missing)	(146)	(3.1)		
Perceived Closeness between Mother and Biological Father (n = 4,648)	**6 - 8**	615	13.2	12.4	2.9
	8.2 - 12	1,295	27.9		
	12.1 - 14	1,741	37.4		
	14.3 - 24	997	21.5		
Perceived Closeness between Mother and Step-Father (n = 4,648)	**6 - 12**	666	29.6	16.4	4.9
	13 - 19	3,257	38.2		
	19 - 24	718	23.8		
Perceived Closeness between Mother and Step-Father (n = 1,374)	**6 – 10**	292	21.3	12.4	2.8
	11 - 12	418	30.4		
	13 – 14	400	29.1		
	15 - 24	264	19.2		
Neighborhood Quality	**8 - 18**	1,135	24.4	20.1	3.7
	18.2-21	1,376	29.6		
	21.1-23	1,127	24.3		
	23.3-24	1,010	21.7		
Depressive Symptoms Index	**0 - 1**	1,521	32.7	3.4	3.2
	2- 4	1,834	39.5		
	5- 18	1,293	27.8		
Risk Proneness	**4 - 9**	1,612	34.7	10.1	2.1
	9.5 – 10.1	1,169	25.2		
	10.2 -16	1,867	40.2		
Alcohol Use	**1 - 9**	773	16.6	9.4	2.4
	9.1 - 10	3,164	68.1		
	10.2 - 18	711	15.3		
Sexual Risk Taking	**0–5.9**	2,105	45.3	7.3	2.5
	6–8.9	1,323	28.5		
	9 -15	1,220	36.3		

NA=Not Applicable

4.2 Bivariate Correlations

All the individual measures in the study were correlated to determine how strongly associated the variables are with each other, yielding a bivariate final sample n of 4,648, as displayed in Table 4-2. Correlations were also employed to ascertain the relationships among the descriptive as well as scale indicators used in the analyses. Only those correlations that were both significant at $p < .05$ or $.01$ and below are discussed. Youth's age and white race yielded a correlation coefficient of -.076, with high significance at $p < .01$. Neighborhood quality correlated with age at interview date (1998) with a value of -.034 and significance at $p < .05$. Perceived parental closeness between the mother and biological father also negatively correlated with youth's age (-.140) and also with risk proneness (-.104) at significance level of $p < .01$. Alcohol use (.080) and sexual risk taking (.295) were both correlated with age and highly significant at $p < .01$.

Male gender, produced positive correlations with white race (.044) and risk proneness (.124), again significant at $p < .01$, and alcohol use (.033) significant at $p < .05$. Male gender negatively correlated with depressive symptoms (-.188, $p < .01$) and sexual risk taking (-.062, $p < .01$). White race positively correlated with neighborhood quality (.253), perceived parental closeness between the mother and biological father (.112), risk proneness (.208) and alcohol use (.132), all significant at $p < .01$. However, white race negatively correlated with sexual risk taking (-.059), at $p < .01$ significance level. Further, neighborhood quality correlated with perceived parental closeness between the mother and biological father at (.079) and alcohol use (.061) also significant at $p < .01$. Other

negative correlations with neighborhood quality (meaning lower score, worse quality neighborhood) included: depressive symptoms index (-.149) and sexual risk taking (-.155), both highly significant at p < .01.

The variable perceived parental closeness between mother and biological father (the lower the score, the worse the parenting) also correlated with perceived parental closeness between mother and step-father (.126), risk proneness (.087), alcohol use (.040) and sexual risk taking (-.149), all significant at p < .01. Likewise, perceived parental closeness between mother and step-father positively correlated with depressive symptoms index (.035), risk proneness (.051) and alcohol use (.065), highly significant at p < .01. Further, depressive symptoms index was associated with risk proneness (.121), and sexual risk taking (.138) at significance level of p < .01. Finally, risk proneness was moderately correlated with alcohol use (.153), as well with sexual risk taking (.164) but highly significant at p < .01.

All the scales together with the sociodemographic variables were then included in a discriminant analysis and Multivariate Analysis of Covariance (MANCOVA) to investigate group differences among high, moderate and low risk proneness scores. Demographic variables were introduced (age, gender, race, dichotomized into White and Other, (primarily consisting of self-identified African American, some Hispanic and Other (all dummy coded)), as well as neighborhood quality, perceived parental closeness, depressive illness symptoms, alcohol use and sexual risk taking scales. Results of discriminant analyis and MANCOVA are presented in Tables 4-4 and 4-5, using perceived parental closeness between mother and biological father or biological parents, and perceived parental closeness between mother and step-father or step- parents.

Table 4.2: Correlations for NLSY 1998 Variables Used in Analysis (n =4,648)

* p < .05; ** p < .01

Correlations										
Variable	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1. Age	1.0									
2. Gender Male	.023	1.0								
3. Race White	-.076**	.044**	1.0							
4. Neighborhood Quality	-.034*	.012	.253**	1.0						
5. Perceived Closeness Between Parents	-.140**	-.003	.112**	.079**	1.0					
6. Perceived Closeness Between Step-Parents	-.015	.018	.005	-.001	.126**	1.0				
7. Depressive Symptoms Index	-.005	-.188**	.014	-.149**	.000	.035*	1.0			
8. Risk Proneness	-.104**	.124**	.208**	.011	.087**	.051**	.121**	1.0		
9. Alcohol Use	.080**	.033*	.132**	.061**	.040**	.065**	.011	.153**	1.0	
10. Sexual Risk Taking	.295**	-.062**	-.059**	-.155**	-.149**	-.013	.138**	.012	.164**	1.0

4.3 Discriminant Analysis and MANCOVA

Discriminant analysis is used primarily to predict group membership among

mutually exclusive categories, such as educational attainment e.g. highschool degree vs.

bachelor's degree, or diagnostic medical tests, or treatment groups. Discriminant analysis

was applied here to further explore the associations uncovered in the bivariate analysis.

MANCOVA was applied to test the mean differences of the centroids (vectors) between

the two dependent variables, i.e. alcohol use and sexual risk taking schools. (See Tables

4-3 and 4-4). Discriminant analysis, using measurement of variance explains the

proximity of reported risk behaviors, defined by category. Thus, the risk proneness scale

has been partitioned into three discriminant categories in order to reveal the distinctions

between the different profiles of those youth who perceive themselves as lower sensation

seekers versus high sensation seekers.

Using discriminant analysis to distinguish sociodemographic and psychosocial

characteristics among levels of risk, despite the segmentation of the categorical risk scale

variable into three components, only two groups emerged (Table 4-3). The greatest

distinction was seen between the lower risk takers or group one with 90.5% of the

variance and higher risk takers or group four with only 9.5% of the variance. Wilks' test

revealed only significant difference between function number one and two (p < .000).

Those adolescents observed in group one (higher risk proneness) were less likely to

engage in sexual risk taking (.003), but did report higher depression scores (.454), and

higher alcohol use (.766), with moderate neighborhood quality (.208) and similar

perceived parental closeness between mother and biological father (.385). In group two

(perceived lower risk proneness as evidenced by group centroid values), respondents were highly likely to participate in sexual risk taking (.623), with low depressive symptoms (-.040), moderate alcohol use (.174), higher neighborhood quality (.385), but low perceived parental closeness between mother and biological father (-.627).

The results of the discriminant analysis with perceived parental closeness between mother and step-father shows that the most marked distinction between groups lies between low risk proneness and high risk proneness by centroid and also by numerical values of the variables (Table 4-4). Function number one within the structure matrix accounts for 93.5% of the variance; function number two 6.5% of the variance. In group one, or among those youth that disclose higher risk proneness, higher alcohol use (.812) is associated with higher depressive illness scores (.473) better neighborhood conditions (.253), moderate perceived parental closeness between mother and step-father, but low sexual risk taking (-.023). The second centroid or lower risk group revealed that sexual risk taking (.953) is associated with lower depressive symptoms (-.288), in conjunction with better neighborhood conditions (.347), but less proclivity toward alcohol use (-.193), and higher perceived parental closeness between mother and step-father (.296).

The MANCOVA, then, confirms in both the perceived parental closeness between mother and biological father and mother and step-father that controlling for age, gender and race, the three risk groups – high, moderate and low—are statistically significant. The univariate F test, considering each independent variable, separately tests the correlation as variance between the predictors and the dependent variables. Equivalent to a T-test, the univariate F values underscore the significant differences between each of the independent variables and the outcomes, i.e. alcohol and sexual risk taking.

Table 4.3: **MANCOVA (with Perceived Parental Closeness Between Mother and Biological Father)**
and Discriminant Analysis (n=4648)

Psychosocial and Environmental Variables	Group Means			Univariate *F*	Significant Means Differences	Function 1 Discriminant Coefficient	Function 2 Discriminant Coefficient
	Risk Proneness Low n=1612	Risk Proneness Mid Score Range n=1169	Risk Proneness High n=1869				
Perceived Parental Closeness Between Mother and Biological Father	12.04	12.59	12.61	19.821	3 > 2 >1	.385	-.627
Neighborhood Quality	19.94	19.96	20.27	4.443	3 > 2 >1	.208	.385
Depressive Illness Symptoms	3.06	3.34	3.66	15.43	3 > 2 > 1	.454	-.040
Alcohol Use	8.97	9.26	9.82	55.37	3 > 2 > 1	.766	.174
Sexual Risk Taking	7.28	7.08	7.37	5.138	3 > 1 > 2	.003	.623
Group Centroid 1	-.232	-.026	.217				
Group Centroid 2	.043	-.108	.031				

Wilks Lambda λ = .978; *F* = 27.65 (4,646, 2)

Means diff. p =< .05

Covariates were age, gender and race.

Table 4.4: **MANCOVA (with Perceived Parental Closeness Between Biological Mother and Step-Father) and Discriminant Analysis (n=4648)**

Psychosocial and Environmental Variables	Group Means			Univariate F	Significant Means Differences	Function 1 Discriminant Coefficient	Function 2 Discriminant Coefficient
	Risk Proneness Low n=1612	Risk Proneness Mid Score Range n=1169	Risk Proneness High n=1869				
Perceived Parental Closeness Between Biological Mother and Step-Father	13.77	13.79	13.86	6.669	3 > 2 >1	.220	.296
Neighborhood Quality	19.94	19.96	20.2771	4.443	3 > 2 >1	.253	.347
Depressive Illness Symptoms	3.061	3.34	3.66	15.430	3 > 2 > 1	.473	-.288
Alcohol Use	8.97	9.26	9.82	55.368	3 > 2 > 1	.812	.193
Sexual Risk Taking	7.28	7.081	7.37	5.138	3 > 1 > 2	-.023	.953
Group Centroid 1	-205	-.061	.216				
Group Centroid 2	.040	-.083	.018				

Wilks Lambda λ = x; F = 26.63

Means diff. p =< .05

4.4 Path Analysis

4.4.1   Two Main Models Using Perceived Parental Closeness Between Mother and Biological Father and Biological Mother and Step-Father

The main model (Figure 4.1), using the full sample of n = 4,648 with perceived

parental closeness between mother and biological father as the parental quality measure,

is exemplary for all eight other models (Appendix D, Figures D.1 – D.8): i.e. perceived

parental closeness between mother and biological father partitioned into higher and lower

educational attainment of the mother; perceived parental closeness between biological

parents and step-parents also divided into two sub-groups by mother's education (less

then high school or high school and above); and perceived parental closeness between

mother and step-father using the respondents who answered both sets of questions

pertaining to perceived parental closeness between biological parents and step-parents,

and also with those youth whose mothers who have less than high school education.

Finally, the model is identical for both younger (aged 14 to 16 years) and older

adolescents (17 to 21 years). All the error terms associated with each endogenous

variable are denoted as e1, e2, e3 and e4.

Thus, using the perceived parental closeness between mother and biological father

as the a priori model (Figure 4.1), higher neighborhood quality is correlated with higher

perceived parental closeness (beta coefficient (b.c.) = .08). Poorer neighborhood quality

is related to higher depression scores (b.c. = -.15). Higher neighborhood quality and

higher alcohol use are also associated (.06) in this model (see Figure 4-1). Poorer

neighborhood quality influences higher sexual risk taking (b.c. = -.14). Moreover, lower

perceived parental closeness between mother and biological father also promotes higher

risk proneness (b.c. = .08). Poor perceived parental closeness between mother and

biological father is also related to elevated sexual risk taking (b.c. = -.15). Higher

depression scores are associated with increased risk proneness (b.c. = .12) and greater

sexual risk taking (b.c. = .12). Risk proneness leads to greater alcohol use (b.c. = .15).

Finally, greater alcohol use promotes higher sexual risk taking (.18).

     Figure 4.2 depicts the structural equation model for those youth who responded to

the questions regarding perceived parental closeness between mother and step-father. The

results of that path analysis are nearly identical to the primary model in Figure 4-1,

except for the correlation of .0 between perceived parental closeness between mother and

step-father and neighborhood quality.

Figure 4.1: The Mediating Role of Risk Proneness on the Ecology of Adolescent Health Risk Behavior: Perceived Parental Closeness Between Mother and Biological Father, Full Model, n = 4,648

Figure 4.2: The Mediating Role of Risk Proneness on the Ecology
of Adolescent Health Risk Behavior: Perceived Parental Closeness Between Mother
and Step-Father, Full Model, n = 4,648

4.4.2   Sub-group Path Analysis

All the other sub-group path analysis models (as depicted in Appendix D) exhibit

similar pathways with the exception of five models found in Appendix E i.e. Figures E.1

– E.5, distinguished by figure titles in capitalized bold-face. The other nine models which

are identical to the models using perceived parental closeness between mother and

biological father (Figure 4-1) and perceived parental closeness between mother and step-

father (Figure 4-2) are denoted with black figure titles (Figures D.1- D.8), appear in

Appendix D. The most salient feature of the models using the perceived parental closeness between mother and step-father among those youth with mothers who have higher education (high school and beyond) is that parenting has no effect on either alcohol use or sexual risk taking (Appendix E – Figures E.1 and E.2). The perceived parental closeness vector does not go through any other predictor variables, in the model where youth answered questions about perceived parental closeness between biological parents and step-parents and whose mother has a high school degree or beyond. Moreover, and even more compelling in the path analysis model, those teens who responded to the step-parenting questions, and with mothers with higher educational, perceived parental closeness has no association with any other variable. Thus, because parenting quality has no influence on adolescent health risk behaviors, mother's educational attainment emerges as an overriding influence and thus type of social support buffer.

Among female adolescents only (Appendix E – Figure E.3), perceived neighborhood quality has no effect on alcohol use. For African Americans, both neighborhood quality and perceived parental closeness between mother and biological father have no relationship with sexual risk taking (Appendix E – Figure E.4). Last, the model for white youth (Appendix E – Figure E.5), like the a priori model in Figure 4-1, shows no path from neighborhood quality to alcohol use. Testing the original primary model on different groups serves to validate not only the consistency of the model, but explain how different attitudes and perceptions can lead to different influences on behavioral health outcomes (such as alcohol use and sexual risk taking), for certain groups of teens by gender, race, and parenting.

4.4.3 Fit Indices

The consistency of all the fit indices values for each of the 15 models demonstrates the robustness of this model for these data, the 1998 NLSY Young Adult Cohort, as shown in Table 4-5. The chi-square for each of the models is low and not significant, meaning the model has good fit. Further, the other fit indices, Comparative Fit Index (CFI), Adjusted Goodness of Fit Index (AGFI), Root Mean Square Error of Approximation (RMSEA) and Tucker Lewis Index (TLI) per Olobatuyi (2006), all meet the criteria of between .9 and 1, also indicating strong fit. Thus, the CFI compares the tested model to the null, i.e. no paths between variables. The AGFI measures the amount of variance and covariance in observed and reproduced matrices. The RMSEA is an indicator of parsimony in the model, meaning the simplest and fewest number of variables. Finally, the TLI, using Chi-square values of the null versus the proposed model, reinforces the rigor of this model.

Table 4.5: Overall Fit Index Statistics for Effect of Environment and Psychosocial Scales on Adolescent Health Risk Behavior by Perceived Parental Closeness and Maternal Education Attainment

Measures of Fit	*Figure 4-1 Bio-Parenting Full n = 4,648*	Appendix D Figure 1 Bio-Parenting High Edu n = 1,438	Appendix D Figure 2 Bio-Parenting Low Edu n = 3,210	*Figure 4-2 Step-Parenting Full n = 4,648*	APPENDIX E FIGURE 1 STEP-PARENTING HIGH EDU N = 1,438	Appendix D Figure 3 Step-Parenting Low Edu n = 1,438	Appendix D Figure 4 Both Bio & Step-Parenting - using Bio-Parenting Responses n = 1,343	APPENDIX E FIGURE 2 BOTH BIO & STEP-PA - HIGH EDU USING BIO - PARENTING RESPONSES N = 350	Appendix D Figure 5 Both Bio & Step-Pa - Low Edu using Bio - Parenting Responses n = 994
χ^2	6.645	15.852	6.533	29.267	9.763	14.624	8.333	13.396	6.252
CFI	.998	.972	.997	.963	.971	.977	.976	.904	.987
AGFI	.998	.984	.997	.991	.986	.994	.991	.971	.991
RMSEA	.008	.039	.010	.032	.040	.024	.022	.037	.016
TLI	.994	.916	.990	.888	.904	.930	.927	.841	.962

Demographic Groups

Measures of Fit	Appendix D Figure 6 Younger Adolescents (14-16 yrs) n = 2,350	Appendix D Figure 7 Older Adolescents (17-21 yrs) n = 2,298	APPENDIX E FIGURE 3 FEMALE ONLY N = 2,251	Appendix D Figure 8 Male Only n = 2,394	APPENDIX E FIGURE 4 BLACK ONLY N = 1,182	APPENDIX E FIGURE 5 WHITE ONLY N = 3,452
χ^2	27.659	14.884	15.600	5.815	18.227	12.771
CFI	.956	.970	.997	.998	.892	.990
AGFI	.984	.991	.992	.997	.982	.996
RMSEA	.044	.029	.027	.008	.042	.018
TLI	.867	.911	.942	.995	.729	.976

4.4.4 Direct, Indirect and Total Effects of Path Analysis on Sexual Risk Taking

Tables 4-5 and 4-6 describe the direct and indirect effects of all the variables together with perceived parental closeness between mother and biological father and mother and step-father respectively, used in this path analysis on sexual risk taking dependent variable. Similar findings are reported in both tables for Figures 4-1 and 4-2. Indeed, the detrimental effect of perceived parental closeness on sexual risk taking is evidenced by the negative coefficient value in both models using ratings of the mother and biological father (-.15) and the mother and step-father (-.03). However, better neighborhood appraisal in both the perceived parental closeness between the mother and biological father group and the mother and step-father respondents had a direct effect (.06) on increased alcohol use. Thus, youth who perceived greater neighborhood quality used more alcohol. However, worse neighborhood quality (-.14) and lower perceived parental closeness (-.15) has a direct negative effect on sexual risk taking. Or conversely, teens who perceive a worse environment engage in less sexual activity. Thus, both neighborhood perception and perceived parental closeness have a protective effect on sexual risk taking, which then, in turn, is diminished by risk proneness (.00) and alcohol use (.18).

Nevertheless, a paradox arises among indirect effects associated with neighborhood quality. Those youth who rate neighborhood quality as high also report using more alcohol and increased sexual risk taking, which can possibly be attributed to more disposal income. In another indirect effect, lower neighborhood quality, operates through higher depression, higher risk proneness, in turn leading to higher alcohol use

and higher sexual risk taking (or total effect of -.155 for both biological parents model and step-parents path analysis, based on four multiplicative paths, then summed together, per Cohen and Cohen (1983), referring to Figures 4-1 and 4-2). The total effects for all variables in each of the two models (Figures 4-1 and 4-2) are close in value, with the exception of perceived parental closeness variable for first the mother and biological father and then the mother and step-father. Since both the indirect effect and direct effect values of perceived parental closeness between mother and step-father is lower, the total effect is much weaker, indicating that step-parenting quality has less influence on adolescent sexual risk taking.

Table 4.6: Indirect, Direct and Total Effects from Path Analysis Using Perceived Parental Closeness Between Mother and Biological Father on Sexual Risk Taking n = 4,648

Variable	Total Indirect Effect	Direct Effect	Total Effect
Perceived Parental Closeness Between Mother and Biological Father	.002	-.150	-.148
Neighborhood Quality	-.019	-.136	-.155
Depressive Symptoms	.003	.120	.123
Risk Proneness	.027	.000	.027
Alcohol Use	.000	.180	.180

Table 4.7: Indirect, Direct and Total Effects from Path Analysis Using Perceived Parental Closeness Between Mother and Step-Father on Sexual Risk Taking
n = 4,648

Variable	Total Indirect Effect	Direct Effect	Total Effect
Perceived Parental Closeness Between Mother and Step-Father	.001	-.030	-.029
Neighborhood Quality	-.007	-.148	-.155
Depressive Symptoms	.003	.115	.118
Risk Proneness	.026	.000	.026
Alcohol Use	.000	.170	.170

CHAPTER 5: DISCUSSION AND IMPLICATIONS FOR PRACTICE, POLICY AND FUTURE RESEARCH

5.1 Discussion of the Findings

From the univariate, bivariate and multivariate analyses, the key finding from this model is the mediational effect of risk proneness. Thus, all the research questions as originally asserted were answered with these data, i.e. the 1998 NLSY Young Adult cohort as follows:

I. Does self-rated risk proneness influence health behaviors?
II. Does self-rated risk proneness mediate the effects of health behavior inputs on health behaviors?
III. Are the mediational effects of self-rated risk perceptions different among members of different groups?

In the bivariate analysis, the strongest associations are seen between lower neighborhood quality and depressive illness, and poorer neighborhood quality ratings and sexual risk taking. Other higher correlations occur between lower perceived parental closeness between mother and biological father and sexual behavior, between depressive symptoms and sexual risk taking and between alcohol and risk proneness and between depressive symptoms and risk proneness, and finally between sexual risk taking and alcohol use. In the multivariate analysis, the discriminant functions yield a very strong relationship between alcohol use, depressive illness symptoms, higher neighborhood quality and perceived parental closeness between the mother and biological father among the lower risk prone group. Contrastingly, the higher risk prone group reports lower perceived parental closeness between mother and biological father, better neighborhood

quality and higher sexual risk taking. Similar values are revealed for both MANCOVA and discriminant analysis for the youth who responded to the perceived parental closeness between mother and step-father.

The path analysis confirms these relationships, explaining how each variable impacts the other. Thus, risk proneness and its relationship to depressive symptoms are critical in understanding the underlying processes that determine health risk behaviors among youth, such as alcohol use and sexual behavior. Moreover, by introducing the weighting technique, particularly with respect to calculation of covariance matrix necessary to execute path analysis, never applied before to these data before in order to normalize against US population, the resulting structural equation model permits making inferences about sub-samples. Therefore, by partitioning the groups by mother's highest grade completed, mother's educational attainment can be tested as a protective factor in mitigating the effect of other conflicting determinants on adolescent health risk behavior, i.e. alcohol use and sexual risk taking.

5.2 Support for the Theoretical Paradigm

As postulated, risk proneness emerges as a mediator in the pathway to adolescent health risk behavior. Indeed, the temporal ordering based on Bronfenbrenner's Macrosystem is consistent with the components of the exosystem, as illustrated by the concentric circle diagram Figure 2-1 in Chapter 2, and confirmed in the path analyses described in Chapter 4. The variables of parenting, representing the meso-system, and the neighborhood as a proxy for the exo-system, lead to risk proneness as a mediator with

sexual risk taking as the outcome. The placement of alcohol use in the sequence can also be viewed as a mediator between neighborhood and sexual risk taking. Thus, those respondents who perceive their neighborhood as lower quality have greater symptoms of depression. Thus, in these data the underlying mechanism of risk proneness is depressive symptoms, suggesting that the proclivity to engage in sensation seeking behavior may be to counteract depressed mood. The exhilaration, then, experienced with risk behavior in turn elevates adrenalin and releases certain endorphins to create a "high," enhanced further by alcohol use and sexual risk taking

Maternal educational attainment, as a proxy for social support, is used as a grouping variable to demonstrate differences of risk proneness by mother's education on adolescent physical health risk outcomes behaviors, i.e. drug/alcohol use and sexual activity. In these data, when testing the model on sub-groups of mothers with higher educational attainment, maternal education becomes evident as a protective effect, since perceived parental closeness between mother and biological father and/or step-father has no influence on either alcohol use or sexual risk taking. Mother's educational attainment (measured as highest grade completed) as a type of social support can be included under the general rubric of social environmental factors, which is an essential component in buffering certain patterns of behavior and how these affect adolescent social conduct. House (1981) defines four different types of social support: emotional, appraisal, informational and instrumental. Emotional support refers to emotional concern, love and empathy received from those in the domain. Appraisal support entails deriving information relevant to self-evaluation. Informational support pertains to seeking knowledge about the situation. Instrumental support involves help with daily activities.

Different types of support are expected from different persons in different environments respectively—including the Bronfenbrenner defined micro, meso and macrosystems. Maternal educational attainment, or highest grade completed, falls under the aegis of informational support and appraisal support, since both aspects of support entail assessment and evaluation skills. Both informational and appraisal support involve increased educational attainment, leading to better decision making.

5.3 Implications for Policy and Practice

This research demonstrates the link between depression and risk proneness in the pathway to deleterious health risk behaviors. These findings inform clinical practice, illustrating the role of social workers in providing social support. Based on the House (1981) model, social work practice can be viewed as a type of social support. The role of social workers in providing social support is to promote pro-social behavior, which includes social participation, and social integration, particularly among youth whose mothers have lower educational attainment and are vulnerable to poorer health decision making and higher risk proneness. Social workers encourage adolescents to remain connected to social networks, which promote pro-social behavior.

Indeed, the intergenerational transfer of maternal educational attainment has been demonstrated to ameliorate child outcomes, including increased cognitive capacity, and better health status (Black, Devereux and Salvanes, 2005; McLanahan, 2004). The direct and indirect benefits of higher educational attainment among women therefore are correlated with higher income, better access to resources, motivation to seek knowledge

and development of network ties, all of which can promote their children's pro-social behavior in the community (Mechanic, 2002; Mechanic and Tanner, 2007). Therefore, as Zhan and Pandey (2004) assert, one simple policy initiative, which would encourage disadvantaged women with high school or less to seek more education, is to treat education or attendance at vocational, technical, community or four year colleges as work credit, under the auspices of the 1996 Personal Responsibility and Work Opportunity Reconciliation Act. Thus, the implications of increased maternal educational attainment extends beyond greater household income for children. An additional positive result of maternal higher educational attainment, as evidenced by this dissertation research evaluating adolescent risk proneness by mother's education, is that youth with mothers who have higher educational attainment are more likely to have lower risk proneness and therefore engage less often in deleterious health risk behaviors.

5.4 Directions for Future Research

In order to test causal direction, analyses need to be conducted with longitudinal data. Using multiple waves from the NLSY Young Adult cohorts, how the causal inter-relationship of depression and risk proneness (sensation seeking) influences adolescent alcohol use and sexual risk taking can be investigated. Structural equation modeling with cross-lagged data can test the reciprocal causality of risk proneness and depressive symptoms and their affect on health risk behaviors over time among adolescents ages 14 to 21. Their internal feeling of despondency could then be projected onto the external environment, termed "depressive realism." This phenomenological cycle can be

evaluated by applying statistical weights for each of the respective years, prior to calculating the covariance matrix for path analyses performed in AMOS. In this current cross-sectional study, the direct and indirect influence of depression and risk proneness on adolescent alcohol use and sexual risk taking suggest a one-way direction of causation. Future research can build on existing findings from single-year data, extending the model from one point in time to determine how Time 1 risk proneness propensity influences Time 2 health risk behaviors which affect Time 3 outcomes, i.e. severity index of adolescent alcohol use in the past 30 days and sexual risk taking.

5.5 Limitations of the Research Study

The current study is limited to cross-sectional data from the 1998 NLSY Young Adult Cohort. Consequently, to further test mediating role of risk proneness, a longitudinal study using panel data can be conducted to evaluate the relationship between adolescent mental and physical health through temporal ordering as a pathway to deleterious later-life health outcomes. The role of cognition in health and the causal direction of presaged intention (risk proneness) in determining health risk behavior decision making can be explored over time.

5.5.1 Primary vs. Secondary Data

The pitfalls of secondary data such as proxy measures for social support

recapitulate the standard caveat emptors of using secondary versus primary data. In the NLSY, proxies for social support measures in the micro, meso and exo systems (as postulated by Bronfenbrenner) need to be viewed within the context of individual self-assessment, perceived parental closeness and neighborhood. The social support measures within the microsystem or family context here are measured as the adolescent's perception of relationship quality between the adolescent's mother and father or mother and step-father. Yet, maternal education as a social support proxy does not fully capture the ideal operationalized definition of appraisal and information support per House, 1981. Indeed, some of the scales not are normalized or standardized against the US population, like the perceived parental closeness scale, the neighborhood quality scale, alcohol use and sexual risk taking indexes. Thus, these severity measures of different levels of environmental influence have not yet been externally validated, to ensure generalizability to other populations.

5.5.2 Selection Factors and Recall Bias

All measures are self-rated and therefore are subject to youth respondent's ability to assess behavior over the course of the past month and/or year. Further, since the primary sampling is by household, and most of the survey questionnaire is self-administered, adolescents may tend to under rate or over rate their behaviors. Additionally, perception of environment may be enhanced by their commitment to the study (sustained selection factor), since these teens and their siblings in the same household have been interviewed in previous years.

5.5.3 Mediating Role of Risk Proneness

Self-rated risk proneness, in conjunction with the psychosocial and environmental factors as promulgated in the Bronfenbrenner paradigm, was evaluated in path analysis as a mediating step to engaging in alcohol and sexual behavior. Results reveal that depressive symptoms are an underlying factor in risk proneness (higher sensation seeking likelihood) among adolescents whose mothers have lower educational attainment, particularly females engaging in concomitant alcohol use and sexual risk taking. Path analysis, then, does demonstrate, through temporal ordering, that risk proneness (sensation seeking) is a mediator in the sequence to alcohol use and sexual risk taking among both African American and white adolescents of mothers with both higher and lower educational attainment. These group differences in mother's educational attainment contribute to the development of targeted community interventions among adolescents in varied neighborhood contexts. This research, then, meets the criterion for causal inferencing, since full effect of all the predictors operates through intervening variables (MacKinnon et al, 2002).

5.6 Summary and Conclusion

To date, no published literature documents the weighting technique applied to the variance-covariance matrix used for the path analysis, generated from the NLSY data for this research project. The algebraic weight formula as cited in Appendix A is used to

transform the raw weights provided in the NLSY Young Adult data set. The raw weights are proportionally calculated based on each case by gender, race and age. However, the raw weights need to be modified before implemented in the multivariate analysis in order to normalize the sample against the US population. Therefore, the value of each case is now altered to ensure the contribution of those responses within a case are representative of the population distribution in the US. Thus, the weighting technique can now be introduced into future research studies involving the NLSY data sets.

The weighting technique is critical even when the model is applied to primary data. For example, if this model were tested on a sample taken from a geographic area with overrepresentation of a particular ethnicity or race, then the weight formula would need to be applied to ensure generalizability and replicability. Thus, in order to determine policy initiatives and objectives with respect to demonstration projects and/or interventions, the data needs to be representative of the population, ensured by implementing the weight formula.

This study examines how mother's education level as a risk or protective factor/social support mechanism can predict adolescent deleterious or prosocial health behaviors through intergenerational transfer of health. By applying path analysis to elucidate differences between and within adolescent groups by maternal educational attainment, psychosocial profiles of vulnerable adolescents can be identified, at the individual, family and environmental level for targeted intervention strategies. The effects of individual, family and neighborhood quality on adolescent substance use and sexual activity are evaluated to explain the relationship of the individual adolescent to the environmental context and how these factors are associated with co-morbid mental and

physical health conditions. Understanding the mechanisms, such as how depression,

sensation seeking, lack of perceived parental closeness (discord on rules) and poorer

neighborhood quality elucidate the link to health risk behaviors in situ.

APPENDIX A: Weight Formula Explanation

The first procedure entails selecting "analyze" then clicking on "descriptive statistics" followed by the function "frequency." Using the revised raw sample weight variable provided in the NLSY data set by the Ohio State University, Center for Human Resource Research, the statistics button is chosen on the bottom of the window and then sum. This procedure prints out the sum of the weights of all the cases in these data. A new weight is then created with the following formula:

Normalized Weight = yaw * n / $\sum$

yaw = young adult's raw weight variable provided in the NLSY Young Adult Data set
n = number of cases in the NLSY Young Adult cohorts 1998
$\sum$ = sum of the raw weights of all cases

An example follows using simple numbers:

	Case#	Weights Weight = Wi
n = 4	1	2
	2	3
	3	1
	4	0.5

Sum of the weight for n = 4 is 6.5
Ratio is 4/6.5

Wi * ratio

Wi = 2	2*4/6.5	=1.230769
Wi = 3	3*4/6.5	=1.846154
Wi = 1	1*4/6.5	=.6153846
Wi = .5	.5*4/6.5	=.3076923

| Total | | = 4 |

This normalized weight will be applied in all analyses executed. While performing,

discriminant analysis, MANCOVA and path analyses, the weight "on" command in SPSS

will be selected to ensure the variables in the sample are normalized against the US

population from which they were originally drawn.

APPENDIX B: Measurement Table

1998 NLSY-Young Adult Variables with Coding and Level of Measurement

Survey Question/ Variable Name	Original Coding	Variable Re-Code Type	Level of Measurement	Category of Variable By Hypothesis
Age	Continuous	Continuous	Continuous	Independent H_1, H_2, H_3
Race	Categorical	Dichotomous	Nominal	Independent H_1, H_2, H_3
Gender	Categorical	Dichotomous	Dichotomous	Independent H_1, H_2, H_3
Perceived Parental Closeness Between Mother and Bio-father	Likert Scale (6) = Parents get along least; (24) = parents get along most	Score (represents mean of items included in the index)	Continuous	Independent H_1, H_2, H_3
1. How often do bio-parents get along well together?	Likert Scale Rating 1 to 4			
2. How often do bio-parents agree on rules about R?	Likert Scale Rating 1 to 4			
3. How often do bio-parents argue? (reverse coded)	Likert Scale Rating 1 to 4			
4. How often R. hesitates to talk about bio-dad in front of mother? (reverse coded)	Likert Scale Rating 1 to 4			
5. How often R hesitates to talk about mother in front of bio-dad? (reverse coded?	Likert Scale Rating 1 to 4			
6. How often R. feels caught between bio-parents? (reverse coded)	Likert Scale Rating 1 to 4			

Survey Question/ Variable Name	Original Coding	Variable Re-Code Type	Level of Measurement	Category of Variable By Hypothesis
Perceived Parental Closeness Between Mother and Step-Father				Independent H1, H2, H3
1. How often does the mother and step-father get along well together?	Likert Scale Rating 1 to 4			
2. How often does the mother and step-father agree on rules about R?	Likert Scale Rating 1 to 4			
3. How often does the mother and step-father argue? (reverse coded)	Likert Scale Rating 1 to 4			
4. How often R. hesitates to talk about step-dad in front of mother? (reverse coded)	Likert Scale Rating 1 to 4			
5. How often R hesitates to talk about mother in front of step-dad? (reverse coded)	Likert Scale Rating 1 to 4			
6. How often R. feels caught between mother and step-dad? (reverse coded)	Likert Scale Rating 1 to 4			

Survey Question/ Variable Name	Original Coding	Variable Re-Code Type	Level of Measurement	Category of Variable By Hypothesis
Neighborhood Quality	Likert Scale (8) = Most problems; (24) = least problems	Score (represents mean of items included in the index)	Continuous	Independent H_1, H_2, H_3
1. In neighborhood people do not respect rules/laws.	Likert Scale Rating 1 to 3			
2. In neighborhood crime and violence is a problem.	Likert Scale Rating 1 to 3			
3. In neighborhood not enough police protection.	Likert Scale Rating 1 to 3			
4. In neighborhood Problems with abandoned/run-down buildings	Likert Scale Rating 1 to 3			
5. In neighborhood not enough public transportation.	Likert Scale Rating 1 to 3			
6. In neighborhood parents do not supervise their children.	Likert Scale Rating 1 to 3			
7. In neighborhood people do not care to keep to themselves.	Likert Scale Rating 1 to 3			
8. In neighborhood many people can't find jobs.	Likert Scale Rating 1 to 3			

Survey Question/ Variable Name	Original Coding	Variable Re-Code Type	Level of Measurement	Category of Variable By Hypothesis
Depressive Symptoms Index	Likert Scale (0) = Least depressed; (18) = parents get along most	Score (represents mean of items included in the index)	Continuous	Independent H_1, H_2, H_3
1. R did not feel like eating.	Likert Scale Rating 0 to 3			
2. R has trouble keeping mind on tasks.	Likert Scale Rating 0 to 3			
3. R feels depressed.	Likert Scale Rating 0 to 3			
4. R sleeps restlessly.	Likert Scale Rating 0 to 3			
5. R feels sad.	Likert Scale Rating 0 to 3			
6. R could not get going.	Likert Scale Rating 0 to 3			
Risk Proneness	Likert Scale Rating (4) = Least risk prone; (16) = Most risk prone	Score (represents mean of items included in the index)	Continuous	-Grouping Variable H_1, --- Mediator H_2, H_3
1. R thinks planning takes the fun out of things.	Likert Scale Rating 1 to 4			
2. Enjoys taking risks	Likert Scale Rating 1 to 4			
3. Enjoys new/exciting experiences even if they are frightening.	Likert Scale Rating 1 to 4			
4. Life with no danger in it would be too dull for R.	Likert Scale Rating 1 to 4			

Survey Question/ Variable Name	Original Coding	Variable Re-Code Type	Level of Measurement	Category of Variable By Hypothesis
Alcohol Use	Likert Scale (0) = no alcohol use; (21) = high alcohol use	Summed Scale	Continuous	Dependent H_1, H_2, H_3
1. Age when first began to drink alcohol once a month or more.	Continuous	Categorical 0 to 3		
2. When was most recent time R had drink of alcohol?	Continuous	Categorical 0 to 3		
3. On how many different days did R drink in past 30 days?	Continuous	Categorical 0 to 3		
4. When R drank in past 30 days, how many drinks per day?	Continuous	Categorical 0 to 3		
5. In past 30 days, on how many days did R have 5+ drinks on the same occasion?	Continuous	Categorical 0 to 3		
6. What is most R had to drink in any 1 day of past 30 days?	Continuous	Categorical 0 to 3		
7. In past 30 days, number of days R drank this amount.	Continuous	Categorical 0 to 3		

Survey Question/ Variable Name	Original Coding	Variable Re-Code Type	Level of Measurement	Category of Variable By Hypothesis
Sexual Risk Taking	Likert Scale	Summed Scale	Continuous	Dependent H_1, H_2, H_3
1. Ever had sexual intercourse	Dichotomous (0) to (1)	Categorical (0) or (4)		
2. No. of people had sex with in past 12 months	Categorical (0) to (4)	Categorical (0) to (4)		
3. Age when first had sex	Continuous	Categorical $\leq13=4;14=3;15=2;$ $16=1;17=0$		
4. During most recent sex used condom	Dichotomous	Categorical 0 or 4		

APPENDIX C: Percent of Cases Imputed for Each Item in Scale

NLSY Young Adult Data 1998 Scale Items: Original Sample Size and Percent Imputed

Domain/Item	No. of Non-missing Cases	No. Imputed Missing Cases
Perceived Closeness Between Mother and Biological Father 1998		
How often do mother and biological father get along well together?	4,125 (88.7%)	523 (11.3%)
How often do mother and biological father agree on rules about R?	4,126 (88.8%)	522 (11.3%)
How often do mother and biological father argue? **(reverse coded)**	4,119 (88.6%)	529 (11.4%)
How often does R hesitates to talk about biological father in front of mother? **(reverse coded)**	4,108 (88.4%)	540 (11.6%)
How often does R hesitate to talk about mother in front of biological father? **(reverse coded)**	4,084 (87.9%)	564 (12.1%)
How often does R feels caught between mother and biological father? **(reverse coded)**	4,096 (88.1%)	552 (11.9%)
Perceived Closeness Between Mother and Step-Father 1998		
How often do mother and step-father get along well together?	1,390 (29.9%)	3,258 (70.1%)
How often do mother and step-father agree on rules about R?	1,374 (29.6%)	3,274 (70.4%)
How often do mother and step-father argue? **(reverse coded)**	1,375 (29.2%)	3,291 (70.8%)
How often does R hesitate to talk about step-father in front of mother? **(reverse coded)**	1,367 (29.4%)	3,281 (70.6%)
How often does R hesitate to talk about mother in front of step-father? **(reverse coded)**	1,368 (29.4%)	3,280 (70.6%)
How often does R feels caught between mother and step-father? **(reverse coded)**	1,371 (29.5%)	3,279 (70.5%)

Domain/Item	No. of Non-missing Cases	No. Imputed Missing Cases
Neighborhood Quality 1998		
In neighborhood people do not respect rules/laws	3,967 (85.4%)	681 (14.6%)
In neighborhood crime and violence is a problem	4,104 (88.3%)	544 (11.7%)
In neighborhood problems with abandoned/run-down buildings	4,041 (86.9%)	607 (13.1%)
In neighborhood not enough police protection	4,011 (86.3%)	637 (13.7%)
In neighborhood not enough public transportation	3,938 (84.7%)	710 (15.3%)
In neighborhood parents do not supervise their children	3,980 (85.6%)	668 (14.4%)
In neighborhood people do not care to keep to themselves	3,839 (82.6%)	809 (17.4%)
In neighborhood many people cannot find jobs	3,560 (76.6%)	1,088 (23.4%)
Depressive Symptoms Index 1998		
R did not feel like eating	4,634 (99.7%)	14 (0.3%)
R has trouble keeping mind on tasks	4,634 (99.7%)	14 (0.3%)
R feels depressed	4,634 (99.7%)	14 (0.3%)
R sleeps restlessly	4,629 (99.6%)	19 (0.4%)
R feels sad	4,634 (99.7%)	14 (0.3%)
R could not get going	4,634 (99.7%)	14 (0.3%)

Domain/Item	No. of Non-missing Cases	No. Imputed Missing Cases
Risk Proneness 1998		
R thinks planning takes the fun out of things.	4,273 (91.9%)	375 (8.1%)
Enjoys taking risks	4,234 (91.1%)	414 (8.9%)
Enjoys new/exciting experiences even if they are frightening	4,272 (91.9%)	376 (8.1%)
Life with no danger in it would be too dull for R	4,265 (91.8%)	383 (8.2%)
Alcohol Use 1998		
Age when first began to drink alcohol once a month or more	1,408 (30.3%)	3,240 (69.7%)
When was most recent time R had drink of alcohol	2,559 (55.1%)	2,089 (44.9%)
On how many different days did R drink in past 30 days	1,306 (28.1%)	3,342 (71.9%)
When R drank in past 30 days, how many drinks per day	1,325 (28.5%)	3,323 (71.5%)
In past 30 days, on how many did R have 5+ drinks on the same occasion	1,330 (28.6%)	3,318 (71.4%)
What is most R had to drink in any 1 day of past 30 days	1,334 (28.7%)	3,314 (71.3%)
In past 30 days, number of days R drank this amount	1,317 (28.3%)	3,331 (71.7%)
Sexual Risk Taking 1998		
Ever had sexual intercourse	4,181 (89.9%)	467 (10.1%)
No. of people had sex with in past twelve months	2,215 (47.7%)	2,433 (52.3%)
Age when first had sex	2,066 (44.5%)	2,582 (55.5%)
During most recent sex use condom	1,525 (32.8%)	3,123 (67.2%)

APPENDIX D: Models Identical to Main Model

Figure D.1, The Mediating Role of Risk Proneness on the Ecology of Adolescent Health Risk Behavior using Perceived Parental Closeness Between Mother and Biological Father with Higher Education, n = 1,438
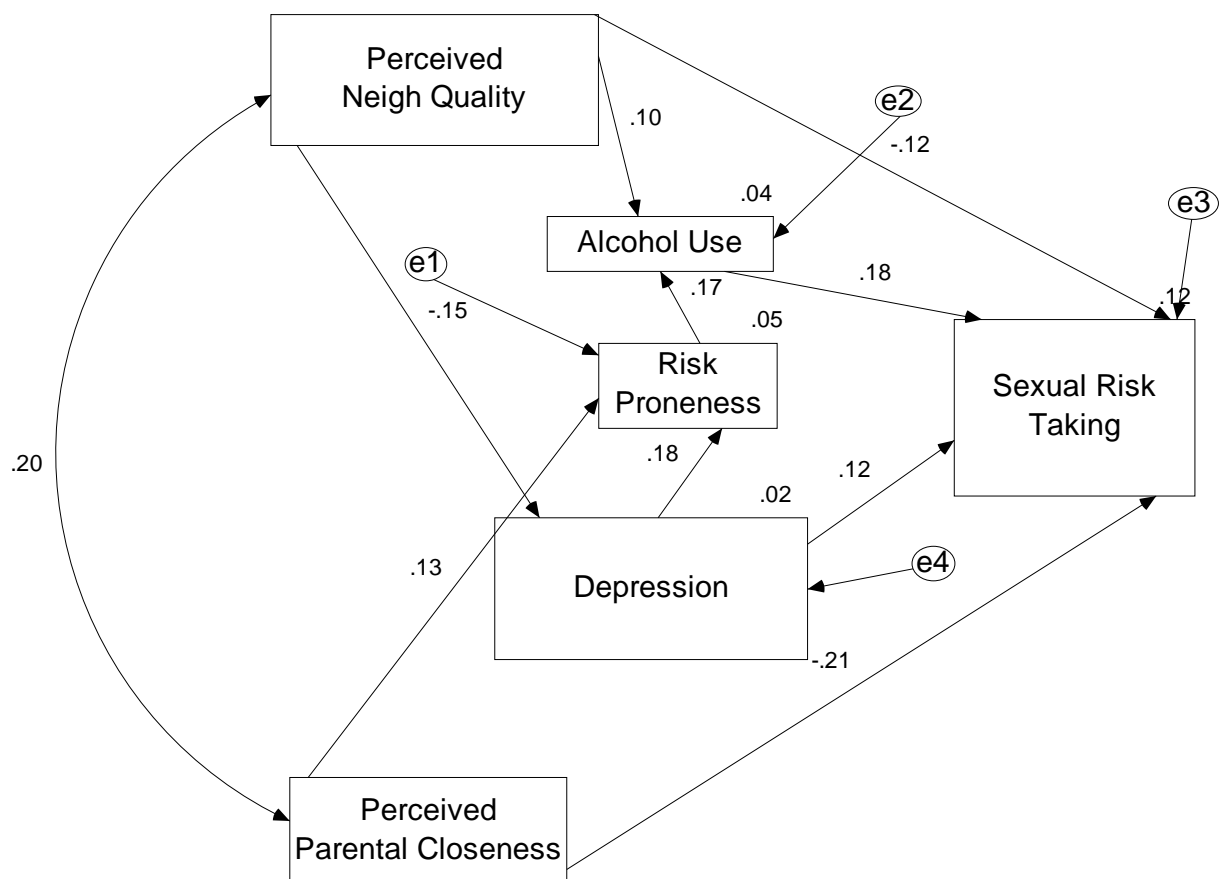
Figure D.2, The Mediating Role of Risk Proneness on the Ecology of Adolescent Health Risk Behavior using Perceived Parental Closeness Between Mother and Biological Father with Lower Education, n = 3,210
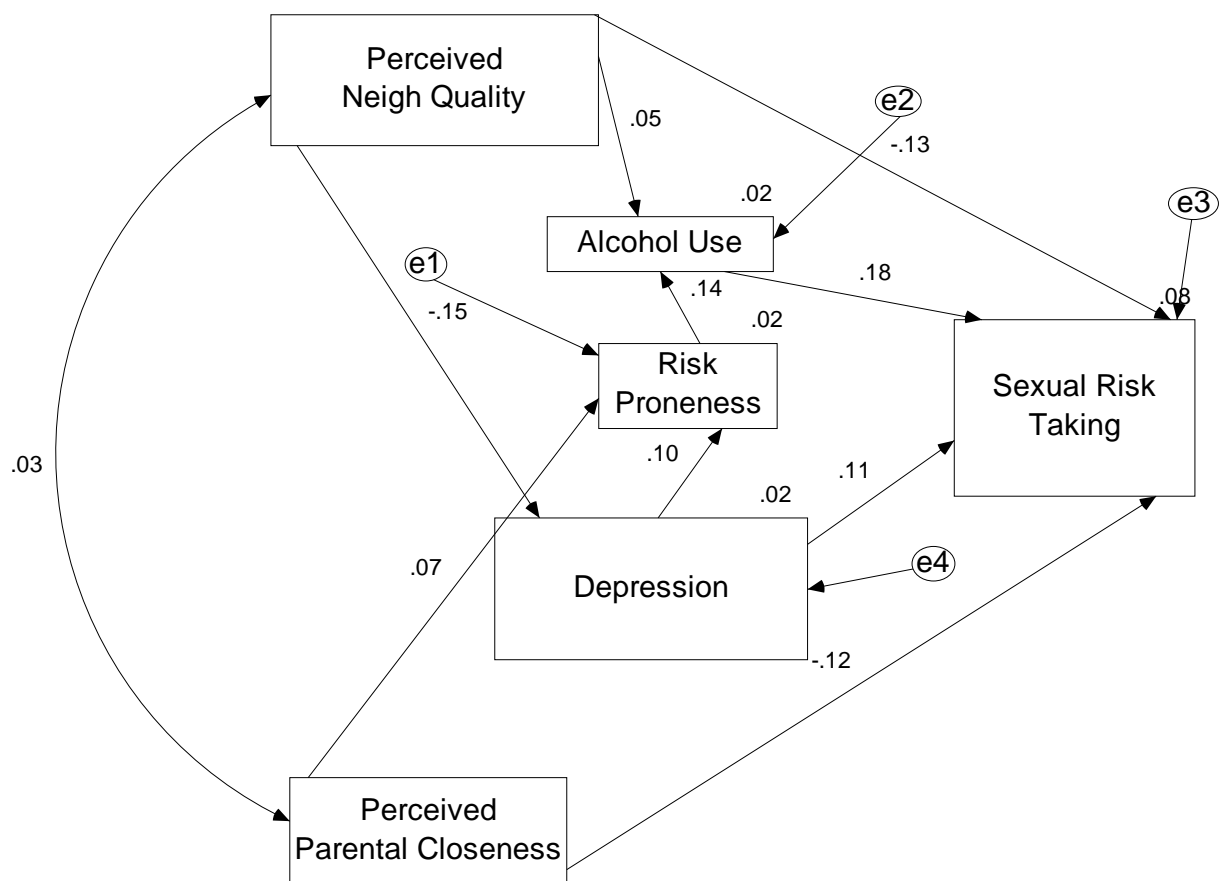
Figure D.3, The Mediating Role of Risk Proneness on the Ecology of Adolescent Health Risk Behavior using Perceived Parental Closeness Between Mother and Step-Father with Lower Education, n = 3,210
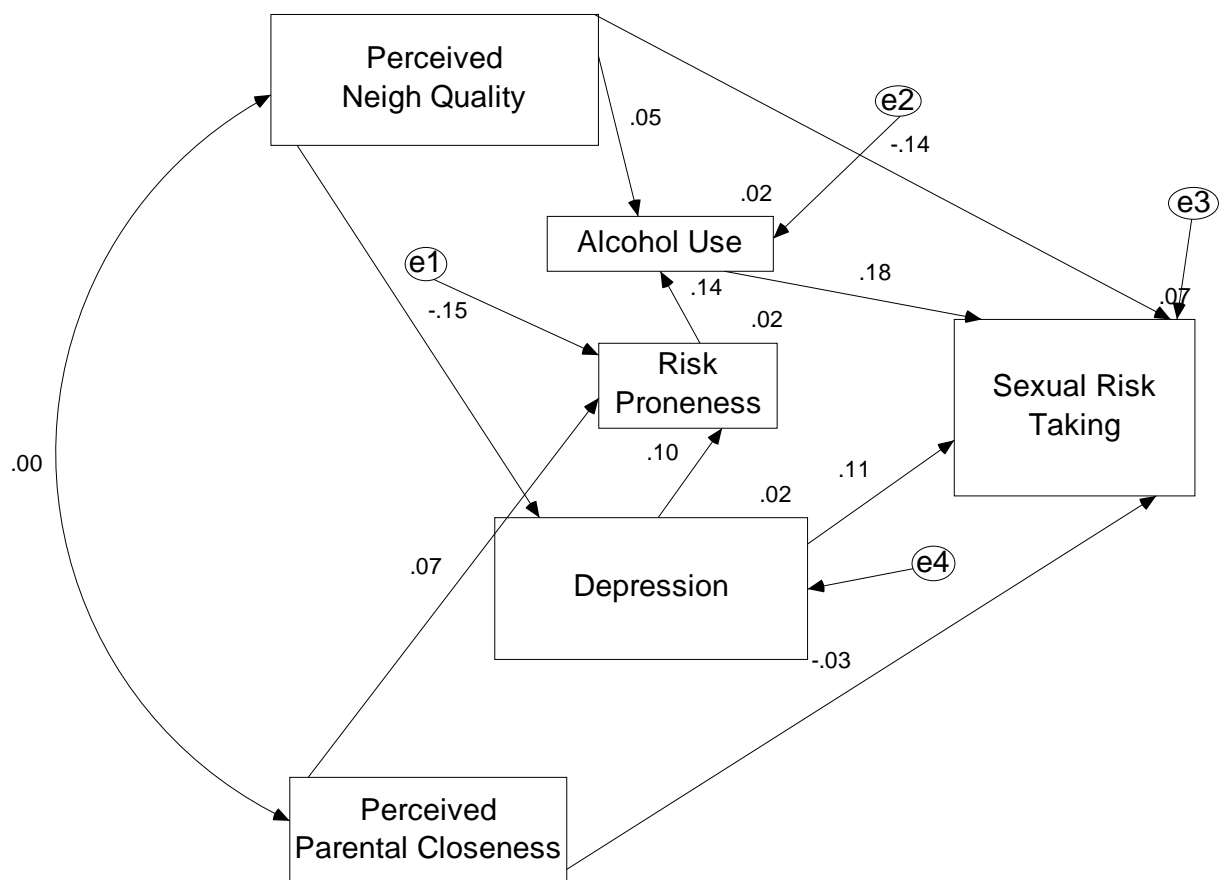
Figure D.4, The Mediating Role of Risk Proneness on the Ecology of Adolescent Health Risk Behavior using Perceived Parental Closeness Between Mother and Biological Father and Mother and Step-Father, n = 1,343
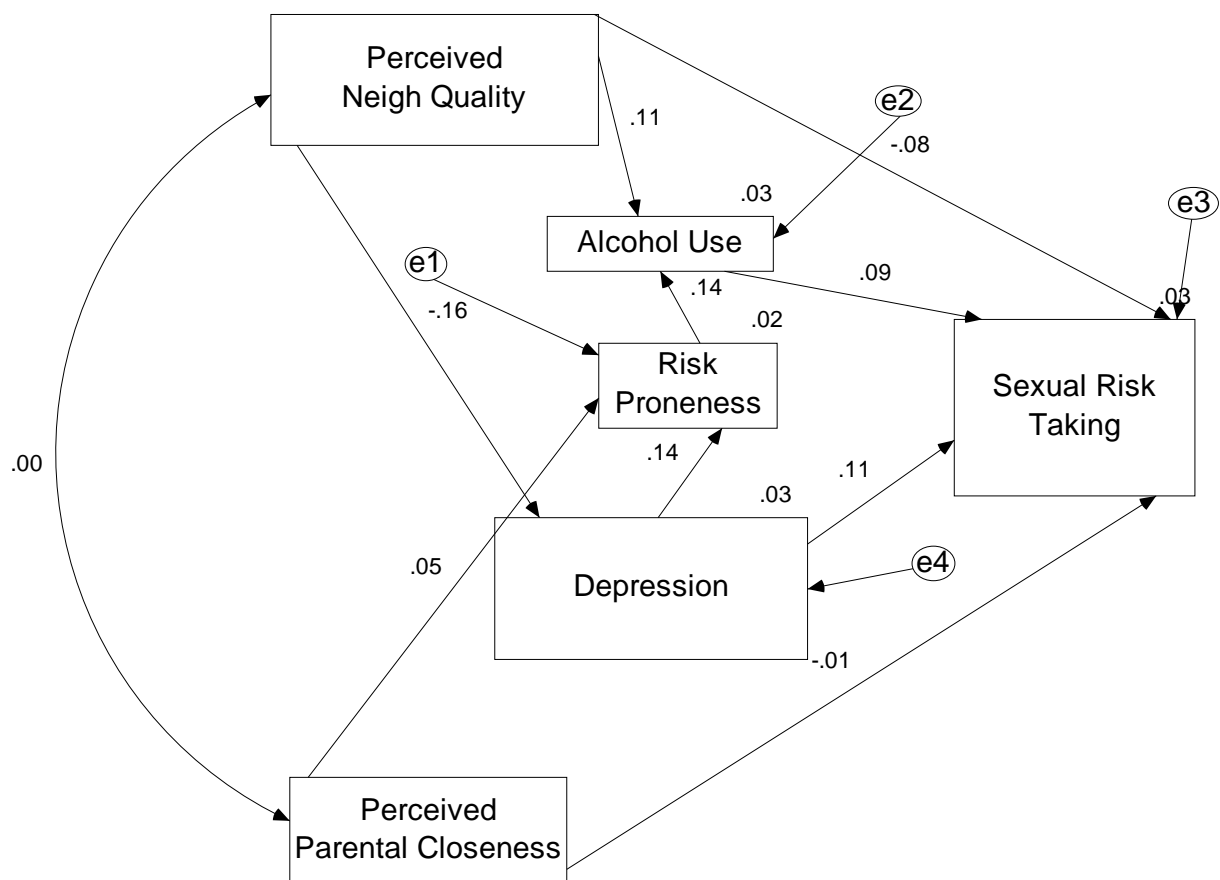
Figure D.5, The Mediating Role of Risk Proneness on the Ecology of Adolescent Health Risk Behavior using Perceived Parental Closeness Between Mother and Biological Father and Mother and Step-Father with Lower Education, n = 994
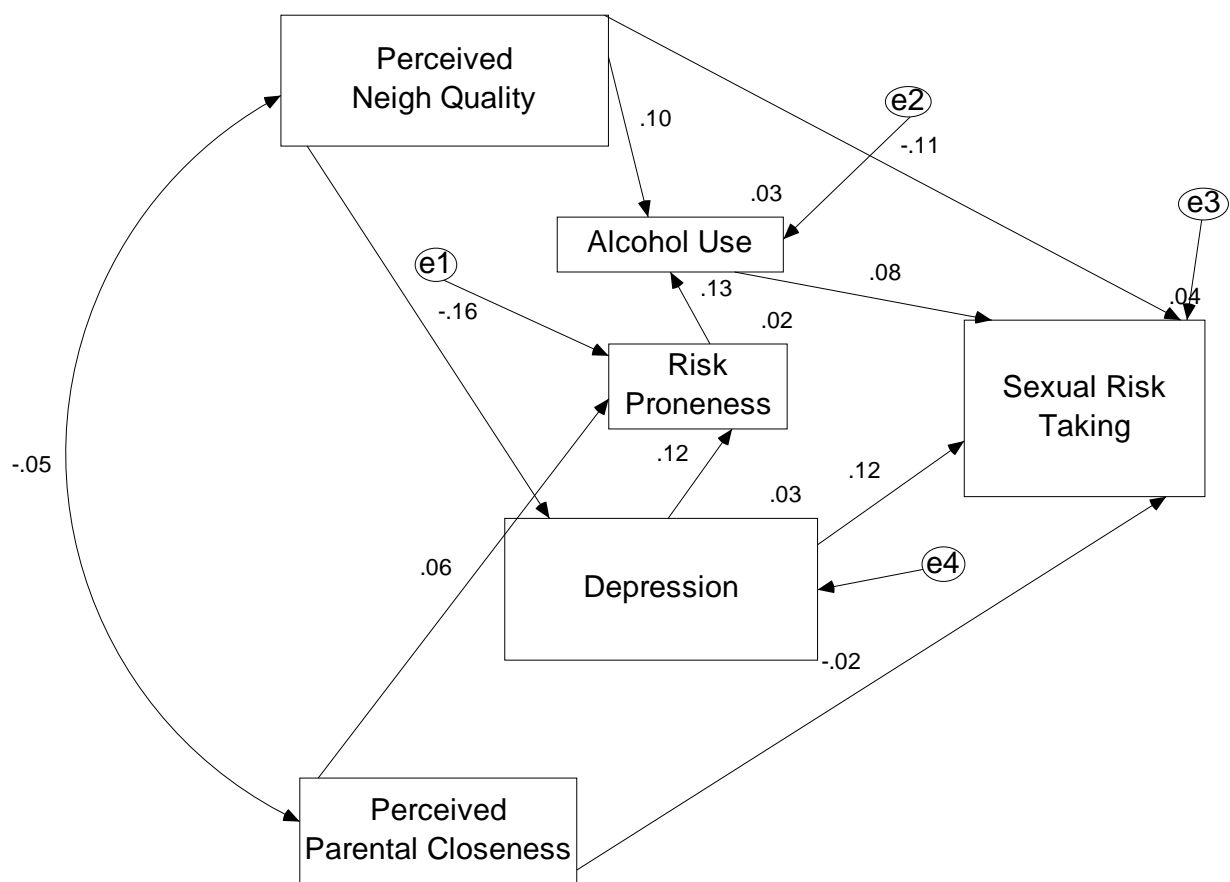
Figure D.6, The Mediating Role of Risk Proneness on the Ecology of Adolescent Health Risk Behavior using Perceived Parental Closeness Between Mother and Biological Father, Younger Adolescents Ages 14-16, n = 2,350
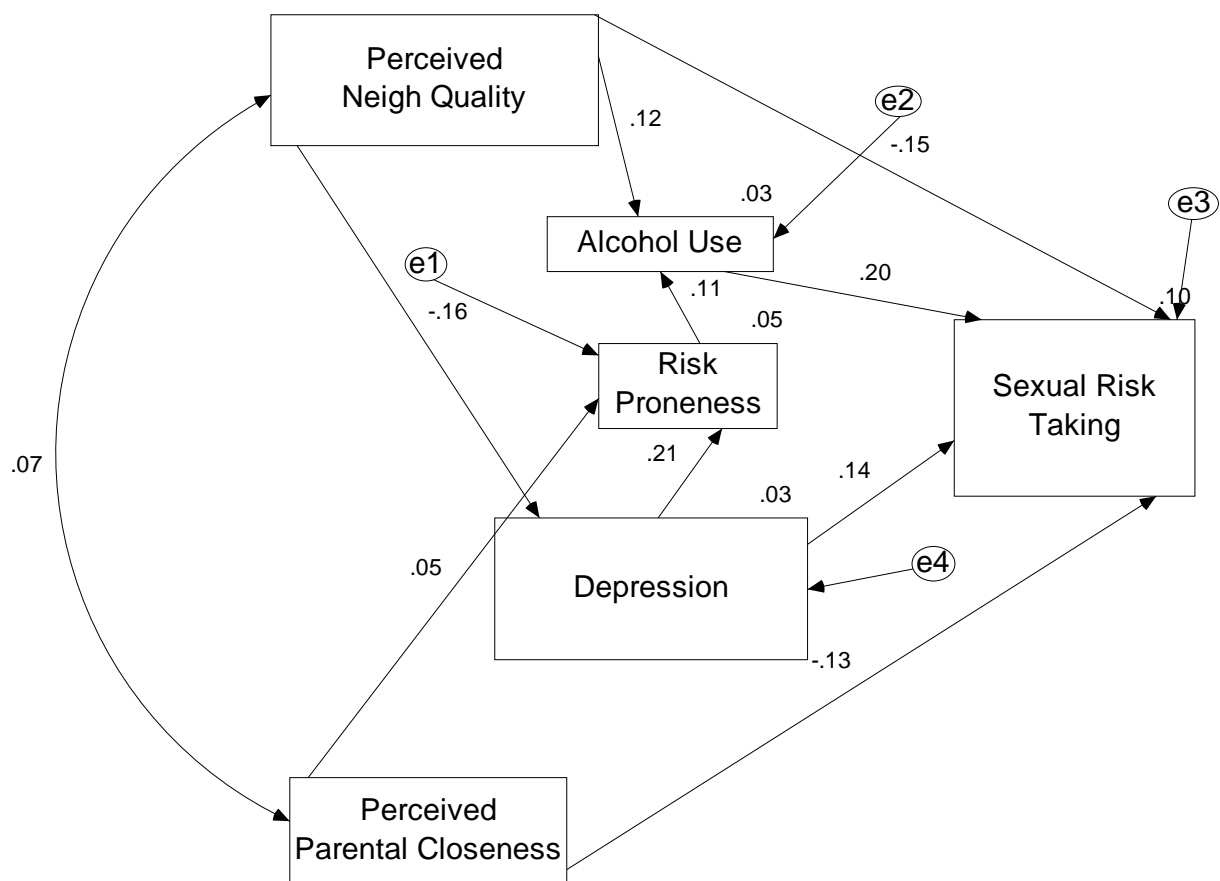
Figure D.7, The Mediating Role of Risk Proneness on the Ecology of Adolescent Health Risk Behavior using Perceived Parental Closeness Between Mother and Biological Father, Older Adolescents Ages 17-21, n = 2,298
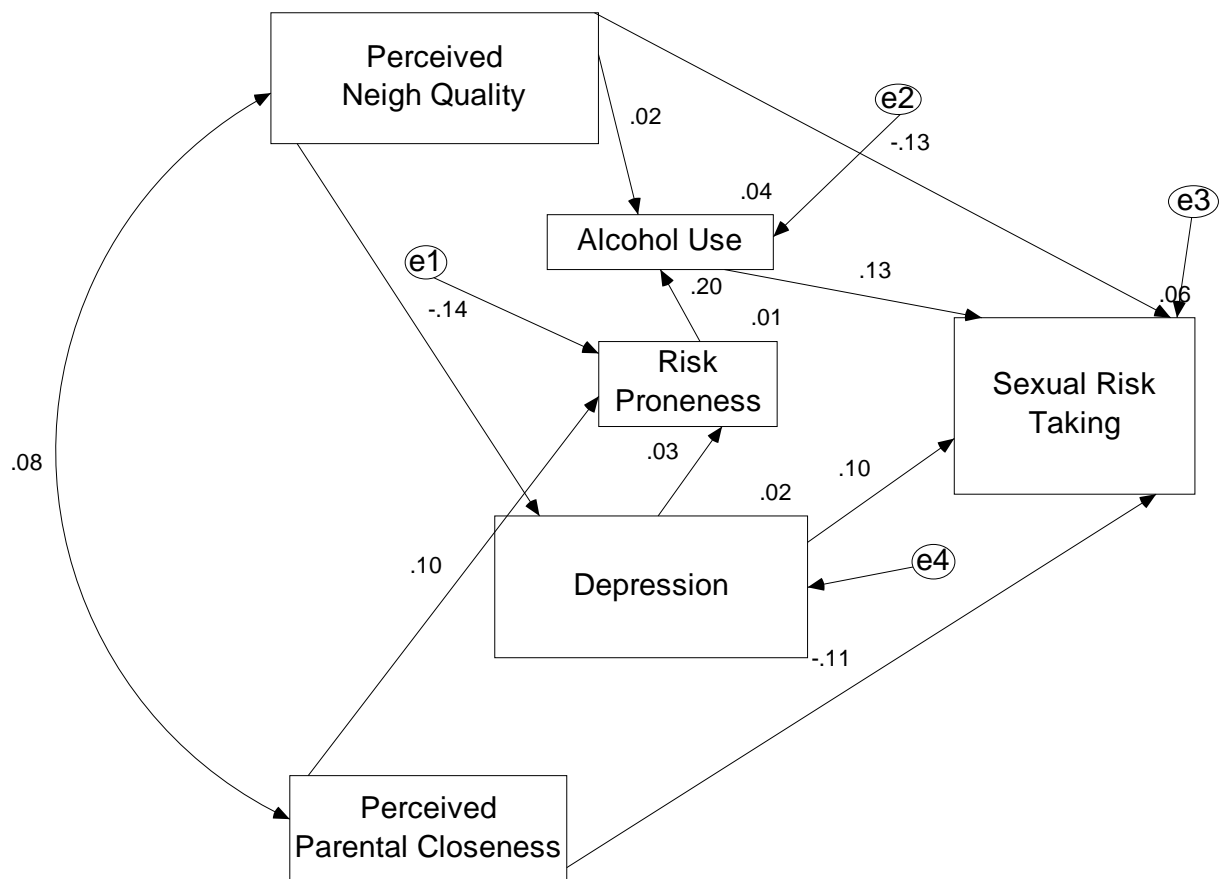
Figure D.8, The Mediating Role of Risk Proneness on the Ecology of Adolescent Health Risk Behavior using Perceived Parental Closeness Between Mother and Biological Father, Male Respondents, n = 2, 394

FIGURE E.1, THE MEDIATING ROLE OF RISK PRONENESS ON THE ECOLOGY OF ADOLESCENT HEALTH RISK BEHAVIOR USING PERCEIVED PARENTAL CLOSENESS BETWEEN MOTHER AND STEP-FATHER WITH HIGHER EDUCATION, N = 1,438

FIGURE E.2, THE MEDIATING ROLE OF RISK PRONENESS ON THE ECOLOGY OF ADOLESCENT HEALTH RISK BEHAVIOR USING PERCEIVED PARENTAL CLOSENESS BETWEEN MOTHER AND BIOLOGICAL FATHER AND MOTHER AND STEP-FATHER WITH HIGHER EDUCATION, N = 350
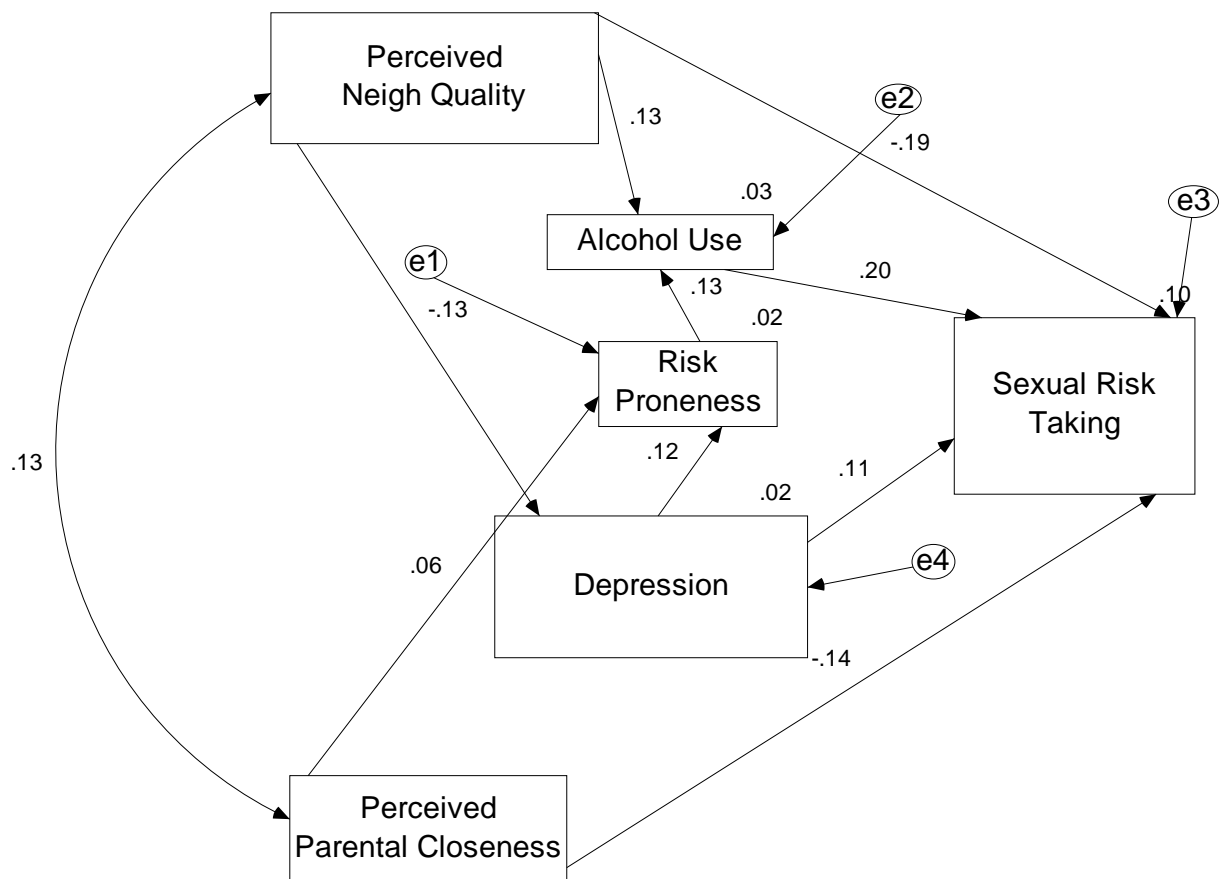
FIGURE E.3, THE MEDIATING ROLE OF RISK PRONENESS ON THE ECOLOGY OF ADOLESCENT HEALTH RISK BEHAVIOR USING PERCEIVED PARENTAL CLOSENESS BETWEEN MOTHER AND BIOLOGICAL FATHER, FEMALE RESPONDENTS, N = 2,251

Perceived
Neigh Quality

e2

-.09

.03

Alcohol Use

.17

e3

e1

-.17

.17

.04

.07

Risk
Proneness

Sexual Risk
Taking

.17

.11

.03

Depression

e4

.03

.11

-.15

Perceived
Parental Closeness

FIGURE E.4, THE MEDIATING ROLE OF RISK PRONENESS ON THE ECOLOGY OF ADOLESCENT HEALTH RISK BEHAVIOR USING PERCEIVED PARENTAL CLOSENESS BETWEEN MOTHER AND BIOLOGICAL FATHER, BLACK RESPONDENTS, N = 1,182
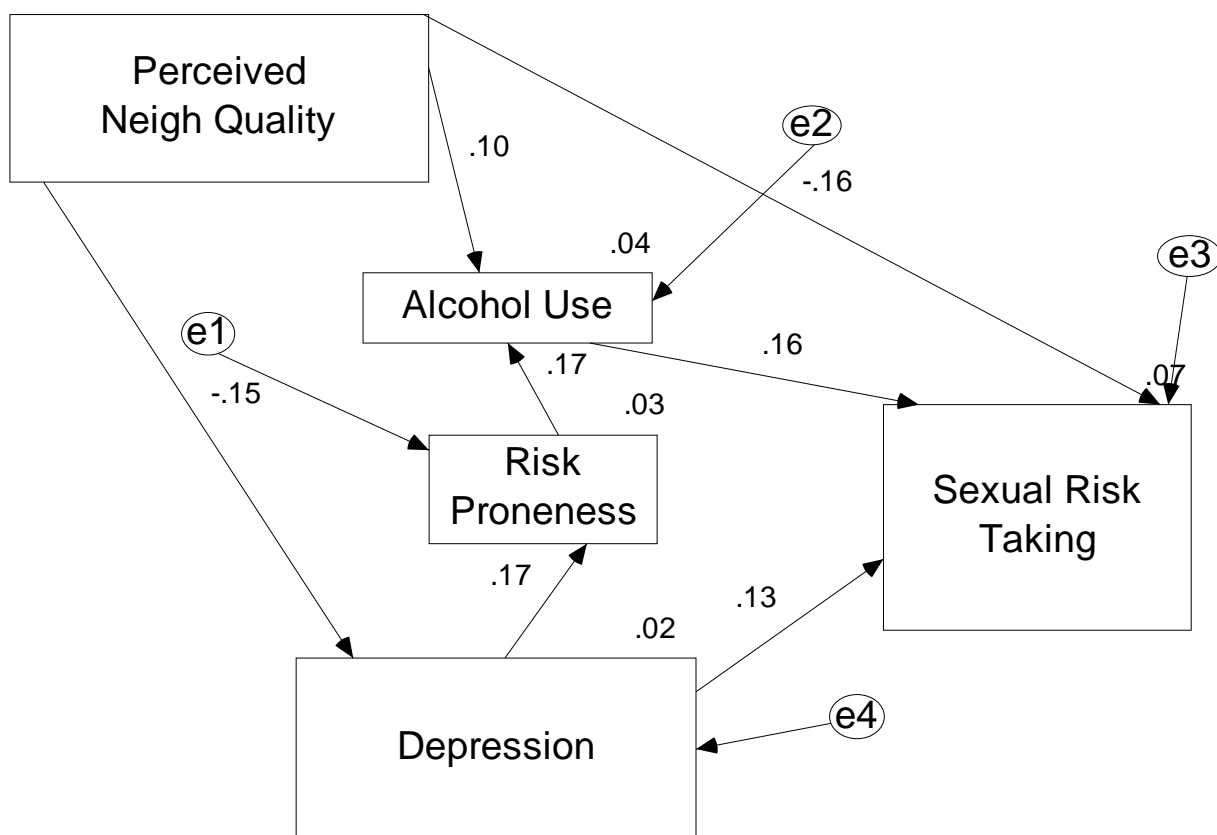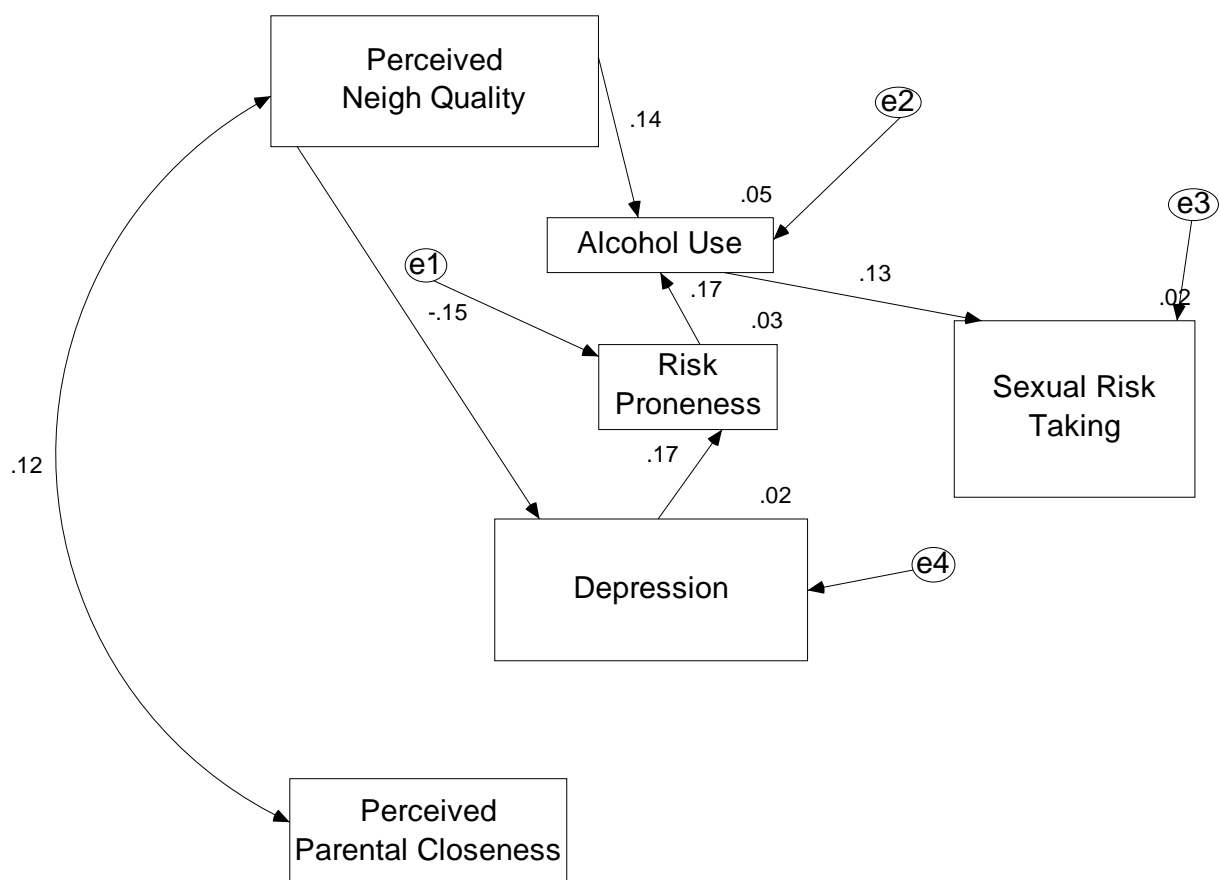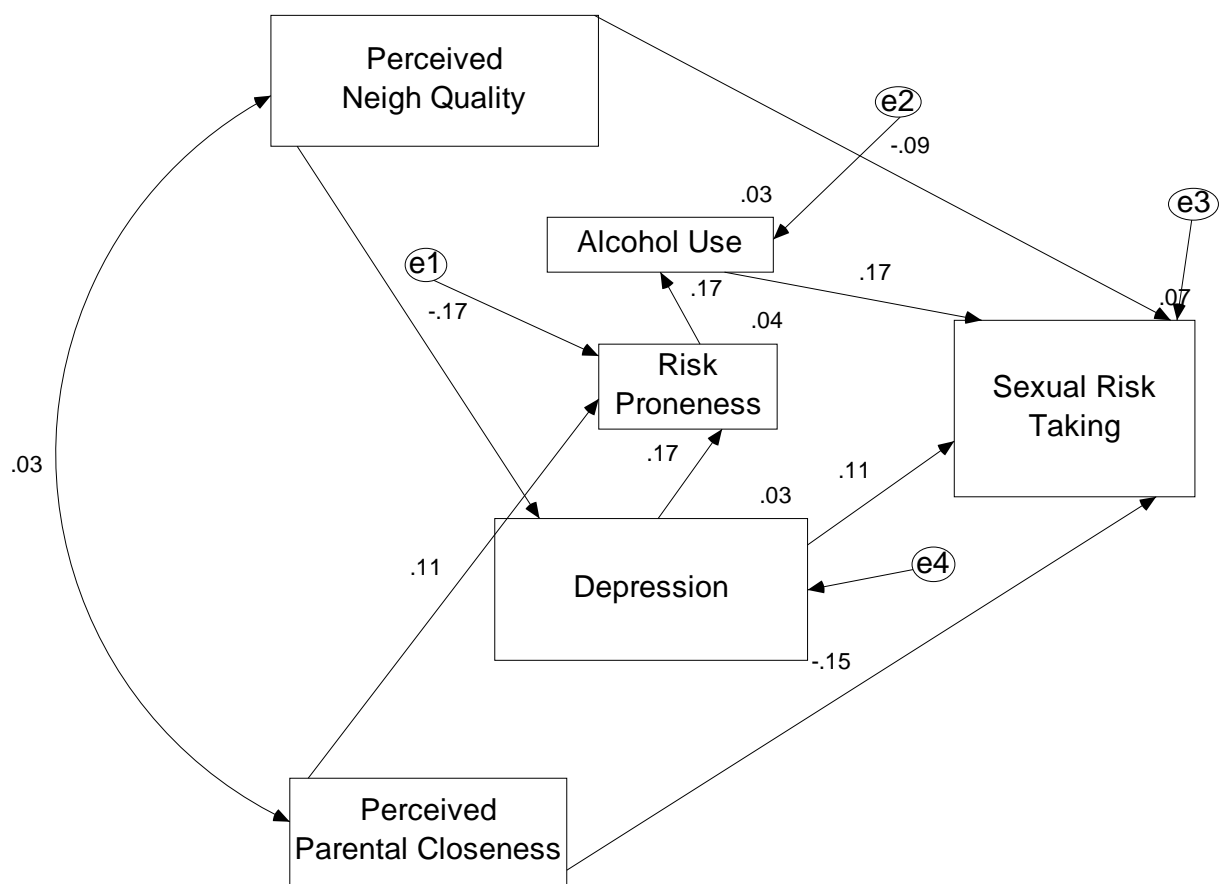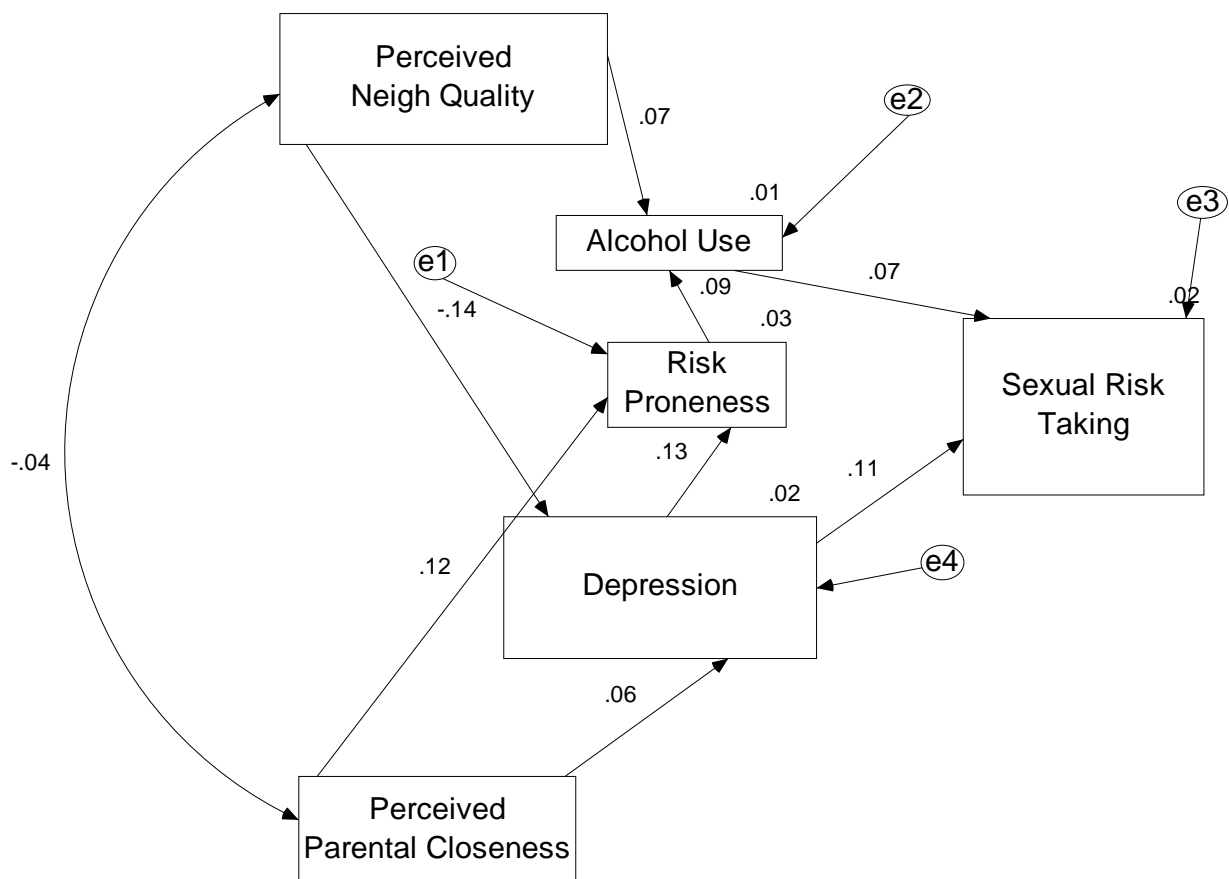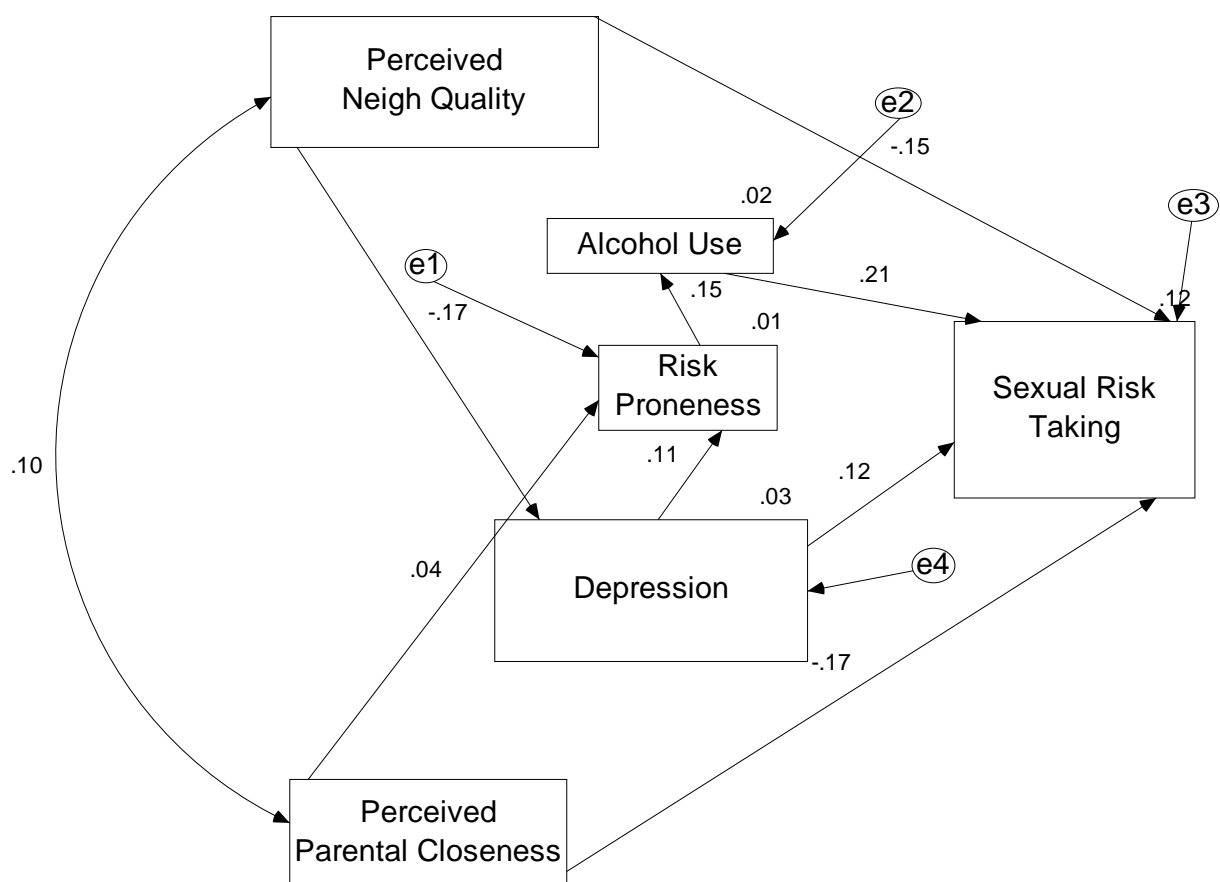
FIGURE E.5, THE MEDIATING ROLE OF RISK PRONENESS ON THE ECOLOGY OF ADOLESCENT HEALTH RISK BEHAVIOR USING PERCEIVED PARENTAL CLOSENESS BETWEEN MOTHER AND BIOLOGICAL, WHITE, N = 3,452

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