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Social Support And Health Outcomes In Adolescents Experiencing Homelessness And Poverty: A Test Of The Main Effect And Stress-Buffering Hypotheses

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SOCIAL SUPPORT AND HEALTH OUTCOMES IN ADOLESCENTS EXPERIENCING HOMELESSNESS AND POVERTY: A TEST OF THE MAIN EFFECT AND STRESS-BUFFERING HYPOTHESES

by

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DEDICATION

To my family

ACKNOWLEDGMENTS

Mom, Tiff, Tuttle, family, friends, and Q-bert and Minnie, thank you for filling my life with joy.
Drs. Toro, Bartoi, Barnett and Miles, thank you for your guidance and support.

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CHAPTER 1: Social Support, Health Outcomes, and Main and Stress-Buffering Effects

INTRODUCTION

Relationships influence our lives, sometimes for better, sometimes for worse. With an optimistic focus on the better, the purpose of this dissertation was to investigate the health benefits of social support, using Cohen and Wills' (1985; Cohen, 2004) main effect and stress-buffering hypotheses. Also of interest, was obtaining a better understanding of how different measures of social support relate to health. To date, most of the salutary effects of social support have been associated with perceived social support. The study also used a longitudinal framework in which to further our understanding of the relationship between social support and health, and of the measurement of social support. Specifically, these relationships were examined in the context of a 6-7 year study of adolescents experiencing poverty and/or homelessness.

Predictors

Major social constructs of support. Features of one's social network (e.g., size, frequency of contact, density, proximity) refer to structural aspects of one's social support; whereas, perceived social support speaks to one's perception of functions and resources provided by his or her social network. Cohen (2004) states that perceived "social support refers to a social networks' provision of psychological and material resources intended to benefit an individual's ability to cope with stress."

House (as cited in Cohen, 2004) differentiated four categories of perceived social support. He referred to the provision of tangible aid which helps maintain routine functioning, such as financial assistance or a ride to the doctor's office, as *instrumental support*. Less

concrete experiences, such as being loved, cared for and shown empathy, are referred to as *emotional support*. Information offered to foster coping, usually in the form of advice or problem-solving suggestions is referred to as *informational support.* Lastly, being given positive evaluative information, such as feedback, is referred to as *appraisal support*.

Pulling from his earlier work with Wills (Cohen & Wills, 1985) and that of House (as cited in Cohen, 2004), Cohen (2004) proposes three mechanisms through which social constructs can affect individuals' health. He posits that social integration (the number of distinct relationship roles an individual plays in relation to his or her social network members) promotes healthy behaviors and/or affects one's physiology and self perception, regardless of level of stress, as such demonstrates a *main effect.* Social support, by promoting healthy coping and reducing stress induced physiological activation is hypothesized to temper the intensity of distress individuals experience under highly stressful circumstances and is therefore *stress-buffering*. At the opposite end, he acknowledges that negative interactions can result in relationships as a source of stress.

Network social support. As mentioned earlier, elements of one's social network reflect structural aspects of social support. For the purposes of this study, social network features that are of interest relate to the size of one's helping network (e.g., total number in helpers in one network) and frequency of contact with these helpers. Cohen and Wills (1985) suggest that global structural measures (e.g., an index that is composed of social network size, marital status, frequency of contact with significant others), provide a more reliable index of social integration, than specific structural measures such as total number of members in one's social network. Global structural measures are more likely to provide consistent support for a main effect model.

Perceived social support. Lakey (2008) indicates that perceived social support, one's perception of available social support, is most often measured using the Interpersonal Support Evaluation List (ISEL; Cohen & Hoberman, 1983) or the Social Provisions Scale (SPS; Cutrona & Russell, 1987). These measures assess one's cognitions (perceptions, expectations) about the extent of his/her access to social resources, *should* they be needed in hypothetical situations, using 4-point Likert scale ratings.

Social support, stress and health. Perceived social support as pointed out by Lakey and Cohen (2000) has been associated with beneficial outcomes on measures of mental health (Sarason, Sarason, & Gurung, 2001) such as, non-specific psychological distress (Finch, Okun, Pool, & Ruehlman, 1999), low self-esteem (Newcomb & Keefe, 1997), suicidal ideation (Schutt, Meschede, & Rierdan, 1994), post-traumatic stress disorder (Brewin, Andrews, & Valentine, 2000), anxiety disorders (Brewin et al, 2000), and clinical depression (Cronkite, Moos, Twohey, Cohen, & Swindle, 1998). Perceived social support has also been associated with a decreased risk for developing depression and substance abuse (Monroe, Imhoff, Wise, & Harris, 1983; Windle, 1992).

When couched in a stress-buffering model, evidence exists for perceived support moderating the effects of stress on health (Cohen &Wills, 1985). In a prospective seven year follow-up study, Orth-Gomer, Rosengren and Wilhelmsen (1993) looked at healthy (Swedish) men age 50 years. An association between negative life events and mortality was found only in men with low perceived emotional support. In other words, when considering individuals experiencing a number of negative life events (i.e., with high stress) those with low (versus high) perceived emotional support were more likely to have died. Thus, supporting that perceived emotional support acts as a stress buffer.

Sex and Social Support. As cited in House, Landis and Umberson (1988) found that although both men and women seem to benefit from social relationships, and that there is evidence men experience a greater benefit **(**Kessler & McLeod, 1984). Shye, Mullooly, Freeborn and Pope (1995) looked at mortality risk among 209 men and 246 women over the age of 65 years and found that network size had a protective effect for both men and women; however, women required larger network size to receive any benefits. How such findings might generalize to adolescent populations is currently unclear.

In a study looking at adolescent health, Pikó (1998) found sex differences with regard to the type of support perceived. Specifically, girls' health was influenced by emotional and informational support, and boys' health by rational-material support. With regard to health behaviors, Marshal and Chassin (2000) found that among girls, mothers' and fathers' social support buffered the effects of peers on alcohol use. However, among boys, parents' support was found to exacerbate the negative effects of peers on alcohol use.

Homelessness and Social Support. Bates and Toro (1999) explored both main effect and stress-buffering effects on health in a sample of homeless adults. They found support for a stress-buffering effect when considering the number of family members in one's support network. Specifically, having a smaller family support network lead to poor health outcomes, but only when stress was high. Also, as cited in Bates and Toro (1999), Shinn, Knickman, & Weitzman (1991) found that homeless mothers had larger networks, than housed mothers. Bates and Toro (1999) found that individuals with greater mental health problems tended to have larger, non-familial, social networks; and that on measures of mental health which tapped distress, those with less family members fared worse.

The self-esteem subscale of the ISEL was found to be negatively correlated to a mental health diagnosis and measures of psychological distress among a sample of poor and homeless adults (Bates & Toro, 1999). Toro, Tulloch, and Ouellette (2008) found support for both main and stress-buffering effects of perceived social support on psychological symptoms in two samples of homeless adults.

Summary. Structural aspects of social support could possibly serve an individual by reinforcing social norms across a number of relationships, promoting one's sense of competence in a number of roles, and fostering a feeling of connectedness with others. Global structural support measures (e.g., social integration) have been found to be related to better physical health and healthier lifestyle choices regardless of one's level of stress. Functional social support can provide individuals with emotional, informational, and tangible coping resources. Good functional social support, primarily perceived social support, has been associated with better mental health outcomes among those experiencing high levels of stress. Both cross sectional and longitudinal research tends to support the salutary effects of global structural support and social support on health.

Stress. Stress is a reaction to one's environment that triggers a series of psychological and physiological events. Lazarus and Folkman (1984) suggest stressors are identified by processes involving appraisal of threat/challenge as well as consideration of one's resources or ability to cope with the threat/challenge. Stress is thought to influence health by activating physiological systems such as the sympathetic-adrenal medullar system and the hypothalamic-pituitary-adrenal cortical axis (Cohen, Kessler, & Gordon, 1995). From an evolutionary perspective, these physiological systems were not designed for prolonged or repeated activation. As such, under chronically stressful or frequently occurring stressful conditions these systems

can become taxed, putting an individual at risk for the development of a range of physical and psychiatric disorders (Cohen, Kessler, & Gordon, 1995).

Stress is also hypothesized to contribute to negative affective states, such as anxiety and depression (DeLongis, Folkman, & Lazarus, 1988). Recently, a few studies have used within-subject analyses to examine the role of daily stress in subsequent mood disturbance. These studies have found that minor stressful events were associated with same-day mood problems; however, there was no effect of daily stress on subsequent mood (Eckenrode, 1984; Stone & Neale, 1984). Caspi, Bolger, and Eckenrode (1987) found that social supports moderated mood on the day following the occurrence of a stressful event, not the day of the occurrence.

However, Caspi et al. (1987) also found that chronic environmental (ecological/neighborhood related) stress contributed to prolonging the negative mood state. In general, chronic stress has been found to precipitate and exacerbate feelings of depression (Pittenger & Duman, 2008). Negative affect has been associated with greater exposure to chronic stress and depressed mood (Steptoe, O'Donnell, Marmot, & Wardle, 2008). On the other hand, positive affect has been associated with greater social connectedness, and emotional and practical support (Steptoe et al., 2008). DeLongis et al (1988) suggest that social support may perhaps protect against the potentially damaging effects of stress by mediating appraisal and coping processes. This may be the case more so for chronic stress, than that related to daily stressful events.

Outcome variables

Sample population. The present study tests Cohen and Wills' main effect and stress-buffering hypotheses among adolescents experiencing poverty. The period of adolescence is of interest because a number of health-related behaviors and habits emerge during this time (Bogart,

Collins, Ellickson & Klein, 2006, McGue & Iacono, 2005). Epidemiological studies on the major causes of adult mortality (e.g., coronary heart disease, cancer, pulmonary disease, and stroke) have revealed that many of the predominant risk factors for these diseases are behavioral (e.g., smoking, alcohol use, dietary habits, and sedentary lifestyle; Chassin, Presson, Rose, & Sherman, 1996; Chen & Kandel, 1995). Dietary and exercise habits often originate in childhood, but are established more permanently during adolescence (Cohen, Brownell, & Felix, 1990). Also, the presence of physical and mental health conditions during adolescence can influence an individual's prognosis in adulthood. As such, identifying protective or preventative factors, and developing related interventions for adolescence could lead to better health outcomes in adulthood.

Of the over 29 million adolescents in the United States 15 percent (4.5 million) were reported to be living below the federal poverty level in 2007 (Douglas-Hall & Chau, 2009). While much heterogeneity exists between families experiencing poverty, a shared, somewhat defining feature is a lack of resources. This includes resources that are material and psychological, which can significantly influence a child's development. For example, living in poverty makes adequate nutrition and health care difficult to maintain. In addition, the psychological conditions of the family and neighborhood systems may be stressed, effecting emotional, social and early cognitive development, and behavioral and academic adaption (e.g., Brooks-Gunn & Duncan, 1997).

This study investigated the benefits of network social support and perceived social support on physical health, healthy behavior choices, and mental health among high stress homeless youth, an important at-risk population, and matched housed youth. As previously mentioned, research looking at homeless adults has found support for the stress-buffering effects

of network social support (Bates & Toro, 1999), as well as for main effects and stress-buffering effects of perceived social support (Toro et al., 2008). So, the benefits of social support may not be expressed the same way in under resourced populations as proposed by Cohen and Wills.

Physical Health. Shinn, Schteingart, Williams, Carlin-Mathis, Bialo-Karagis, Becker-Klein and Weitzman (2008) found that asthma, chronic ear infections, anemia, and allergies were the most common health conditions affecting poor children ages birth to 17 yrs. Poor children across all age ranges were reportedly affected by asthma, younger children by ear infections and anemia, and adolescents by allergies. When considering the health outcomes of those living in poverty versus their more affluent peers, poor children, including adolescents, tend to rate themselves in worse health. They also have higher rates of mortality and chronic illness (e.g., Brooks-Gunn & Duncan, 1997; Starfield, Riley, Witt, & Robertson, 2002).

Adolescent Substance Abuse. The unhealthy behavior of interest in this study is adolescent substance abuse. The percent of adolescents 12-17 years of age who used alcohol in the past month was 17 percent (Centers for Disease Control and Prevention [CDC], 2009), their rate of current alcohol use was 15.9 percent, and binge and heavy drinking rates were 23.3 and 6.9 percent, respectively (Substance Abuse and Mental Health Services Administration [SAMSHA], 2009). In their review Hanson and Chen (2007) found that alcohol use among adolescents did not vary based on SES. Others have found specific SES indicators, such as living in a household with fewer than two biological parents, to be associated with relatively high prevalence rate of past-year alcohol use (SAMSHA, 2008).

In 2007, 9.5 percent of youths aged 12 to 17 reported current illicit drug use. Approximately 6.7 percent used marijuana, 2.9 percent engaged in nonmedical use of prescription-type psychotherapeutics, 1.1 percent used inhalants, 1.0 percent used hallucinogens,

and 0.4 percent used cocaine (SAMSHA, 2009). Hanson and Chen (2007) found that marijuana use among adolescents did not vary based on SES in their review. However, others have found that living in a household with fewer than two biological parents was related to relatively high prevalence rates of past-year illicit drug use (SAMSHA, 2008). Furthermore, higher rates of both alcohol and drug abuse/dependence have been found among those who are homeless (Robertson & Toro, 1999; Toro, Dworsky, & Fowler, 2007).

Mental Health. Nearly 12% of children 12-17 years in the U.S. were identified as having a serious behavioral or mental health problem (Knopf, Park, & Mulye, 2008). These findings were based on parents report, and indicate that male adolescents were slightly more likely to struggle with mental health issues than their female peers (12.3 percent vs. 10.9 percent). Low income adolescents had a two-fold increase in the likelihood of struggling with a mental health issue than higher-income adolescents (17.9 percent vs. 8.0 percent). Analysis of previous NHIS data revealed a similar disparity (Knopf et al., 2008).

Poor children are more likely than their peers to have externalizing and other behavior problems; including problems with aggression, and delinquency during adolescence (American Psychological Association [APA], 2010). When looking at a group of clinically referred children ages 6-17 years old, McCoy, Frick, Loney, and Ellis (1999) found a negative relationship between socioeconomic status, and parent and teacher reports of aggressiveness and delinquency in children. Also, poverty has been identified as a risk factor for the development of disruptive behavior disorders in children (Brinkmeyer & Eyberg, 2003). Similarly high rates have been found among homeless youth as well (Toro et al., 2007).

Children experiencing poverty are more likely to have emotional problems as well (APA, 2010). Goodman (1999) found that as family income decreases adolescents are more likely to

rate themselves as experiencing symptoms of depression and attempt suicide. After adjusting for other SES and sociodemographic factors, education and income remained independent correlates of depression, and income remained an independent correlate of attempted suicide; thus, highlighting the significant role of income. Furthermore, Glied and Pine (2002) found that rates of depression are four times higher among very low income girls and boys than among high income peers.

In 2007, there were 2.0 million youths (8.2 percent of the population aged 12 to 17) who had major depressive episode (MDE) during the past year. An estimated 1.4 million (5.5 percent) had MDE with severe impairment in one or more role domains. School attendance, smoking, binging, and suicidal ideation are significantly correlated with depression (Glied & Pine, 2002). Goodman, Slap and Huang (2003) found that the specific SES indicators of lower household income and lower parental education each were associated with approximately one third of depression among a national sample of adolescents.

Sex and Mental Health. Furthermore, sex differences in the prevalence rates of certain mental health conditions exist. It has been well established that females are disproportionately identified with depression. SAMHSA (2009) statistics indicate that among adolescents aged 12 to 17 in 2008, the prevalence rates of MDE and MDE with severe impairment among females was almost three times that among males. Female youths had an MDE prevalence rate of 12.4 percent in 2008, while the prevalence rate for males in the same age range was 4.3 percent. The prevalence of MDE with severe impairment was 9.2 percent for females and 2.9 percent for males (SAMSHA, 2009). Adolescent males, however, are disproportionately identified with externalizing problems (Lewinsohn, Hops, Roberts, Seeley, & Andrews, 1993; Zahn-Waxler, 1993). Also, a SAMHSA National Survey (2008) found that more males than females ages 12-

20 reported current alcohol use (28.9 percent vs. 27.5 percent), binge drinking (21.3 percent vs. 16.1 percent), and heavy drinking (7.6 percent vs. 4.3 percent).

Homelessness and Health Outcomes. Research by the National Alliance to End Homelessness (2006) indicates that homeless youth experience more trauma, physical health problems, substance abuse problems, and mental health problems than their housed matched peers. Findings from a 2003 survey of Minnesota youths support that homeless youth experience more trauma and substance abuse problems than matched housed peers (http://www.wilder.org/download.0.html?report=410).

Health Variables Summary. Overall, most adolescents, including those living in poverty or of lower SES, tend to be in good physical and mental health, and do not engage in unhealthy behaviors. In most instances, however, lower SES adolescents tend to experience these less favorable outcomes more so than higher SES adolescents. Some exceptions that were identified were with regard to the unhealthy behaviors of alcohol and marijuana use, where findings were mixed. This latter point may be influenced by which indicators of SES were examined.

Adolescents, social network support, perceived social support and health outcomes. When considering the role of network social support on adolescent health, the literature is sparse. More research has focused on the relationship between perceived social support and mental health. Higher levels of perceived social support have been associated with fewer symptoms of depression, anxiety and somatization (Kaltiala-Heino, Rimpelä, Rantanen, & Laippala, 2001; Compas, Slavin, Wagner, & Vannatta, 1986), though these effects are weaker among lower SES populations (Wight, Botticello, & Aneshensel, 2006).

Hypotheses

The longitudinal data for this study were used to examine how changes in an individual's health outcomes over a 6-7 year period related to levels of stress, and network (structural) and perceived social support.

1. *Hypothesis 1:* Network social support, determined by the Social Network Interview, will demonstrate a main effect on health outcomes and healthy behavior choices (e.g., substance abuse) across time (per Cohen and Wills). Specifically, those having more network social support will have better outcomes (less symptoms) on physical health and healthy behaviors than individuals with less network social support. Additionally, given this is a sample of poor and homeless youth, a stress-buffering effect of network social support on health is also anticipated (per Bates & Toro, 1999).
2. *Hypothesis 2:* Perceived social support will demonstrate a stress-buffering effect on mental health outcomes across time (per Cohen and Wills). Specifically, under low conditions of stress, similar mental health outcomes are expected for individuals regardless of level of perceived social support. However, under high stress conditions, mental health outcomes for individuals with high and low levels of social support will differ, such that those with higher levels of perceived social support will evidence better mental health outcomes. Additionally, considering the population of study is poor and homeless adolescents, perceived social support will also demonstrate a main effect on mental health outcomes (per Toro et al., 2008). Note, the latter prediction is not proposed by Cohen and Wills.
3. In light of research on sex differences, it is hypothesized that:
    a. When testing Hypothesis #1, a main effect for sex will be found for substance abuse. In general, males are expected to report a greater number of substance abuse

symptoms. Although there are no additional specific predictions, the cross-sectional and longitudinal impact of sex on outcomes will be tested and controlled in all key analyses.

b. When testing Hypothesis #2, a main effect for sex is expected for mental health. Specifically, females will demonstrate higher scores on mental health problems as measured by the GSI. Again, although there are no additional specific predictions, the cross-sectional and longitudinal impact of sex on outcomes will be tested and controlled in all key analyses.

4. Given some differences have been identified between homeless youth and their matched housed peers, it is hypothesized that:

   a. When testing Hypothesis #1, a main effect for initial housing status will be found for physical health and substance abuse. In general, homeless youth are expected to report a greater number of health and substance abuse symptoms. Although there are no additional specific predictions, the cross-sectional and longitudinal impact of initial housing status on outcomes will be tested and controlled in all key analyses.

   b. When testing Hypothesis #2, a main effect is expected for initial housing status. Specifically, homeless youth are expected to demonstrate greater mental health problems as measured by the GSI. Again, although there are no additional specific predictions, the cross-sectional and longitudinal impact of initial housing status on outcomes will be tested and controlled in all key analyses.

CHAPTER 2: METHODS

Participants

There were a total of 401 participants. The homeless participants (n=252) were recruited from 1997-2000 at homeless shelters, soup kitchens, and other organizations providing services to homeless youth. At baseline, these participants ranged in age from 13 to 17 years. The homeless sample was limited to adolescents who had spent a night on their own, during the month before the baseline interview, unaccompanied by their guardian. At baseline, the adolescents were mostly staying in some form of residential facility for adolescents with problems. The nine shelters used were a random sample of shelters for youth in the five-county metropolitan area of a large Midwestern city. The sample at each agency included a number of adolescents that was roughly proportional to the percentage of homeless adolescents who had utilized each agency in the prior year. To obtain a random sample at each shelter, shelter staff were asked to pick a potential participant by counting down a random number on a list of shelter residents. Before the interview, the parent or the social worker, if parents were unavailable or were no longer the legal guardians of their children, was contacted for permission. Only 3% refused permission. If permission was granted, the adolescents were asked whether they wanted to participate (for further details of the sampling rationale, see Toro, et al. 1999 and Tompsett & Toro, 2010).

The matched comparison group (n=149) was obtained through (1) a peer-nomination process by which the homeless adolescents were asked to nominate acquaintances for the study, and (2) sampling at various neighborhood sites where large numbers of youth could be found. The housed adolescents and their parents were contacted by mail before an interview was conducted. After consent was obtained from the participant and the parent, interviews were

carried out. The acquaintances in the neighborhood sample were matched with the homeless adolescents on gender, age, ethnic background, and neighborhood socio-economic characteristics.

The total baseline sample (N=401) was 65% female, 47% European American, 45% African American and 8% Hispanic, Native American, or persons of mixed ethnicity/race. Because of their small numbers, the later ethnic groups were combined with the African American adolescents, and compared to European Americans, in all data analyses. Note, three individuals (two from the homeless group and one from the matched housed group) presented with cognitive impairment, and were consequently excluded from the study.

Procedure

Interviewer training. Interviews were conducted by paid full-time interviewers and graduate and advanced undergraduate students in psychology. All interviewers completed intensive training on the interview protocol, and were observed for satisfactory compliance with the protocol. Interviews were carried out by pairs of interviewers in order to retain the integrity of the protocol and to provide for the safety of the interviewers. The interviews were carried out at the agency, shelter, or in a public place in the youth's home (if housed) that afforded both the safety of the interviewer and sufficient privacy so the adolescent was not overheard. Both adolescent assent and parental consent were obtained wherever possible; at follow-up young adult consent was obtained. The initial interview took three to four hours to complete; the follow-up interviews took between 90 minutes and two hours to complete. All measures were verbally administered with all responses recorded on standardized answer sheets. Upon completion of the interview the participant was paid $20.00 for the initial interview and the first 3 follow-up interviews (at 6, 12, and 18-42 months after their baseline interview). They were

paid $50.00 for each subsequent follow-up interview (at 4.5, 5.5 and 6.5 years). Participants with any combination of follow-up interviews (6, 12, 18 months, and/or 4.5, 5.5, 6.5 years) were included in the analysis. Sample sizes at each time of measurement were as follows: baseline (N=398), 6-month follow-up (N=231), 12-month follow-up (N=150), 18-42 -month follow-up (N=235), 4.5-year follow-up (N=327), 5.5-year follow-up (N=296), and 6.5-year follow-up (N=330). Three hundred and sixty-eight individuals had at least two of six follow-up interviews. The follow-up rate was approximately 80% at the last three time points (range 74-83%), with lower rates at the first three follow-up times (38-59%). Although there was greater attrition for homeless vs. housed early on (e.g., 54% vs. 21% at 6 months), for later interviews there was no significant differential attrition based on housing status (19% vs. 15% at 4.5 years) or any of indicators of socioeconomic risk or resource.

Measures

Demographic Information. Demographic information on gender, participant age, ethnicity, and socioeconomic status (SES) was collected in the interview.

Structural Social Support/Social Network Measures. The Social Network Interview (SNI) was administered by interviewers to assess numerous characteristics of a participant's social network, such as type of relationship, frequency of contact, and substance use and petty deviance of network members. Participants were asked questions such as, "Who have you gone to for help in the past 6 months?; for the members who helped, "how often have you gone to ____ for help with basic things like money, food, clothing, a place to stay, or a ride?;" and "How often have you gone to ____ for help with personal problems, like advice about your family or friends, or if you just wanted someone to talk to?" The measure has shown evidence of reasonable test-retest stability for various indices (one week stability ranges from .67 to .98 for

various indices) and evidence for validity from stress-buffering studies (Bates & Toro, 1999). For the current study a Help Index was created by adding together z-scores reflecting (1) the number helpers identified as supporters in one's network and (2) the average frequency of contact with these supporters.

Perceived Social Support. The Interpersonal Support Evaluation List (ISEL; Cohen, Mermelstein, Kamarck, & Hoberman, 1985*)* is a 40-item self-report questionnaire developed to assess direct and stress-buffering effects of perceived social support. This measure was given at 4.5 year, 5.5 year, and 6.5 year follow-ups. Scale development was guided by a comprehensive theoretical review of social support (Cohen et al, 1985). ISEL subscales capture tangible assistance, appraisal, self-esteem support, and belonging. ISEL items include, "If I needed a ride to the airport very early in the morning, I would have a hard time finding anyone to take me" (tangible); "If a family crisis arose, few of my friends would be able to give me good advice about handling it" (appraisal); "Most people I know think highly of me" (self-esteem); and "I often meet or talk with family or friends" (belonging). Each item is answered on a 4-point Likert scale ranging from *definitely false* to *definitely true*. In community studies, the ISEL has obtained 6-month test-retest stability coefficients of .74 and high internal consistency (α = .90; Cohen et al., 1985). In a series of longitudinal studies, the ISEL has predicted a variety of psychiatric outcomes, including changes in depression and well-being, as well as stress-buffering effects (Cohen et al., 1985). The ISEL total composite score was the measure of perceived social support used in this study.

Stress. The Modified Life Events Inventory (MLEI) is a 73-item checklist that was used to measure stressful events in a number of life domains including social relationships, housing situations, employment, education/job training and mental and physical health. It was developed

specifically for use with homeless populations (Lovell, 1984) and has demonstrated good total score test-retest reliability (r=.84; Toro et al., 1999). It was adapted for use with a youth population, and the total score was used as a measure of stress in this study.

Physical Health. The Physical Health Symptoms Checklist (PHSC) was adapted from a measure used in the National Health Interview Survey (U.S. Dept. of Health & Human Services, 1985) and includes a 78-item checklist of health problems, both acute and chronic. Adolescents are asked to report whether they have been troubled by each symptom during the past 6 months. There is evidence of sufficient test-retest reliability (r=.85, Toro et al., 1999). Number of acute health symptoms was the health measure used in this study.

Substance Abuse. The Diagnostic Interview Schedule-Children (DISC) is a structured interview designed to measure psychiatric symptoms and formulate psychiatric diagnoses based on data collected by trained lay interviewers. The DISC items are based on DSM-III-R (1987) diagnostic criteria, and the measure has shown evidence of reasonable reliability and validity (Shaffer, Fisher, Lucas, Dulcan & Schwab-Stone, 2000). The DISC may be more sensitive than routine clinical assessment among mental health practitioners in detecting substance abuse symptoms (Kramer, Robbins, Phillips, Miller & Burns, 2003). A substance abuse variable was created by summing all DISC symptoms of alcohol abuse/dependence and marijuana abuse/dependence.

Mental Health. The Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983) was used to determine psychological distress. The BSI is a 53-item self-report symptom scale that asks about symptoms occurring in the past 7 days. There are nine primary symptom dimensions: somatization, obsessive-compulsive behavior, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. Additionally, there are three

global indices: Global Severity Index (GSI), Positive Symptom Distress Index (PSDI), and Positive Symptom Total (PST). Answers are on a 5-point scale, from 0 = "not at all", to 4 = "extremely", and between 0 and 53 for the PST. The BSI has been shown to have high internal consistency ranging from 0.71-0.85 (Slesnick & Prestopnik, 2004) for subscales (e.g., anxiety α = .79, depression α = .76, and hostility α = .84) and global severity index α = .96 (Milburn, Rotheram-Borus, Batterham, Brumback, Rosenthal, & Mallett, 2005; Bailey, Ouellet, Mackesy-Amiti, Golub, Hagan, Hudson, Latka, Gao, & Garfein, 2007). Also, good test retest reliability (.68 and .91 with a 2-week interval between tests; Derogatis & Lazarus, 1994) has been demonstrated. In terms of validation, high convergence between BSI scales and like dimensions of the MMPI provide good evidence of convergent validity, and factor analytic studies of the internal structure of the scale contribute evidence of construct validity. Several criterion-oriented validity studies have also been completed with this instrument, and it's been used in various homeless populations and youth (McCaskill, Toro, & Wolfe, 1998). The Global Severity Index (GSI) was used as the main measure of mental health outcome in this study.

CHAPTER 3: DATA ANALYSIS

Missing data was evaluated using *Little's Missing Completely at Random (MCAR) test* in Statistical Package for the Social Sciences (SPSS, 2009). Chi-square analyses were used to identify any differences between homeless and housed samples on sex and race, and independent-samples t-tests were run to assess differences between the two subgroups on age and neighborhood income at baseline.

Although the study is longitudinal, thus allowing for prospective prediction of changes in health outcomes over time, hypotheses regarding main effects and stress-buffering models were first tested using a cross sectional method. Specifically, multivariate analyses of variance

(MANOVAs; SPSS, 2009) were run for number of health symptoms, number of substance abuse symptoms and global severity index score, with stress and type of social support as fixed factors. This was done at baseline, and again at 4.5 year follow-up when the ISEL was first administered.

Next, Hierarchical Linear Modeling (Raudenbush, Bryk, Cheong & Congdon, 2009) was used to examine the relationship between different health outcomes, and stress and social support over time. Bryk and Raudenbush (1992) list five advantages of using HLM for analyzing repeated measures data, the three most relevant to this study being: 1) individual growth curves can be generated, 2) higher level growth parameters can easily be added to the model, and 3) it allows use of participants with some missing time points, rather than only using those with complete data. Full maximum likelihood estimation was used to fit linear growth trajectories. This approach describes the fit of the entire model, so that the goodness of fit statistics can be used to test hypotheses about any type of parameter, either a fixed effect or a variance component; Singer & Willett, 2003). The results reported are based on the robust standard errors.

CHAPTER 4: RESULTS

Little's (1988) MCAR test was not statistically significant (p = 1.00) for the current dataset, therefore, in the few cases where values were missing, they were left as missing (no values were imputed; Singer & Willett, 2003). Also, there were no significant differences between housed and homeless youth on gender, χ^2 (1, N=398) = .519, *ns*; race, χ^2 (1, N=398) = .045, *ns*; age, $t(396) = 1.437$, $p = .151$ for housed (M=15.03, SD=1.256) compared to homeless (M=14.84, SD=1/296); or income, $t(396) = .838$, $p = .403$ for housed (M=33168.07, SD=14322.91) compared to homeless (M=32072.84, SD=11473.07).

Cross-sectional analyses

Baseline MANOVAs. A 4-factor MANOVA including all outcome variables, physical health, substance abuse and mental health symptoms, and stress, network social support, sex and initial housing status as fixed factors was computed at baseline. Significant multivariate main effects were found for gender, Wilks' $\lambda = .978$, $F(3,366) = 2.715$, $p = .045$; initial housing status, Wilks' $\lambda = .940$, $F(3,366) = 7.835$, $p = .000$; stress, Wilks' $\lambda = .773$, $F(3,366) = 35.795$, $p = .000$; and network social support, Wilks' $\lambda = .977$, $F(3,366) = 2.883$, $p = .036$.

Univariate main effects were examined for each factor. Significant univariate main effects for sex were found on number of health symptoms, F (15, 368) = 5.119, p =.024, and GSI (mental health), F (15, 368) = 5.324, p =.022. Girls reported more symptoms of both types. Significant univariate main effects of initial housing status were found for number of health symptoms, F (15, 368) = 6.999, p =.009, and number of substance abuse symptoms, F (15, 368) = 5.340, p =.021. Housed youths reported more health symptoms, and homeless youth reported more substance abuse symptoms. Significant univariate main effects of stress were found for number of health symptoms, F (15, 368) = 59.674, p =.000, number of substance abuse symptoms, F (15, 368) = 24.733, p =.000, and GSI (mental health), F (15, 368) = 77.226, p =.000. Specifically, the high stress group reported more symptoms on all three outcomes. Lastly, a significant univariate main effect of network social support was found for number of substance abuse symptoms, F (15, 368) = 5.016, p =.026, with the high network social support group reporting *more* substance abuse symptoms. Of note, no significant interaction terms were found, in general, or for stress by network social support, more specifically.

Four and a half year MANOVAs. A 5-factor MANOVA including all outcome variables, physical health, substance abuse and mental health symptoms, and stress, network social support, *perceived* social support, sex and initial housing status as fixed factors was computed at 4.5 year follow-up. Significant multivariate main effects were found for gender, Wilks' $\lambda = .948$, $F(3,291) = 5.281$, $p = .001$; stress, Wilks' $\lambda = .779$, $F(3,291) = 27.512$, $p = .000$; and perceived social support, Wilks' $\lambda = .916$, $F(3,291) = 8.872$, $p = .000$.

Univariate main effects were examined for each factor. Significant univariate main effects of sex were found for number of health symptoms, F (31, 293) = 8.801, p =.003, and number of substance abuse symptoms, F (31, 293) = 4.910, p =.027. Girls reported more health symptoms and boys reported more substance abuse symptoms. Significant univariate main effects of stress were found for number of health symptoms, F (31, 293) = 46.753, p =.000, number of substance abuse symptoms, F (31, 293) = 26.692, p =.000, and GSI score (mental health), F (31, 293) = 54.798, p =.000. Again, the high stress group reported more symptoms on all three outcomes. Lastly, significant univariate main effects of perceived social support were found for number of health symptoms, F (31, 293) = 4.079, p =.044, and GSI score, F (31, 293) = 19.098, p =.000. The high perceived social support group reported less health symptoms and lower GSI scores. Again, no significant interaction terms were found, in general, or for stress by social support, more specifically.

Longitudinal analyses

Models were generated for each of the three outcomes, with two stress and social support variable pairs (one for network social support, and one for perceived social support). The following equations represent the models run.

a) the unconditional means model,

$$Y_{ij} = \pi_{0i} + e_{ij}$$

b) the unconditional growth model with time centered around month of last follow-up (f.u.),

$$Y_{ij} = \pi_{0i} + \pi_{1i}(MONTH_{current\ f.u.} - MONTH_{last\ f.u.})_{ij} + + e_{ij}$$

Next, models were generated to determine the effects of predictors without considering the effect of time. The first model simply included stress as a predictor. Then, social support was added to create a second model. A stress by social support interaction variable, gender, baseline housing status, and lastly time were gradually added to create a third, fourth, fifth, and finally "full" model which included all the stated predictors, respectively. The full model reflects all major findings, as such will be the only one evaluated in the set of models built.

c) full model,

$$Y_{ij} = \pi_{0i} + \pi_{1i}(MONTH_{current\ f.u.} - MONTH_{last\ f.u.})_{ij} + e_{ij}$$

$$\pi_{0i} = \gamma_{00} + \gamma_{01}(C\_STRESS) + \gamma_{02}(C\_SOCIAL\ SUPPORT) + \gamma_{03}(STRESS\ X\ SS) + \gamma_{04}(GENDER) + \gamma_{05}(HOUSING\ STATUS) + R_0$$

$$\pi_{1i} = \gamma_{10} + \gamma_{11}(C\_STRESS) + \gamma_{12}(C\_SOCIAL\ SUPPORT) + \gamma_{13}(STRESS\ X\ SS) + \gamma_{14}(GENDER) + \gamma_{15}(HOUSING\ STATUS) + R_1$$

The above HLM models describe the intercept (π_{0i}) and rate of change (π_{0i}). By centering time on the month of last follow-up the intercept allows use of baseline and 4.5 year data to predict long term outcomes.

There are a few other things to note. First, stress and social support were mean centered, and their product was the interaction term. Also, main effects and stress-buffering effects (via the stress by social support interaction term) were included in models for all outcomes. This was done to determine if indeed models that were hypothesized to only demonstrate a main effect did not also have a significant stress-buffering effect, and vice versa; thus, conforming strictly to

either a main effect or stress-buffering model. Next, the ISEL as a measure of perceived social support was only administered for the last three waves of data collection. As such, models generated for perceived social support use a truncated data set, whereas those for network social support, as measured by the Help Index, used the complete data set, from baseline through the 6.5-year follow-up. Because only two or three data points were obtained per individual for the truncated dataset (versus up to seven data points with the complete dataset), it is possible that different parameter estimates and trajectories were generated for the truncated model. As such, an additional model for network social support using the truncated data was also generated, simply for the purpose of comparison. Lastly, all of the outcome variables and some of the predictor variables were skewed and consequently transformed. Number of health and substance abuse symptoms were log transformed, LOG(X+1); mental health as measured by the GSI score was inverse transformed, 1/(GSI+1); and number of stressful life events was square root transformed, $STRESS^{1/2}$. Time was not transformed, and therefore assumed to be linear, nor were the Help Index or ISEL Total scores. Due to the use of transformed variables, the parameter estimates (γ's) presented in the following sections are not directly interpretable. However, they do indicate the type of relationship, positive or negative, between two variables.

Health and Social Support

Number of Health Symptoms and Network Social Support. The first set of models generated was for health symptoms using data collected across all time points. Again, a "full" model was built to determine how adding different predictors affected health symptoms at last follow-up (6-7 years post baseline). The first model simply included stress centered around its mean at baseline as a predictor. Then, the Help Index, mean centered at baseline, was added to create a second model. A baseline stress by network social support interaction variable, gender,

baseline housing status, and time were gradually added to create a third, fourth, fifth, and finally "full" model which included all the stated predictors, respectively.

For the mean number of health symptoms at last follow-up, a main effect was found for level of baseline stress (γ_{01} = .079, p = .000) and differences in mean number of health symptoms at last follow-up. There was a positive relationship between the two variables indicating that those with higher baseline stress had more health symptoms at the last follow-up. Additionally, the lack of significant main effects for the remaining predictors suggests that mean differences in health symptoms at last follow-up were not significantly related to differences in baseline levels of network social support, the baseline level of stress by network social support interaction, being male or female, or being housed or homeless at baseline ($\gamma_{02,}$ $\gamma_{03,}$ γ_{04} and γ_{05}).

The mean change in the number of health symptoms over time for the reference group was not significant. However, a significant difference in mean changes in health symptoms over time was found between those with different levels of baseline stress (γ_{11} = -.001, p = .001). Specifically, a higher level of baseline stress (in increments of a factor of .001) was associated with smaller mean changes in health symptoms over time (slower rate). To interpret this finding, we see that those with the highest levels of baseline stress tended to stay fairly stable in their number of health symptoms reported over time, whereas those with the lowest levels of stress at baseline tended to show larger increases in health symptoms reported over time (see Figure 1). Also, a significant difference in mean change in health symptoms over time was found between housed and homeless youth. Specifically, being homeless was associated with larger increases in health symptoms over time (a faster rate of change), see Figure 2.

Overall these findings suggest, those with lower levels of baseline stress reported significantly less health symptoms at the last follow-up than those with higher levels of baseline

stress. Those with lower baseline levels of stress also showed larger increases in the number of health symptoms reported over time, compared to those with higher baseline levels of stress, who tended to report a fairly consistent (but higher) number of health problems over time. Although the difference in mean number of health symptoms at last follow-up reported by those who were initially housed versus homeless was not significantly different (γ_{05}), the homeless group reported a mean increase in their number of health symptoms over time that was significantly larger than that reported by the housed group (which actually demonstrated a fairly constant and slightly decreasing number of health symptoms over time).

Health Symptoms and Perceived Social Support. Next, a model for health symptoms looking at the effects of perceived social support was evaluated. Again, because the ISEL was used as the measure of perceived support, and it was initially administered at the 4.5 year follow-up, a truncated dataset focusing on data collected during the last three points of follow-up (approximately 4.5 to 6.5 years after baseline) was used to generate the model of interest. Said model included: stress centered around its mean at 4.5 year follow-up, perceived social support centered around its mean at 4.5 year follow-up, the stress by perceived social support interaction, gender, baseline housing status, and time.

As with the complete dataset, there was also a main effect for stress and difference in mean number of health symptoms at last follow-up (γ_{01} = .107, p = .000). Also, significant main effects were found for perceived social support (γ_{02} = -.039, p = .004), the interaction of stress and perceived social support (γ_{03} =.031, p = .011), and sex (γ_{04} = 0.704, p = .041) for the truncated model. A negative relationship was identified between level of perceived social support at 4.5 year follow-up and the mean difference in number of health symptoms at last follow-up (i.e., a higher 4.5 year level of perceived social support was associated with a decrease

in mean health symptoms a few years later). The interaction term is best understood graphically. Figure 3 illustrates an inverted stress-buffering effect. At one end, there are individuals experiencing low levels of stress at the 4.5 year follow-up. Of those, some have lower levels of perceived social support, and others have higher levels of perceived social support. Those with higher levels of perceived social support reported lower mean number of (less) health symptoms at last follow-up than those experiencing lower levels of perceived social support. At the other end, those experiencing high levels of stress at 4.5 year follow-up, regardless of their level of perceived social support at that time, reported a comparable number of health symptoms at last follow-up. Thus, the greatest health benefits of having more perceived social support were found when individuals experienced lower levels of stress. For gender, a positive association was found between level of sex (0 = males, 1 = females) and difference in mean number of health symptoms at last follow-up (i.e., being female was associated with more health problems at last follow-up).

When considering mean changes in number of health symptoms over time for the truncated reference group, the change was not significant. However, significant differences in the mean change in number of health symptoms over time was found between those with different levels of stress at 4.5 year follow-up (γ_{11} = -.003, p = .005). Figure 4 indicates that an increase in level of stress at 4.5 year follow-up was associated with larger (faster) mean changes in health symptoms over time. Those with the highest levels of stress tended to show larger decreases in health symptoms over time, whereas those with the lowest levels of stress tended to stay fairly stable in the number of health symptoms reported over time. Note, these findings differ from those found for levels of baseline stress and mean change in number of health symptoms over time for the complete dataset, this issue will be soon be addressed. Another

difference between the models is that for the truncated model, significant differences in the mean change in number of health symptoms over time between the housed and homeless groups disappears.

Differences between the Complete and Truncated Models. Regarding social support, these findings suggest that perceived social support and the stress by perceived social support interaction are better predictors of the mean number of health symptoms at last follow-up than network social support (see Table 2). Additionally, it appears that the relationship between sex and mean number of health symptoms at last follow-up differs when considering all the data starting from baseline versus data only including the last three points of follow-up. To further explore these differences Figures 5 and 6 were generated, and indicate the two datasets have different trajectories. In general, these graphs show lower mean numbers of health symptoms for most participants at baseline with an upward trend over time for the complete dataset; and higher mean numbers of health symptoms with a downward trend starting at the 4.5 year follow-up. Specifically, it appears the sample as a whole reports more health symptoms at 4.5 year follow-up and that this increase from baseline was more pronounced among females. Overall, the truncated model was more sensitive to decreases in the number of health symptoms occurring at the last three points of follow-up. Thus, it appears that there is a curvilinear effect on health symptoms over time, with the peak at 4.5 years.

Finally, the differences in mean change of health symptoms over time for initially housed versus homeless youth for the two models were compared (Figures 2 and 7). For both models the mean number of health symptoms for homeless and housed youth converges near the last follow-up. However, in the truncated model homeless and housed appear to report a comparable number of mean health symptoms at 4.5 year follow-up, with a similar decrease in mean number

of symptoms over time. For the complete model homeless youth tend to report less mean health symptoms at baseline, but show a larger increase in mean number of health symptoms over time.

Substance Abuse Symptoms and Social Support

Substance Abuse Symptoms and Network Social Support. For the complete dataset, significant main effects were found for the mean number of substance abuse symptoms at last follow-up and its intercept (γ_{00} = .726, p = .000), stress (γ_{01} = .041, p = .049) and sex (γ_{04} = -.180, p = .000). The main effect for stress indicates a positive relationship between baseline stress and the mean number of substance abuse symptoms at last follow-up (e.g., higher baseline stress was associated with more substance abuse symptoms reported 6-7 years later). The main effect for sex indicates a negative relationship with mean number of substance abuse symptoms at last follow-up; such that, as sex increased (being female), the difference in mean number of substance abuse symptoms was lower at last follow-up. No significant main effects related to differences in baseline levels of network social support (γ_{02}), baseline level of stress by network social support interaction (γ_{03}), or being housed or homeless at baseline (γ_{05}) were found.

Regarding time, differences in the mean change of substance abuse symptoms over time for the reference group was significant (γ_{10} = .005, p = .000). This indicates that, in general, there was a significant increase in the mean number of substance abuse symptoms reported over time. Additionally, significant differences in the observed change in substance abuse symptoms over time were found between those with different levels of baseline stress (γ_{11} = -.001, p = .001), baseline network social support (γ_{12} = -.001, p = .008), and sex (γ_{13} = -.002, p = .003). Specifically, these findings suggest that those with higher levels of baseline stress reported smaller increases in the mean number of substance abuse symptoms over time than those with lower levels of baseline stress (a slower rate of change; see Figure 8). Similarly, smaller

increases in mean number of substance abuse symptoms over time were found for those with higher (versus lower) levels of network social support and females (versus males), see Figures 9 and 10.

Substance Abuse Symptoms and Perceived Social Support. Next, a model for substance abuse symptoms looking at the effects of perceived social support was evaluated. Again, a truncated dataset focusing on data collected during the last three points of follow-up (approximately 4.5 to 6.5 years after baseline) was used to generate the model of interest. As with the complete dataset, a significant intercept, and significant main effects for stress, this time at 4.5 year follow-up, (γ_{00} =.704, p = .000) and sex (γ_{01} = .107, p = .000) were found on mean number of substance abuse symptoms at last follow-up. Perceived social support (γ_{02}) and the interaction of stress and perceived social support (γ_{03}) at 4.5 year follow-up, and initial housing status were not significant predictors of mean number of substance abuse symptoms at last follow-up.

When considering differences in the mean change in number of substance abuse symptoms over time for the truncated model, results were similar to that from the complete dataset. Again, a significant increase in substance abuse symptoms over time, in general, (γ_{10} =.003, p = .001), and between those with different levels of stress (γ_{11} = -.001, p = .001) were found. However, unlike with the complete dataset, there were no significant differences between those with different levels of perceived social support or between males and females in the mean change in number of substance abuse symptoms over time.

Differences between the Complete and Truncated Models. A comparison of the effects of social support in Table 3, suggests there were only two differences found between the complete and truncated models. Both were with regard to how number of substance abuse symptoms

reported at last follow-up related to changes in outcome over time. The first relates to differences between those with differing levels of network and perceived social support, and it appears that differing levels of perceived social support was not a significant predictor, unlike levels of network social support. The second relates to sex differences and differences in change over time. Comparing both models (Figures 10 and 11), it appears that the general trend (upward) for both males and females was comparable. However, in the truncated model, men appear to have reported a similar increase in the number of substance abuse symptoms over time as females, rather than more over time as suggested by the full model.

Mental Health and Social Support

Global Severity Index and Network Social Support. A significant intercept (γ_{00} = .789, p = .000), and significant baseline stress (γ_{01} = -.029, p = .004) and initial housing status (γ_{05} = -.067, p = .001) main effects were found for the *inverse* GSI score at last follow-up. The intercept indicates that for the reference group, the mean GSI score at last follow-up was significantly different from zero. The main effect of stress indicates a positive relationship between number of stressful life events and mean GSI scores at the last follow-up (note: the relationship with *inverse* GSI score is negative). As such, those with higher levels of baseline stress tended to have significantly higher GSI scores at last follow-up. Also, initial housing status had a positive relationship with mean GSI scores at the last follow-up. Specifically, those homeless at baseline had significantly higher mean GSI scores at last follow-up. The lack of significant main effects for the remaining predictors suggests that mean differences in GSI scores at last follow-up were not significantly related to differences in baseline levels of network social support, baseline level of stress by network social support interaction, or being male or female ($\gamma_{02,}$ $\gamma_{03,}$ and γ_{04}).

When considering mean changes in GSI scores over time, there was a significant increase in the *inverse* GSI scores over time (γ_{10} =.001, p = .004), which indicates a decrease in actual psychological symptoms over time. Significant differences in the mean change of GSI scores over time were also found between those with different levels of baseline stress (γ_{11} =.001, p = .000) and sex (γ_{14} =.001, p = .003). Specifically, those with higher baseline stress showed larger decreases in GSI scores over time (see Figure 12). Those with the highest levels of baseline stress showed a faster decline in their GSI scores over time, whereas those with the lowest levels of baseline stress stayed fairly stable in their GSI scores over time. Regarding gender, females tended to have a larger decrease in GSI scores over time than males, so much so that even though on average females demonstrated higher baseline GSI scores, by the time of last follow-up they had slightly lower GSI scores (see Figure 13). This latter point actually helps to explain why there was no significant main effect for sex and mean GSI scores at last follow-up.

Global Severity Index and Perceived Social Support. A significant intercept (γ_{00} = .776, p = .000), and significant main effects for stress (γ_{01} = -.058, p = .000) and perceived social support (γ_{02} = .021, p = .003) at 4.5 year follow-up were found on the *inverse* GSI score at last follow-up. The first two findings are similar to those using the full dataset and previously interpreted. However, unlike network social support, perceived social support *does* have a significant main effect on mean GSI scores at last follow-up, a negative relationship. Specifically, those with higher levels of perceived social support at 4.5 year follow-up tended to have significantly lower mean GSI scores at last follow-up. The lack of significant main effects for the remaining predictors suggests that mean differences in GSI scores at last follow-up were not significantly related to differences in 4.5 year level of stress by perceived social support

interaction (γ_{03}), being male or female (γ_{04}), or being housed (γ_{05})—which demonstrated a main effect in the complete model.

As would be expected, when considering mean changes in GSI scores over time, findings for the truncated dataset were similar to those for the full dataset. Again, significant differences in the mean change of GSI scores over time were found between those with different levels of 4.5 year follow-up stress (γ_{11} =.001, p = .006) and sex (γ_{14} =.002, p = .007; see Figures 14 and 15). However, unlike with the full dataset, overall changes in mean GSI scores over time were *not* significant using the truncated data.

Differences between the Complete and Truncated Models. A comparison of the effects of social support in Table 4, suggests that the significant finding of a main effect for perceived social support in the truncated model and lack of finding for network social support in the complete model were actual effects and not artifacts of the truncated dataset. A comparison of Figures 16 and 17 suggests that, when considering the truncated data, there was a smaller difference between housed and homeless youth on mean GSI scores at last follow-up; hence, the lack of a main effect for initial housing status in the truncated model. Figure 17 also suggests that smaller, not significant, changes in GSI scores occur over the last three points of follow-up, compared to the complete model which could also explain the diminished main effect of initial housing status.

CHAPTER 5: DISCUSSION

Two models of stress and social support were evaluated in this study. One model included data spanning across 6-7 years and focused on network social support, the other, a truncated set of the data only including the last three points of follow-up and focused on perceived social support. For the most part, findings between the two models were similar, but

there were some major differences. Compared to the model of the complete dataset, the truncated model indicated that participants reported, on average, more physical health and substance abuse symptoms, lower GSI scores, and less stressful life events. In the truncated model sex predicted mean differences in number of health outcomes at last follow-up (more health symptoms for females), and initial housing status did not predict differences in mean change in number of health symptoms over time, as it did in the complete model. Also, in the truncated model, sex did not predict differences in mean change in number of substance abuse symptoms over time; and though nearly significant (p = .055), there were no significant differences in mean GSI score at last follow-up based on one's initial housing status. Next, differences between the models regarding social support will be addressed.

Overall, the current findings provide mixed support for Cohen and Wills' (1985) main effect and stress-buffering hypotheses. *Hypothesis 1:* Network social support, determined by the Social Network Interview, will demonstrate a main effect on health outcomes and healthy behavior choices (e.g., substance abuse) across time (per Cohen and Wills). Specifically, those having more network social support will have better outcomes (less symptoms) on physical health and healthy behaviors than individuals with smaller support networks. Additionally, given this is a sample of poor and homeless youth, a stress-buffering effect of network social support on health is anticipated (per Bates & Toro, 1999).

Data from baseline MANOVAs using the complete dataset, showed no significant main effect for network social support for number of health symptoms, but a significant main effect in the opposite direction for number of substance abuse symptoms (healthy behavior choices). No interactions, stress-buffering effects, were found for either number of health problems or number

of substance abuse problems. MANOVAs from 4.5 follow-up indicate no significant findings for network social support.

HLM was used to examine effects over time. No significant main effects or stress-buffering effects were found for network social support on either, overall number of health symptoms, or overall number of substance abuse symptoms. Specifically, one's level of network social support at baseline did not predict differences in health or healthy behavior choices outcomes 6-7 years later. However, higher levels of baseline network social support were associated with smaller increases in number of substance abuse symptoms over time, suggesting that having higher levels of network social support may reduce the amount of substance abuse symptoms acquired over time.

When testing the effects of perceived social support, both cross sectional and longitudinal analyses revealed significant main effects on number of health symptoms. A significant stress-buffering effect was also found on number of health symptoms using HLM. Specifically, the main effect indicated that having higher levels of perceived social support at 4.5 year follow-up was associated with fewer health symptoms a few years later at the last follow-up. The significant stress-buffering effect indicated that at 4.5 year follow-up higher levels of stress were associated with more health symptoms, regardless of level of perceived social support; whereas lower levels of stress were associated with fewer health symptoms, and those having higher levels of perceived social support having the fewest health symptoms. Over time, it appears that the number of health symptoms decreases for those who were under high stress at baseline but who also had high perceived social support. In fact, the level of health symptoms for this group even begins to converge with those who reported low stress and low social support at baseline

(this group stays fairly stable, demonstrating only a slight increase over time). These findings actually reflect an effect that is an inversion of the stress-buffering effect.

In summary, there is little support for Hypothesis #1. Only baseline MANOVAs revealed a main effect for network social support on number of substance abuse symptoms, which was in a direction opposite that hypothesized. No significant stress-buffering effects were found for network social support on either of the health outcomes. While these findings provide partial support for Cohen and Wills' Main Effect Hypothesis, the latter finding regarding stress-buffering effects, is inconsistent with findings of Toro and colleagues regarding poor and homeless adult populations. Furthermore, implicit in Cohen and Wills' Main Effect Hypothesis is the notion that perceived social support will have no significant effects on health or healthy behavior choices. However, regarding health, this was not the case in the current study. Here, perceived social support was found to have both a significant main effect and stress-buffering effect with number of health symptoms.

Lack of support for hypothesis #1 could be due to how structural social support was measured. In other words, it's possible that the Help Index could have been more comprehensively defined or that it was not an appropriate structural measure of social support. Cohen and Wills often refer to social integration as a structural measure of social support, one that taps community connections. Thus, main effects on health and healthy behavior choices might be most evident when using social integration, specifically, as a structural measure of social support. It's also possible that the Main Effect Hypothesis and findings from Bates and Toro (1999) and Toro et al. (2008) do not generalize to *adolescents* who are poor and homeless.

Regarding mental health outcomes, only support for the main effect of perceived social support was found for hypothesis 2. *Hypothesis 2:* Perceived social support will demonstrate a

stress-buffering effect on mental health outcomes across time (per Cohen and Wills). Specifically, under low conditions of stress, similar mental health outcomes are expected for individuals regardless of level of perceived social support. However, under high stress conditions, mental health outcomes for individuals with high and low levels of social support will differ, such that those with higher levels of perceived social support will evidence better mental health outcomes. Additionally, considering the population of study is poor and homeless adolescents, perceived social support will also demonstrate a main effect on mental health outcomes (per Toro et al., 2008). The latter prediction is not proposed by Cohen and Wills.

Data from the 4.5 year follow-up MANOVA indicates a main effect for perceived social support on mental health outcomes, GSI score, but no significant stress-buffering effect (interaction effect). HLM results fit with these findings, and suggest that the level of perceived social support at 4.5 year follow-up is associated with differences in mean GSI score a few years later. Specifically, those with higher levels of perceived social support at 4.5 year follow-up had lower mean GSI scores at last follow-up.

As cited in Uchino, Cacioppo, and Kiecolt-Glaser (1996), when testing for a stress-buffering effect Cohen and Wills (1985) present the requirement that there be a significant main effect for the stress assessment to ensure that the measure demonstrated an adequate range of scores and measurement reliability. As such, given that no significant stress-buffering effect was found for perceived social support and mental health, and an inverted stress-buffering effect was found on number of health symptoms, it is possible that the poor and homeless population studied had higher levels of stress than populations that are not experiencing the risk factor of poverty (e.g., APA, 2010; Evans & Kim, 2007). In which case, the “low stress” conditions that Cohen and Wills conceive of, where social support has less of an impact on mental health

outcomes, may not exist for this sample. Additionally, as pointed out by Zimmerman, Ramirez-Valles, Zapert and Maton (2000) stress-buffering mechanisms have been found among mostly white middle class samples. In their own investigation of the stress-buffering hypothesis among urban, male, African American adolescents they too found no support for social support on alcohol and substance use, and psychological symptoms.

Sex differences in outcomes were also explored. Hypothesis 3 states: When testing Hypothesis #1, a main effect for sex will be found for substance abuse. In general, males are expected to report a greater number of substance abuse symptoms. Although there are no additional specific predictions, the cross-sectional and longitudinal impact of sex on outcomes will be tested and controlled in all key analyzes. Also, when testing Hypothesis #2, a main effect for sex is expected for mental health. Females will demonstrate greater mental health problems as measured by the GSI. Again, although there are no additional specific predictions, the cross-sectional and longitudinal impact of sex on outcomes will be tested and controlled in all key analyses.

Four and a half year follow-up MANOVAs supported sex differences in the number of substance abuse symptoms as do both the complete and truncated HLM models. The truncated model indicated that females had fewer substance abuse symptoms approximately two years later, and even more powerful, the complete model indicated females had fewer substance abuse symptoms 6-7 years later. Also, for the complete model, females had smaller increases in substance abuse symptoms over time, versus larger gains for males.

Sex differences in mental health outcomes were mixed. Baseline MANOVAs supported a sex difference between males and females on GSI score, however, 4.5 year follow-up MANOVAs did not. HLM findings suggest that sex differences at baseline and 4.5 year follow-

up do not predict differences in GSI scores at last follow-up, though at both of these reference time points on average females report higher GSI scores. Also, females had larger decreases in GSI score over time.

Per Hypothesis 4, differences between homeless and housed youths were explored. Specifically, it was hypothesized that: When testing Hypothesis #1, a main effect for initial housing status will be found for physical health and substance abuse. In general, homeless youth are expected to report a greater number of health and substance abuse symptoms. Although there are no additional specific predictions, the cross-sectional and longitudinal impact of initial housing status on outcomes will be tested and controlled in all key analyses. Also, when testing Hypothesis #2, a main effect is expected for initial housing status. Specifically, homeless youth are expected to demonstrate greater mental health problems as measured by the GSI. Again, although there are no additional specific predictions, the cross-sectional and longitudinal impact of initial housing status on outcomes will be tested and controlled in all key analyses.

Baseline MANOVAs indicated differences in both the number of health and substance abuse symptoms based on initial housing status. HLM findings suggested that initial housing status did not predict differences in number of health or substance abuse symptoms at last follow-up. However, being homeless was associated with a larger increase in number of health symptoms over time. Overall, it appears that while differences may exist between housed and homeless youth on number of health and substance abuse symptoms at baseline, over time the extent of these differences diminished.

Regarding differences in mental health outcomes, a significant main effect for initial housing status was only found for the complete HLM model. Specifically, being homeless was associated with higher GSI scores at last follow-up. The lack of consistent findings for initial

housing status may be a result of a stronger effect of current housing status (e.g., initially homeless youth may now be housed) or changing housing status over time.

Consideration for Future Studies

Regarding the measures, as noted earlier, a Helper Index was created as a structural measure of social support. Future studies might consider including a specific measure of social integration as a structural measure of social support. However, regardless of the structural social support measure used, testing the mechanism by which it influences health is another more complicated matter. Given that little support was found for the stress-buffering hypothesis, future research might also include groups from various income brackets, being sure to include a "typical" group for comparison. Considering how well perceived social support also "matches" the needs resulting from stressful events could reveal a stress-buffering effect (e.g., Cohen, 1992; Cutrona & Russell, 1990). Lastly, given that the sample of homeless youth used in this study were mostly recruited from shelters, generalizability of these findings to homeless youth living on the street should be made with some caution.

Implications for Intervention

Mean number of health symptoms appear to increase over time, peaking around the 4.5 year follow-up, and then begin to decrease. During the peak, participants are in late adolescence to early adulthood; suggesting it is important to provide accessible and adequate medical health service for this population as a form of prevention and later on to address the increase medical health needs. Having more health problems, females should especially be considered. Also, at the start of this study those that were housed reported more health symptoms, on average. It is possible that, due to their housed status, they are ineligible for services their homeless peers may

be benefiting from. As such, increasing accessibility of services to housed but impoverished adolescents is important.

Over time, a steady increase in substance abuse, which includes alcohol and marijuana abuse/dependence, symptoms was observed in this study. This finding is not surprising, given that as the population grew older, their accessibility to alcohol and marijuana likely increased (e.g., they came of legal drinking age, and could obtain alcohol more easily; they may have had more money to purchase both alcohol and marijuana). Consistent with findings in the field, males tend to report more substance abuse problems, and as found in this study, tend to increase number of substance abuse symptoms over time at a greater rate than females. Suggesting that, both males and female would benefit from substance abuse prevention and intervention, but males stand to benefit the most.

On a more positive note, it appears that the mental health of our sample improved over time. Females, who began with reportedly greater psychological distress, were reporting comparable levels of distress by the end of the study. One could hypothesize that, over time, these individuals are adapting to their situation, and/or utilizing mental health services available to them. Prevention services should be focused on those in early adolescents, especially females. Interventions could be targeted to help facilitate the decrease in mental health problems over time.

APPENDIX A: TABLES

Table 1a
Means, Standard Deviations, and Correlations for Social Support Predictors, and Health Outcomes at Baseline

	Mean (SD)	(1)	(2)	(3)	(4)	(5)
Health (1)	7.20 (6.84)	1				
Alcohol use (2)	2.87 (4.08)	.235**	1			
GSI (3)	.72 (.58)	.555**	.234**	1		
Stress (4)	12.99 (7.37)	.345**	.399**	.474**	1	
Network Social Support (5)	0.028 (1.25)	-.019	.022	-.132**	-.056**	1

** Correlation is significant at the 0.01 level (2-tailed).

Table 1b
Means, Standard Deviations, and Correlations for Social Support Predictors, and Health Outcomes at 4.5 year Follow-up

	Mean (SD)	(1)	(2)	(3)	(4)	(5)	(6)
Health (1)	7.75 (6.75)	1					
Alcohol use (2)	4.00 (4.35)	.212**	1				
GSI (3)	.52 (.52)	.588**	.416**	1			
Stress (4)	11.43 (7.64)	.459**	.497**	.590**	1		
Network Social Support (5)	0.034 (1.56)	.195**	.102	.159**	.172**	1	
Perceived Social Support (6)	13.34 (1.51)	-.212**	-.048	-.386**	-.236**	.041	1

** Correlation is significant at the 0.01 level (2-tailed).

Table 2
Results of three models representing time-invariant predictors of stress, network social support perceived social support, the interaction of stress and social support, sex and housing as possible group level predictors on number of health symptoms

		Parameter	Network (Baseline)	Perceived (4.5 Follow-up)	Network (4.5 Follow-up)
Fixed Effects					
Initial,	Mean health symptoms at last assessment	γ_{00}	0.733*** (0.044)	0.704*** (0.042)	0.683*** (0.044)
	Difference in mean # of health symptoms based on change in level of **Stress**	γ_{01}	0.079*** (0.020)	0.107*** (0.020)	0.113*** (0.022)
	Difference in mean # of health symptoms based on change in level of **Social Support**	γ_{02}	-0.025 (0.015)	-0.039** (0.013)	0.012 (0.015)
	Difference in mean # of health symptoms based on change in level of Stress x **Social Support**	γ_{03}	-0.002 (0.011)	0.031* (0.012)	0.010 (0.012)
	Difference in mean # of health symptoms based on **gender**	γ_{04}	0.051 (0.042)	0.095* (0.046)	0.097* (0.048)
	Difference in mean # of health symptoms based on **initial housing status**	γ_{05}	0.034 (0.045)	-0.004 (0.044)	0.005 (0.045)
Rate of change,	Mean change in health symptoms over time	γ_{10}	0.000 (0.001)	-0.001 (0.002)	-0.001 (0.002)
	Difference in mean change in # of health symptoms based on change in level of **Stress**	γ_{11}	-0.001*** (0.000)	-0.003 (0.001)**	-0.002* (0.001)
	Difference in mean change in # of health symptoms based on change in level of **Social Support**	γ_{12}	-0.000 (0.000)	-0.000 (0.001)	-0.000 (0.001)
	Difference in mean change in # of health symptoms based on change in level of Stress x **Social Support**	γ_{13}	-0.000 (0.000)	0.001 (0.001)	-0.000 (0.001)
	Difference in mean change in # of health symptoms based on **gender**	γ_{14}	-0.000 (0.001)	-0.002 (0.002)	-0.002 (0.002)
	Difference in mean change in # of health symptoms based on **initial housing status**	γ_{15}	0.002** (0.001)	0.000 (0.002)	0.000 (0.002)
Variance Component					
Level-1	within-person	σ_ε^2	0.075	0.049	0.049
Level-2	In initial status	σ_0^2	0.092***	0.092***	0.094***
	In rate of change	σ_1^2	0.000***	0.000***	0.001***

* $p < .05$; ** $p < .01$; *** $p < .001$.
Network (Baseline) = Full model for Network Social Support using data from baseline-6.5 year follow-up; Perceived (4.5 Follow-up) Full model for Perceived Social Support using truncated dataset from 4.5-6.5 year follow-up; Network (4.5 Follow-up) Full model for Network Social Support using truncated dataset from 4.5-6.5 year follow-up.

Table 3
Results of three models representing time-invariant predictors of stress, network social support perceived social support, the interaction of stress and social support, sex and housing as possible group level predictors on substance abuse symptoms

		Parameter	Network (Baseline)	Perceived (4.5 Follow-up)	Network (4.5 Follow-up)
Fixed Effects					
Initial,	Mean substance abuse symptoms at last assessment	γ_{00}	0.726*** (0.041)	0.712*** (0.038)	0.713*** (0.040)
	Difference in mean # of substance abuse based on change in level of **Stress**	γ_{01}	0.041 (0.021)*	0.076*** (0.019)	0.059** (0.020)
	Difference in mean # of substance abuse based on change in level of **Social Support**	γ_{02}	-0.025 (0.016)	0.021 (0.015)	0.032* (0.014)
	Difference in mean # of substance abuse based on change in level of Stress x **Social Support**	γ_{03}	-0.011 (0.014)	-0.002 (0.013)	0.002 (0.012)
	Difference in mean # of substance abuse based on **gender**	γ_{04}	-0.180*** (0.043)	-0.172*** (0.042)	-0.170*** (0.043)
	Difference in mean # of substance abuse based on **initial housing status**	γ_{05}	-0.027 (0.041)	0.013 (0.042)	0.016 (0.041)
Rate of change,	Mean change in substance abuse s over time	γ_{10}	0.005*** (0.001)	0.003* (0.001)	0.004* (0.001)
	Difference in mean change in # of substance abuse based on change in level of **Stress**	γ_{11}	-0.001*** (0.000)	-0.003*** (0.001)	-0.003*** (0.001)
	Difference in mean change in # of substance abuse based on change in level of **Social Support**	γ_{12}	-0.001** (0.000)	0.000 (0.001)	0.001* (0.001)
	Difference in mean change in # of substance abuse based on change in level of Stress x **Social Support**	γ_{13}	-0.000 (0.000)	0.001 (0.000)	-0.000 (0.000)
	Difference in mean change in # of substance abuse based on **gender**	γ_{14}	-0.002** (0.001)	-0.001 (0.002)	-0.001 (0.002)
	Difference in mean change in # of substance abuse based on **initial housing status**	γ_{15}	-0.001 (0.001)	0.001 (0.002)	0.001 (0.002)
Variance Component					
Level-1	within-person	σ_ε^2	0.064	0.045	0.044
Level-2	In initial status	σ_0^2	0.098***	0.083***	0.081***
	In rate of change	σ_1^2	0.000***	0.000**	0.000**

* $p < .05$; ** $p < .01$; *** $p < .001$.
Network (Baseline) = Full model for Network Social Support using data from baseline-6.5 year follow-up; Perceived (4.5 Follow-up) Full model for Perceived Social Support using truncated dataset from 4.5-6.5 year follow-up; Network (4.5 Follow-up) Full model for Network Social Support using truncated dataset from 4.5-6.5 year follow-up.

Table 4

Results of three models representing time-invariant predictors of stress, network social support perceived social support, the interaction of stress and social support, sex and housing as possible group level predictors on mental health outcomes

		Parameter	Network (Baseline)	Perceived (4.5 Follow-up)	Network (4.5 Follow-up)
Fixed Effects					
Initial,	Mean health symptoms at last assessment	γ_{00}	0.789*** (0.019)	0.776*** (0.017)	0.776*** (0.018)
	Difference in mean # of Health Symptoms based on change in level of **Stress**	γ_{01}	-0.029** (0.010)	-0.058*** (0.008)	-0.063*** (0.009)
	Difference in mean # of Health Symptoms based on change in level of **Social Support**	γ_{02}	0.009 (0.008)	0.021** (0.007)	-0.007 (0.006)
	Difference in mean # of Health Symptoms based on change in level of Stress x **Social Support**	γ_{03}	0.010 (0.006)	0.001 (0.006)	0.002 (0.005)
	Difference in mean # of Health Symptoms based on **gender**	γ_{04}	0.020 (0.020)	0.008 (0.019)	0.014 (0.020)
	Difference in mean # of Health Symptoms based on **initial housing status**	γ_{05}	-0.067*** (0.020)	-0.036 (0.019)	-0.044* (0.020)
Rate of change,	Mean change in health symptoms over time	γ_{10}	0.001** (0.000)	0.000 (0.001)	-0.000 (0.001)
	Difference in mean change in # of Health Symptoms based on change in level of **Stress**	γ_{11}	0.001*** (0.000)	0.001** (0.000)	0.001** (0.000)
	Difference in mean change in # of Health Symptoms based on change in level of **Social Support**	γ_{12}	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)
	Difference in mean change in # of Health Symptoms based on change in level of Stress x **Social Support**	γ_{13}	0.000 (0.000)	-0.000 (0.000)	0.000* (0.000)
	Difference in mean change in # of Health Symptoms based on **gender**	γ_{14}	0.001** (0.000)	0.002** (0.001)	0.002** (0.001)
	Difference in mean change in # of Health Symptoms based on **initial housing status**	γ_{15}	-0.000 (0.000)	-0.001 (0.001)	-0.000 (0.001)
Variance Component					
Level-1	within-person	σ_ε^2	0.014	0.012	0.012
Level-2	In initial status	σ_0^2	0.021***	0.015***	0.015***
	In rate of change	σ_1^2	0.000***	0.000	0.000

* $p < .05$; ** $p < .01$; *** $p < .001$.

Network (Baseline) = Full model for Network Social Support using data from baseline-6.5 year follow-up; Perceived (4.5 Follow-up) Full model for Perceived Social Support using truncated dataset from 4.5-6.5 year follow-up; Network (4.5 Follow-up) Full model for Network Social Support using truncated dataset from 4.5-6.5 year follow-up.

APPENDIX B: FIGURES

Figure 1. Mean number of health symptoms as a function of time in months preceding last assessment and level of stress for the complete dataset.

Figure 2. Mean number of health symptoms as a function of time in months preceding last assessment and initial housing status for the complete dataset.

Figure 3. Mean number of health symptoms as a function of mean number of stressful life events above and below the mean, level of stress and level of perceived social support at 4.5 year follow-up.

Figure 4. Mean number of health symptoms as a function of time in months preceding last assessment and level of stress for the truncated dataset.

Figure 5. Mean number of health symptoms as a function of time in months preceding last assessment and sex for the complete dataset.

Figure 6. Mean number of health symptoms as a function of time in months preceding last assessment and sex for the truncated dataset.

Figure 7. Mean number of health symptoms as a function of time in months preceding last assessment and initial housing status for the truncated dataset.

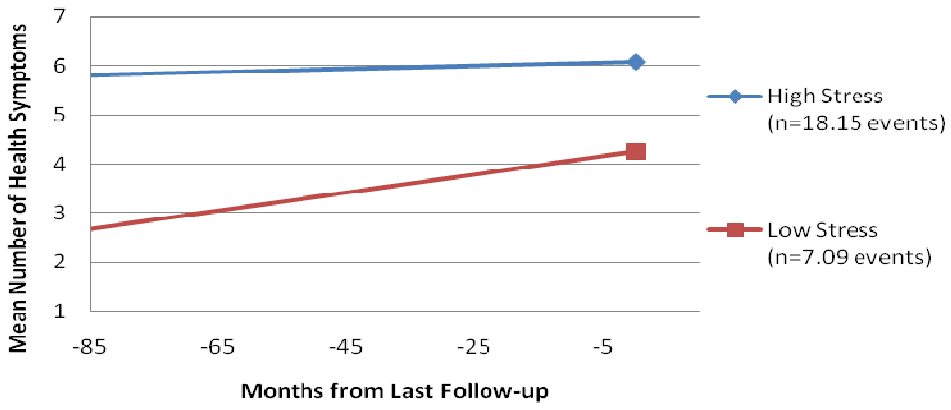
Figure 8. Mean number of substance abuse symptoms as a function of time in months preceding last assessment and level of stress for the complete dataset.

Figure 9. Mean number of substance abuse symptoms as a function of time in months preceding last assessment and level of network social support for the complete dataset.

Figure 10. Mean number of substance abuse symptoms as a function of time in months preceding last assessment and sex for the complete dataset.

Figure 11. Mean number of substance abuse symptoms as a function of time in months preceding last assessment and sex for the truncated dataset.

Figure 1



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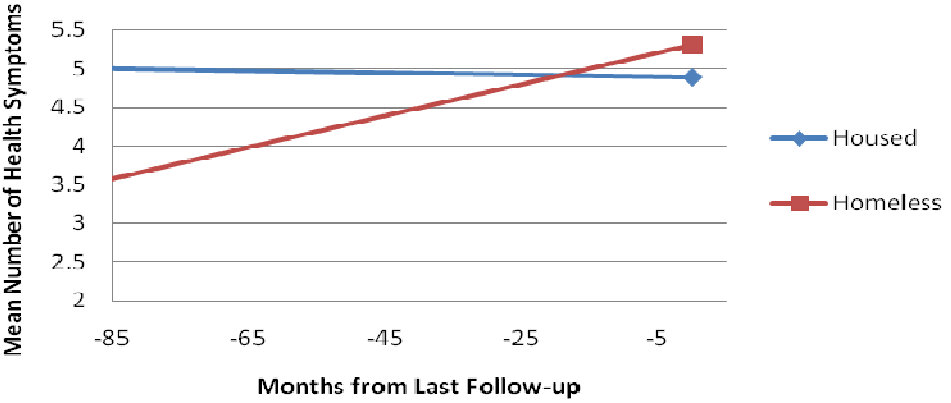

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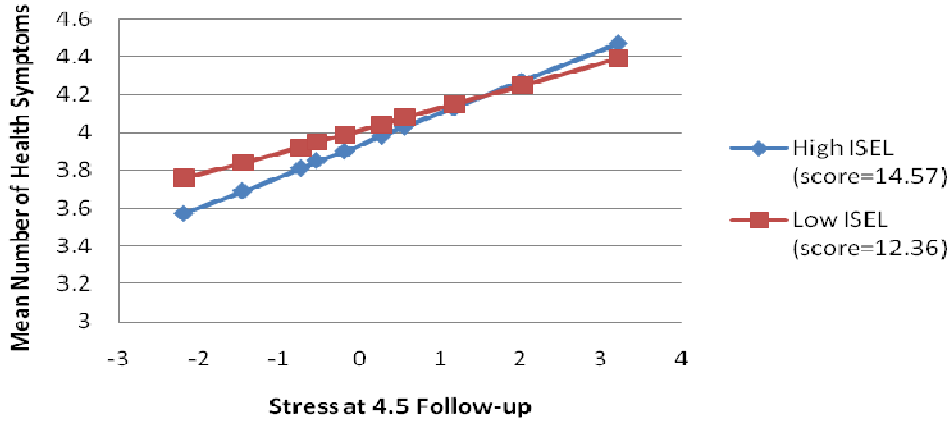

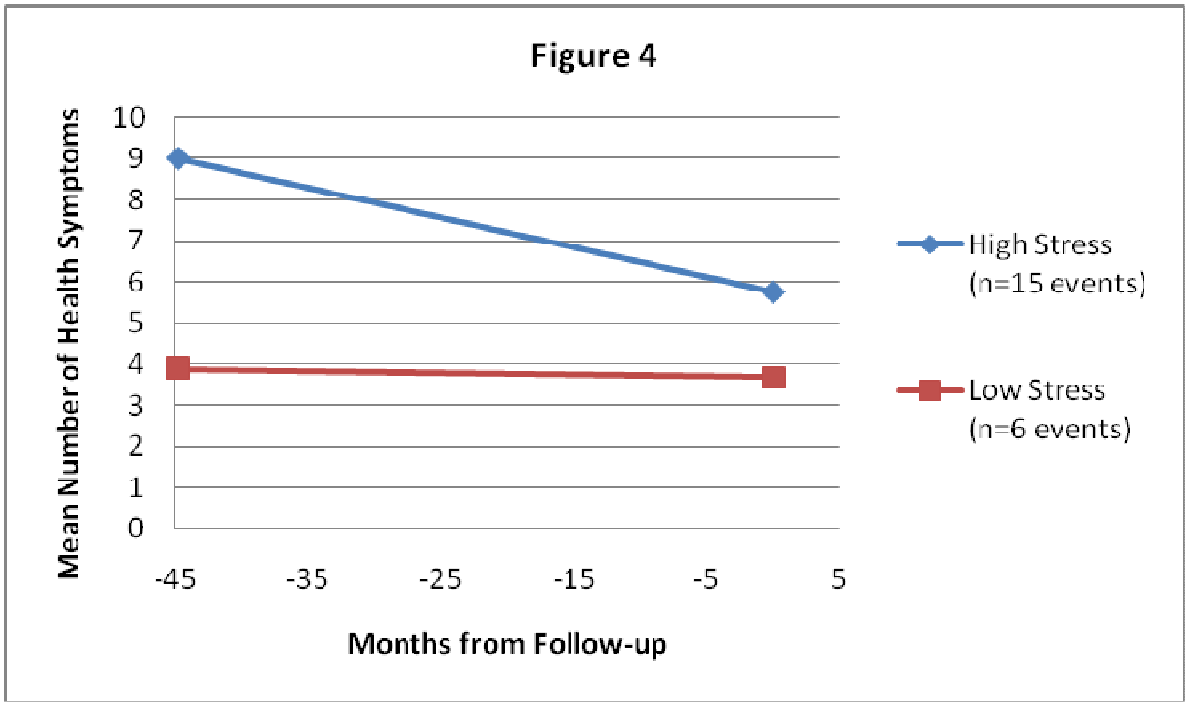
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Mean Number of Health Symptoms
10
9
8
7
6
5
4
3
2
1
0
-45
-35
-25
-15
-5
5
Months from Follow-up
High Stress
(n=15 events)
Low Stress
(n=6 events)

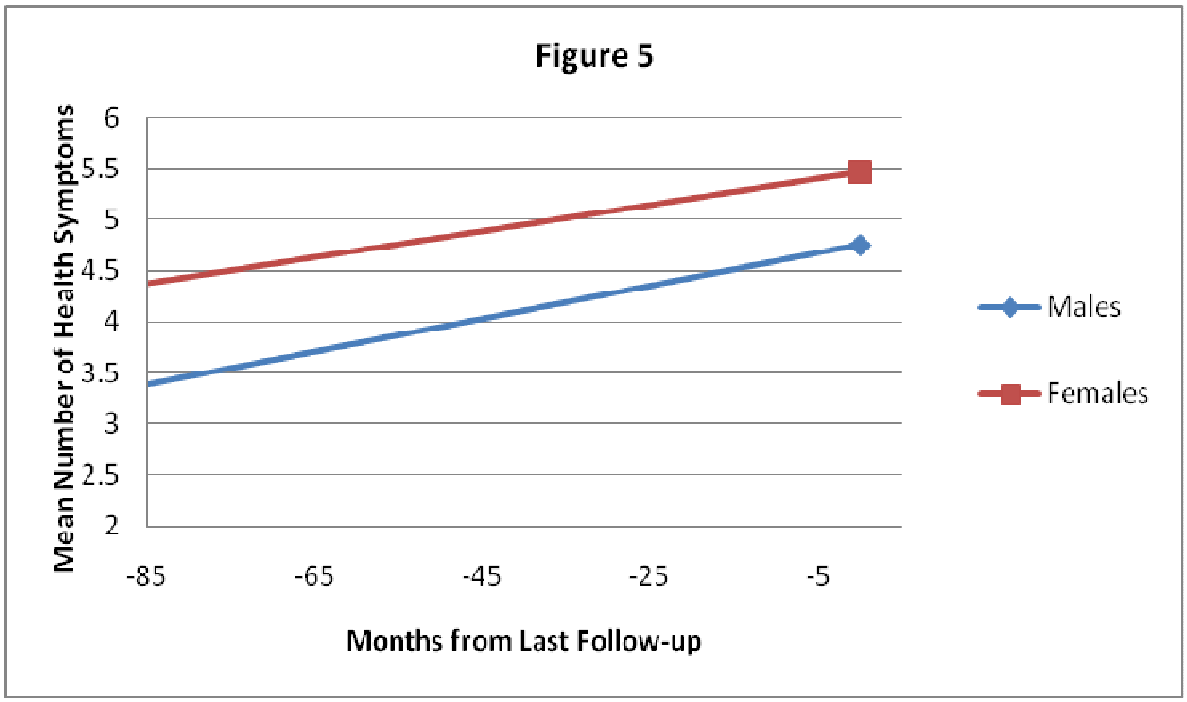


Figure 5
Mean Number of Health Symptoms
6
5.5
5
4.5
4
3.5
3
2.5
2
-85
-65
-45
-25
-5
Months from Last Follow-up
Males
Females

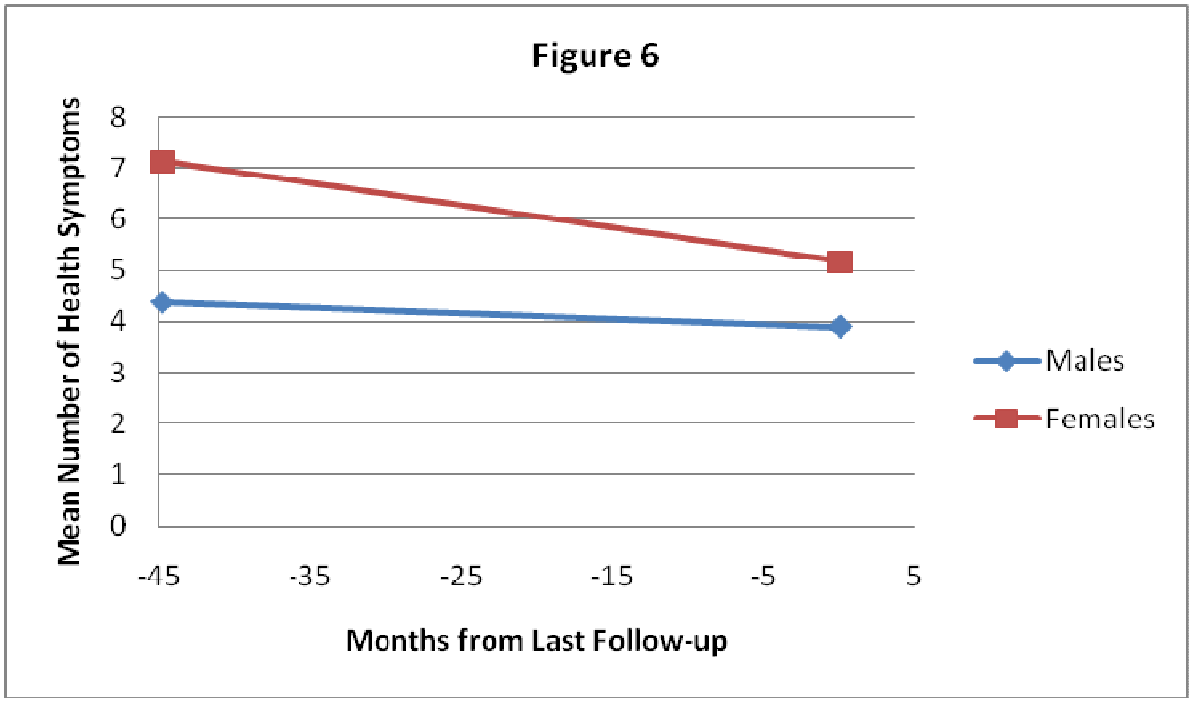


Figure 6
Mean Number of Health Symptoms
8
7
6
5
4
3
2
1
0
-45
-35
-25
-15
-5
5
Months from Last Follow-up
Males
Females

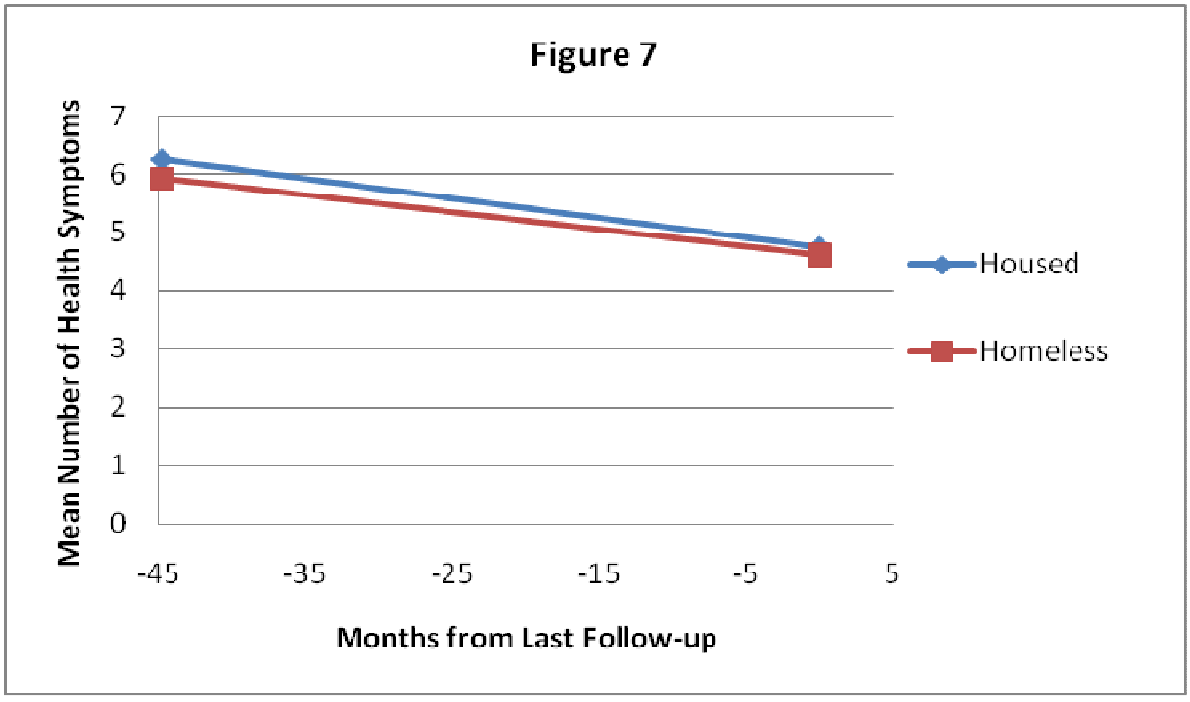


Figure 7
Mean Number of Health Symptoms
7
6
5
4
3
2
1
0
-45
-35
-25
-15
-5
5
Months from Last Follow-up
Housed
Homeless

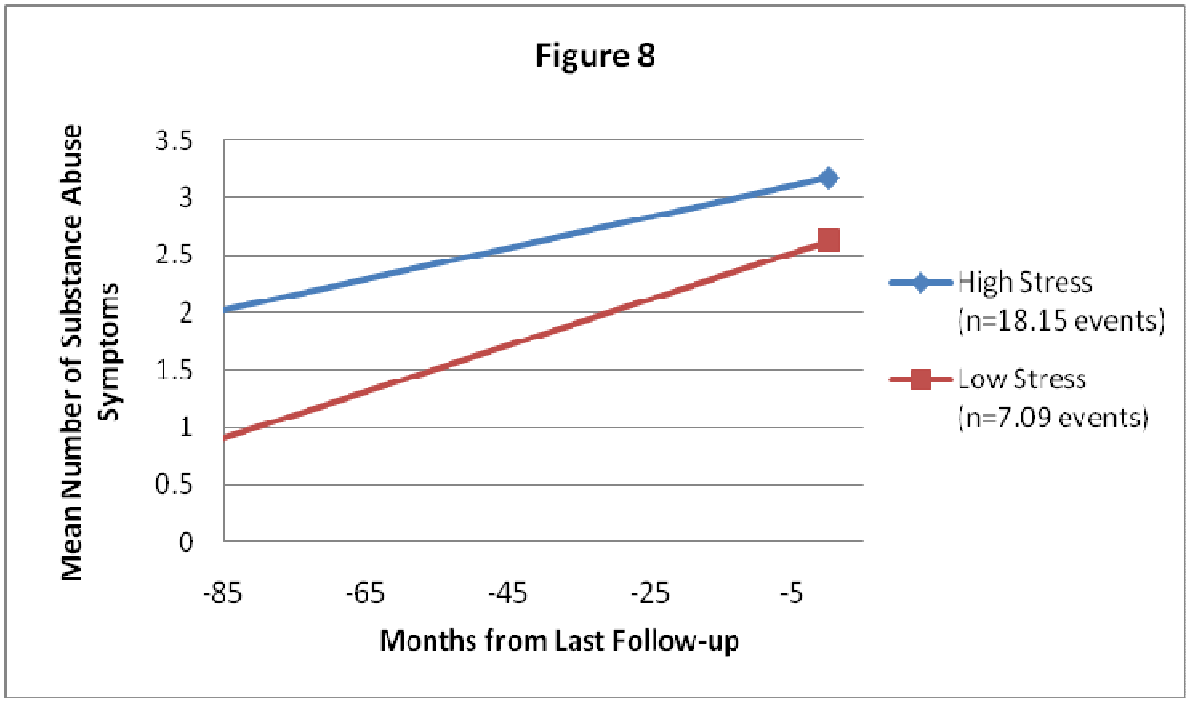


Figure 8
Mean Number of Substance Abuse Symptoms
3.5
3
2.5
2
1.5
1
0.5
0
-85
-65
-45
-25
-5
Months from Last Follow-up
High Stress (n=18.15 events)
Low Stress (n=7.09 events)

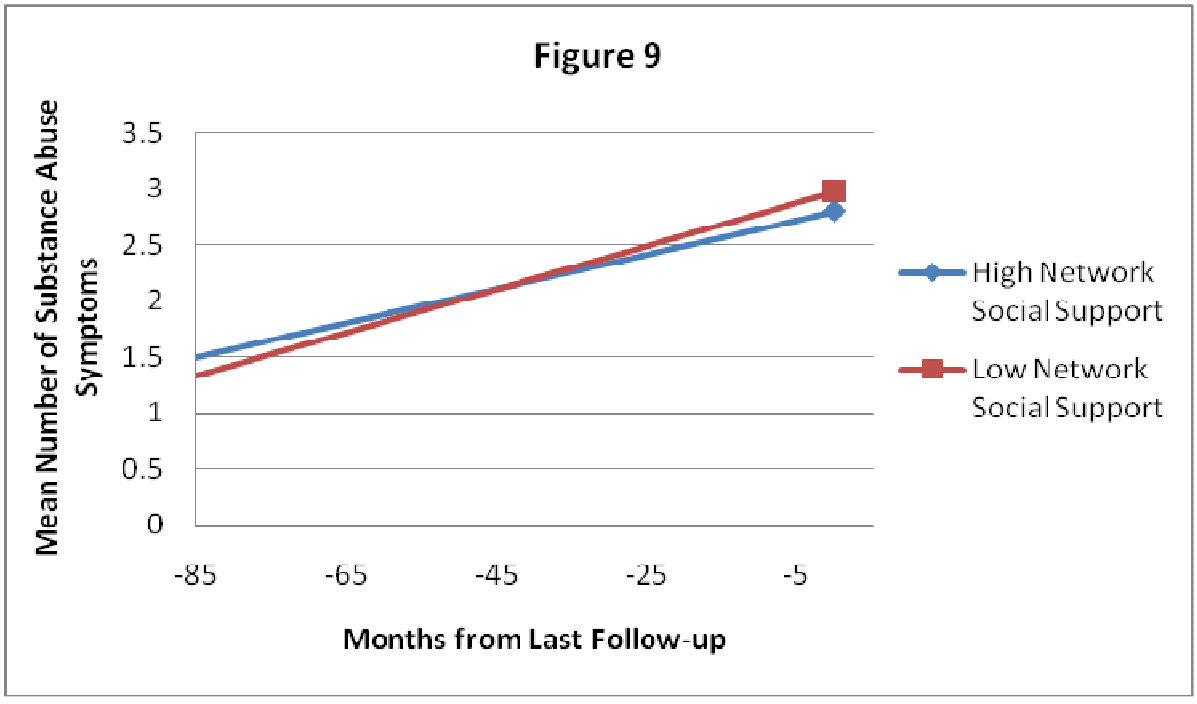
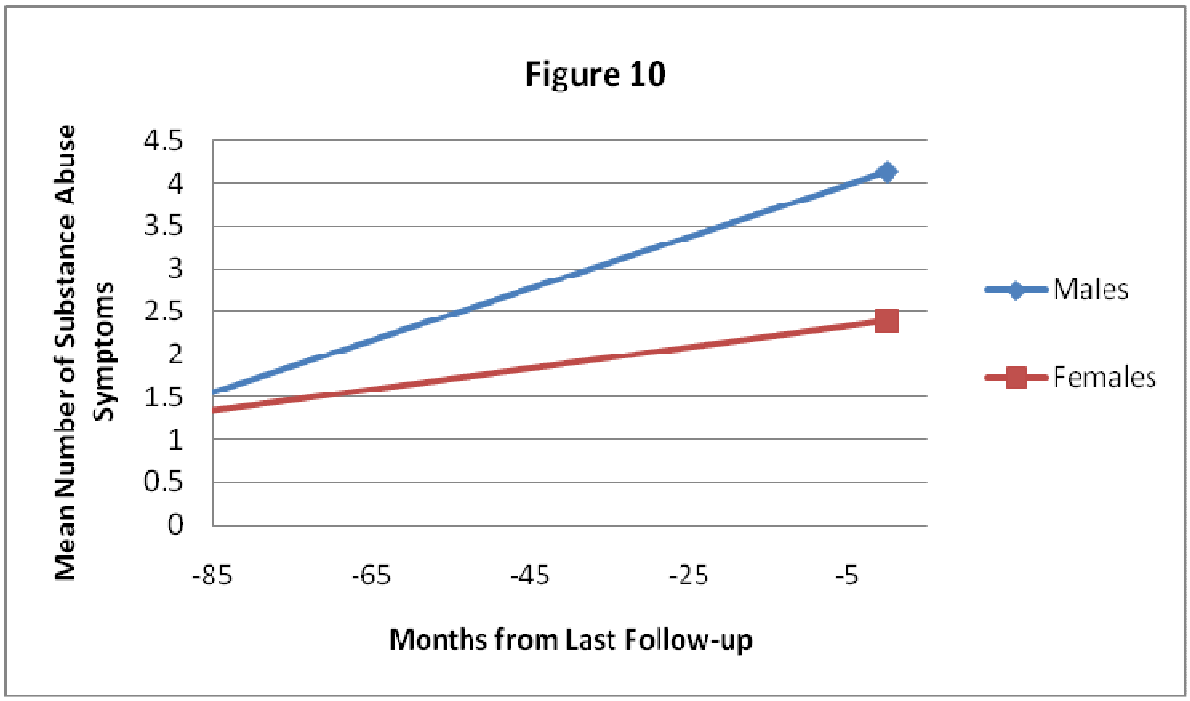


Figure 9
Mean Number of Substance Abuse Symptoms
3.5
3
2.5
2
1.5
1
0.5
0
-85
-65
-45
-25
-5
Months from Last Follow-up
High Network Social Support
Low Network Social Support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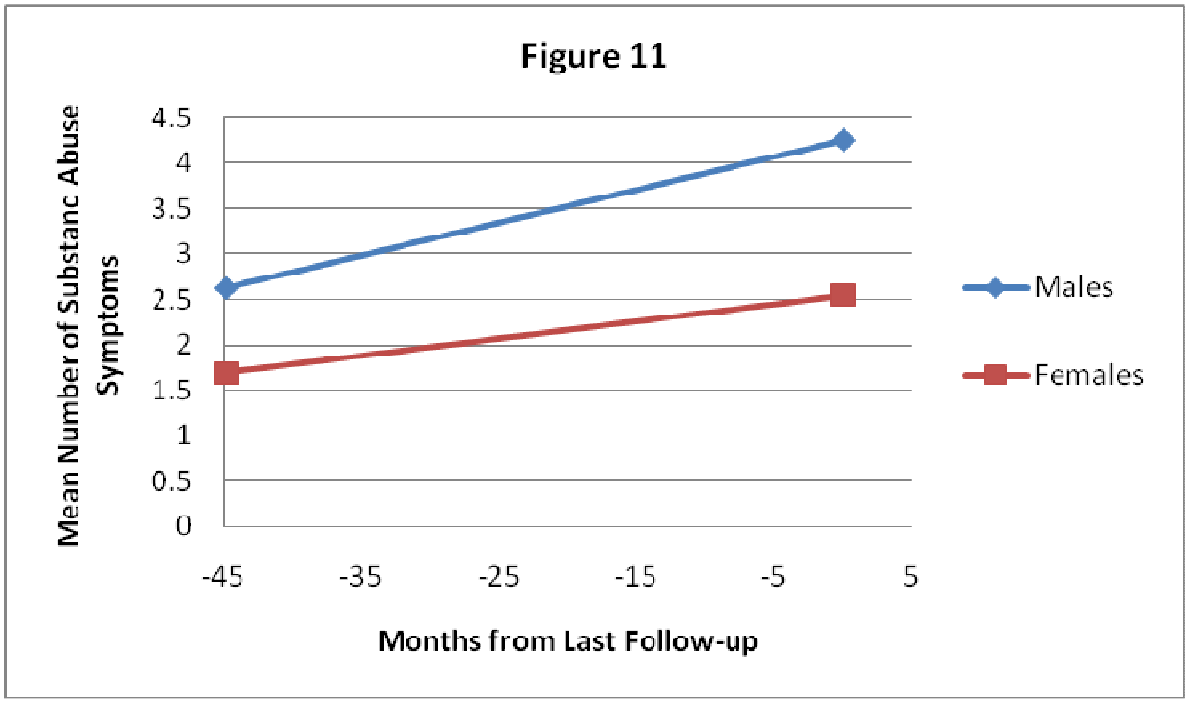
Mean Number of Substance Abuse Symptoms
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
-85
-65
-45
-25
-5
Months from Last Follow-up
Males
Females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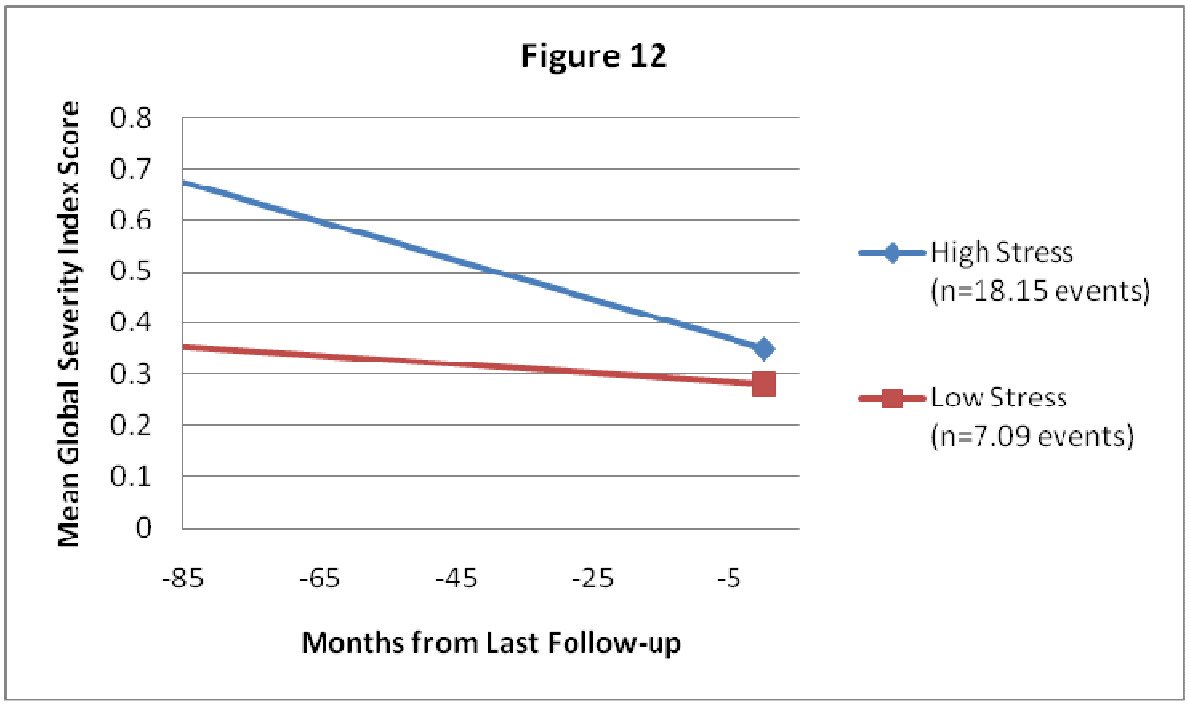
Mean Number of Substanc Abuse Symptoms
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
-45
-35
-25
-15
-5
5
Months from Last Follow-up
Males
Females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Mean Global Severity Index Score
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-85
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-45
-25
-5
Months from Last Follow-up
High Stress
(n=18.15 events)
Low Stress
(n=7.09 events)

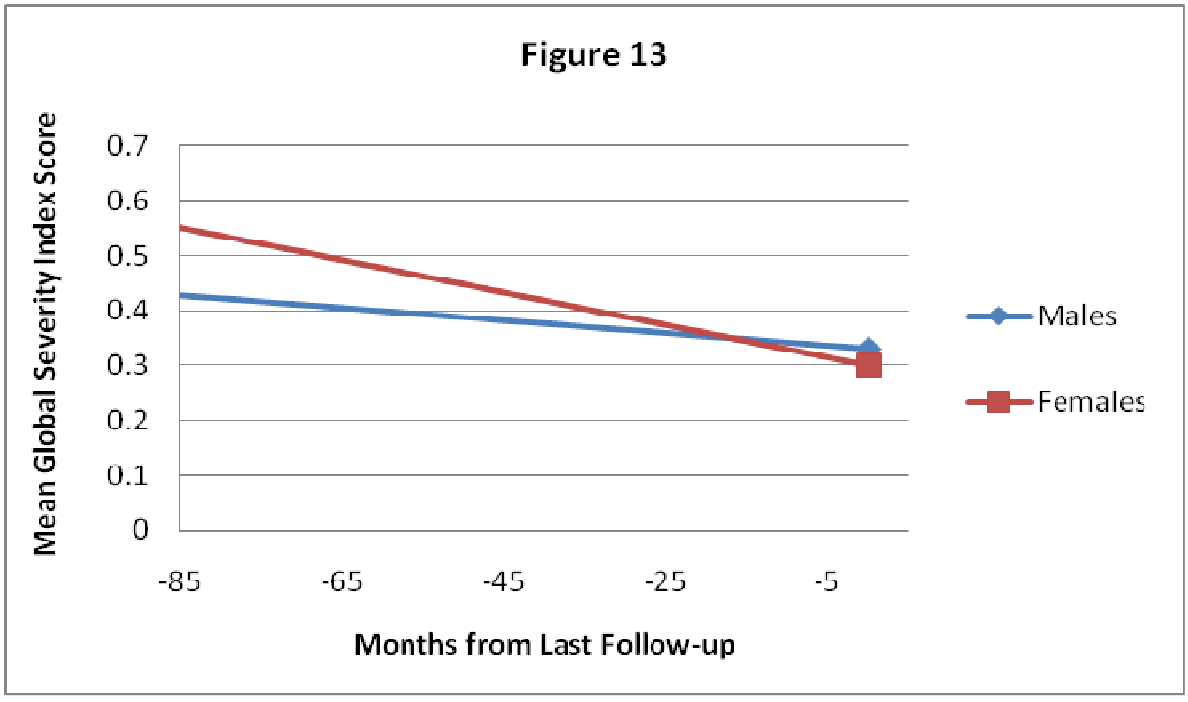


Figure 13
Mean Global Severity Index Score
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-85
-65
-45
-25
-5
Months from Last Follow-up
Males
Females

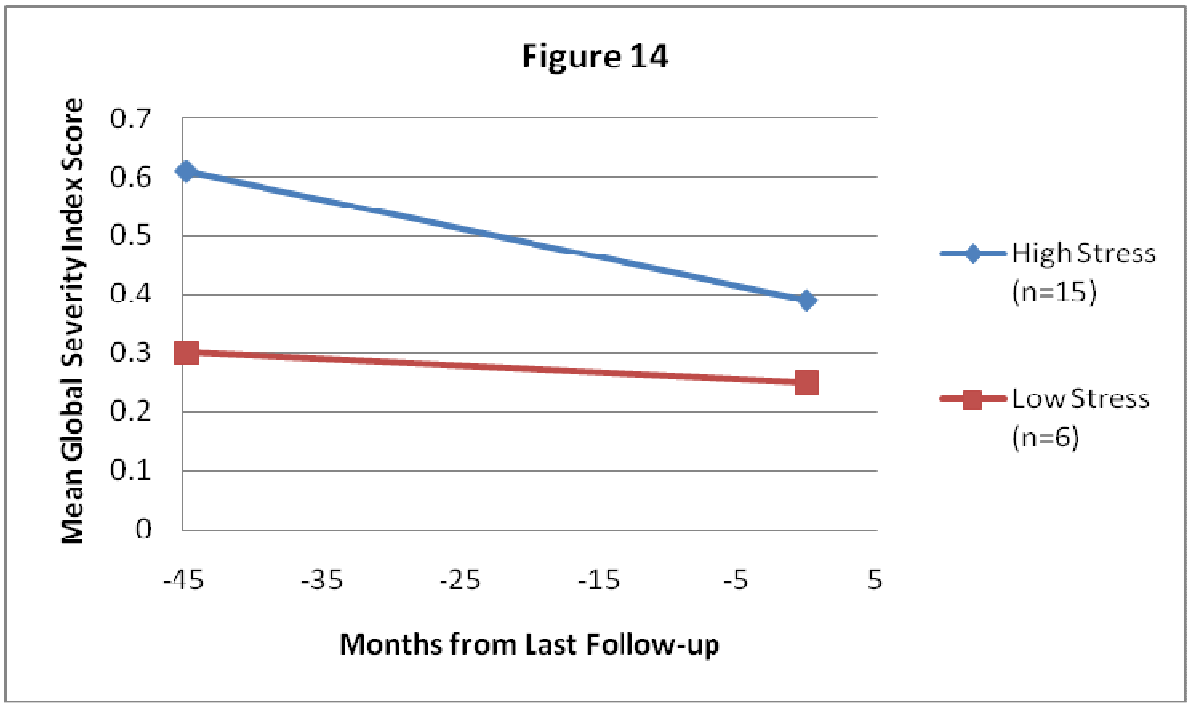


Figure 14
Mean Global Severity Index Score
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-45
-35
-25
-15
-5
5
Months from Last Follow-up
High Stress (n=15)
Low Stress (n=6)

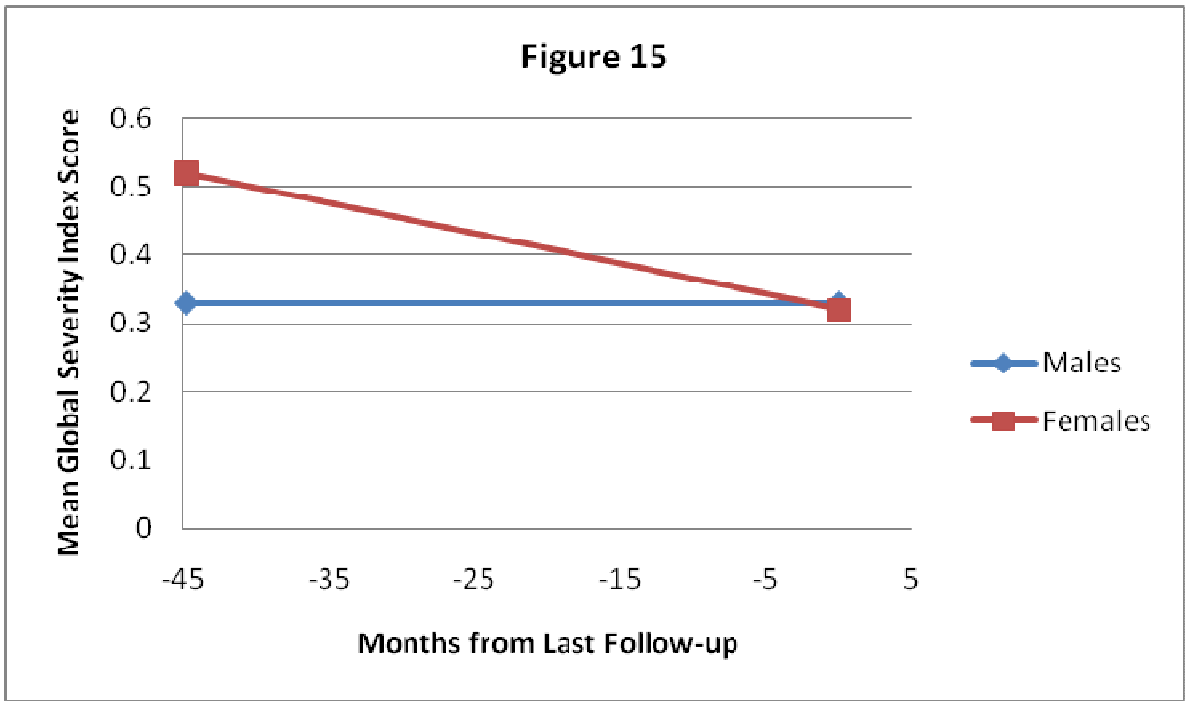


Figure 15
Mean Global Severity Index Score
0.6
0.5
0.4
0.3
0.2
0.1
0
-45
-35
-25
-15
-5
5
Months from Last Follow-up
Males
Females

Figure 16

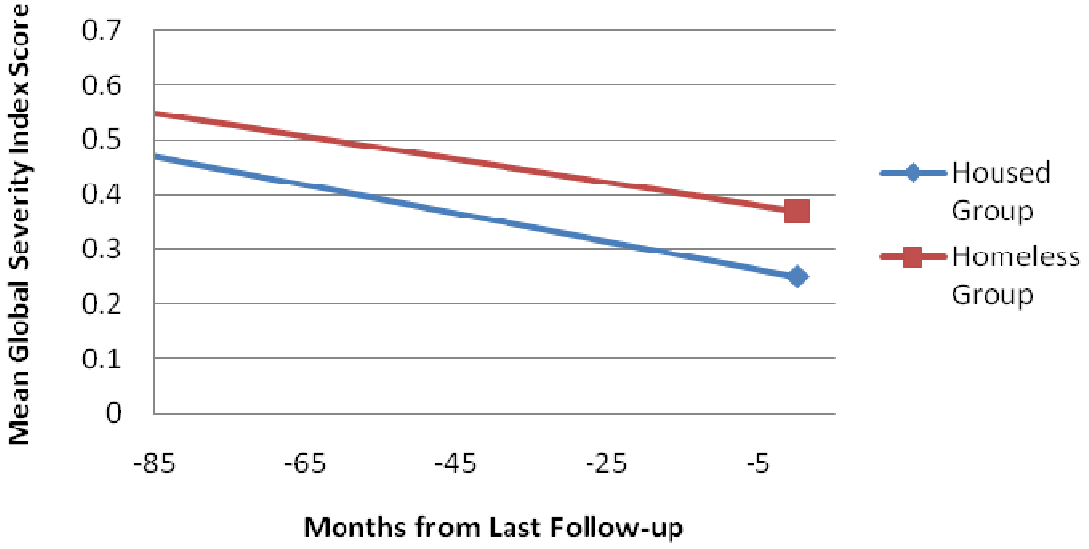
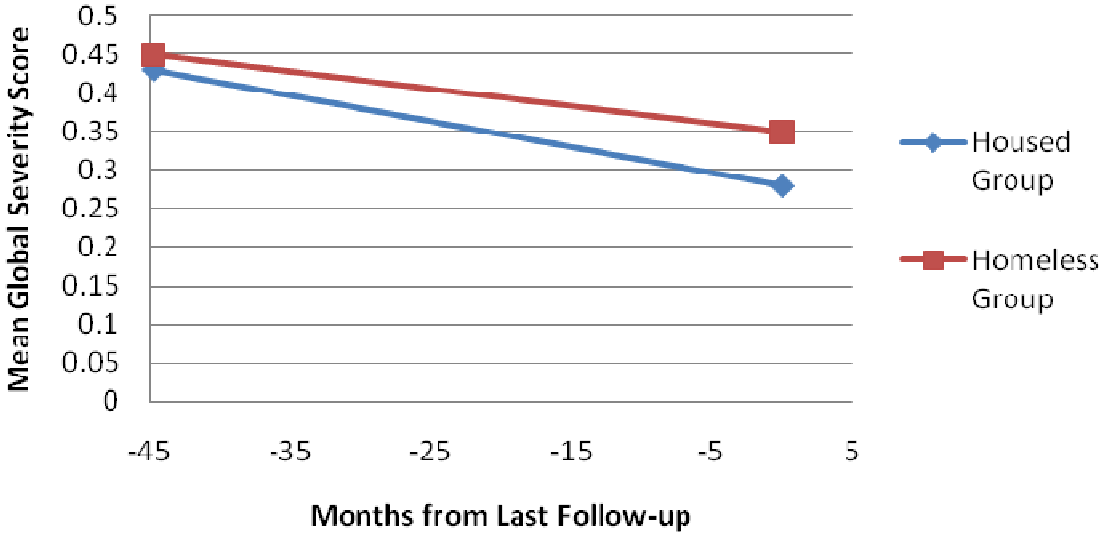


Figure 17



REFERENCES

American Psychiatric Association. (1987). *Diagnostic and statistical manual of mental disorders* (3rd ed., revised). Washington, D.C.

American Psychological Association. (2010). Effects of Poverty, Hunger, and Homelessness on Children and Youth. Retrieved January, 2010 from: http://www.apa.org/pi/families/poverty.aspx

Bailey, S. L., Ouellet, L. J., Mackesy-Amiti, M. E., Golub, E. T., Hagan, H., Hudson, S. M., Latka, M. H., Gao, W., & Garfein, S. S. (2007). Perceived risk, peer influences, and injection partner type predict receptive syringe sharing among young adult injection drug users in five U. S. cities. *Drug and Alcohol Dependence, 91S,* S18-S29.

Bates, D., & Toro, P. A. (1999). Developing measures to assess social support among homeless and poor people. In P. A. Toro (Ed.), Special Issue on Homelessness, *Journal of Community Psychology, 27,* 137-156.

Bogart, L. M., Collins, R. L., Ellickson, P. L., & Klein, D. J. (2006). Adolescent predictors of generalized health risk in young adulthood: A 10-year longitudinal assessment. *Journal of Drug Issues, 36,* 571-595.

Brewin, C. R., Andrews, B., & Valentine, J. D. (2000). Meta-analysis of risk factors for posttraumatic stress disorder in trauma-exposed adults. *Journal of Consulting and Clinical Psychology, 68,* 748-766.

Brinkmeyer, M. Y., & Eyberg, S. M. (2003). Parent-child interaction therapy for oppositional children. In A. E. Kazdin & J. R. Weisz (Eds.), *Evidence-based psychotherapies for children and adolescents* (pp. 204-223). New York, NY, Guilford Press.

Brooks-Gunn, J., & Duncan, G. J. (1997). The effects of poverty on children. *Children and Poverty, 7,* 55-71.

Bryk, A.S., & Raudenbush, S.W. (1992). Hierarhical linear models: applications and data analysis methods. *Advanced Qualitative Techniques in the Social Sciences, 1*. Thousand Oaks, CA, US: Sage Publications, Inc.

Caspi, A., Bolger, N., & Eckenrode, J. (1987). Linking person and context in the daily stress process. *Journal of Personality and Social Psychology, 52,* 184-195.

Centers for Disease Control and Prevention. (2009, March). Adolescent health. Retrieved August 2009, from http://www.cdc.gov/nchs/FASTATS/adolescent_health.htm

Chassin, L., Presson, C. C., Rose, J. S., & Sherman, S. J. (1996). The natural history of cigarette smoking from adolescence to adulthood: Demographic predictors of continuity and change. *Health Psychology, 15,* 478-484.

Chen, K., & Kandel, D. B. (1995). The natural history of drug use from adolescence to the mid-thirties in a general population sample. *American Journal of Public Health, 85,* 41-47.

Cohen, S. (1992). Stress, social support, and disorder. In H.O.F. Veile,& U. Baumann (Eds.), *The meaning and measurement of social support. The series in clinical and community psychology (pp. 109-124).* Washington, D.C.: Hemisphere Publishing Corp.

Cohen, S. (2004). Social relationships and health. *American Psychologist, 59,* 676-684.

Cohen, R. Y., Brownell, K. D., & Felix, M. R. (1990). Age and sex differences in health habits and beliefs of schoolchildren. *Health Psychology, 9,* 208-224.

Cohen, S., & Hoberman, H. M. (1983). Positve events and social supports as buffers of life change stress. *Journal of Applied Social Psychology, 13,* 99-125.

Cohen, S., Kessler, R. C., & Gordon, L. U. (1995). Strategies for measuring stress in studies of psychiatric and physical disorders. In S. Cohen, R. C. Kessler, & L. U. Gordon (Eds.), *Measuring stress: A guide for health and social scientists* (pp. 3-26). New York, NY: Oxford University Press.

Cohen, S., Mermelstein, R., Kamarck, T., & Hoberman, H. (1985). Measuring the functional components of social support. In I. G. Sarason & B. R. Sarason (Eds.), *Social support: Theory, research, and application*. The Hague, Holland: Martinus Nijhoff.

Cohen, S., & Wills, T.A. (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin, 98,* 310-357.

Compas, B. E., Slavin, L. A., Wagner, B. M., & Vannatta, K. (1986). Relationship of life events and social support with psychological dysfunction among adolescents. *Journal of Youth and Adolescence, 15,* 205-221.

Cronkite, R. C., Moos, R. H., Twohey, J., Cohen, C., & Swindle, R. (1998). Life circumstances and personal resources as predictors of the ten-year course of depression. *American Journal of Community Psychology, 26,* 255-280.

Cutrona, C. E. (n.d.). *Social Provisions Scale*. Retrieved April 2008, from http://www.psychology.iastate.edu/~ccutrona/socprov.htm

Cutrona, C. E., & Russell, D. W. (1987). The provisions of social relationships and adaptation to stress. *Advances in Personal Relationships, 1,* 37-67.

Cutrona, C. E., & Russell, D. W. (1990). Type of social support and specific stress: Toward a theory of optimal matching. In B. R. Sarason, I. G. Sarason, & G. R. Pierce (Eds.), *Social support: An interactional view* (pp. 319-366). Oxford, England, John Wiley & Sons.

DeLongis, A., Folkman, S., & Lazarus, R. S. (1988). The impact of daily stress on health and mood: Psychological and social resources as mediators. *Journal of Personality and Social Psychology, 54,* 486-495.

Derogatis, L. R., & Lazarus, L. (1994). SCL 90-R, Brief Symptom Inventory, and matching clinical rating scales. In M. E. Maruish (Ed.), *The use of psychological testing for treatment planning and outcome assessment (pp. 217-248).* Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.

Derogatis, L. R., & Melisaratos, N. (1983). The Brief Symptom Inventory: An introductory report. *Psychological Medicine, 13,* 595-605.

Douglas-Hall, A., & Chau, M. (2009, April). Basic facts about low-income adolescents. Retrieved August 2009 from http://www.nccp.org/publications/pub_872.html

Eckenrode, J. (1984). Impact of chronic and acute stressors on daily reports of mood. *Journal of Personality and Social Psychology, 46,* 907-918.

Evans, G. W., & Kim, Pilyoung. (2007). Childhood poverty and health: cumulative risk exposure and stress dysregulation. *Psychological Science, 18,* 953-957.

Finch, J.F., Okun, M.A., Pool, G.J., & Ruehlman, L.S. (1999). A comparison of the influence of conflictual and supportive social interactions on psychological distress. *Journal of Personality, 67,* 581-622.

Glied, S., & Pine, D. S. (2002). Consequences and correlates of adolescent depression. *The Archives of Pediatrics and Adolescents, 156,* 1009-1014.

Goodman, E. (1999) The role of socioeconomic status gradients in explaining differences in US adolescents' health. *American Journal of Public Health, 89,* 1522-1528.

Goodman, E., Slap, G. B., & Huang, B. (2003). The public health impact of socioeconomic status on adolescent depression and obesity. *American Journal of Public Health, 93,* 1844-1850.

Hanson, M. D., & Chen, E. (2007). Socioeconomic status and health behaviors in adolescence: A review of the literature. *Journal of Behavioral Medicine, 30,* 263-285.

House, J.S. (1987). Social support and social structure. *Sociological Forum, 2,* 135-146.

House, J. S., Landis, K. R., & Umberson, D. (1988). Social relationships and health. *Science, 241,* 540-545.

Kaltiala-Heino, R., Rimpelä, M., Rantanen, P., & Laippala, P. (2001). Adolescent depression: The role of discontinuities in the life course and social support. *Journal of Affective Disorders, 64,*155-166.

Knopf, D., Park, M. J., & Mulye, T. P. (2008). The mental health of adolescents: A national profile, 2008. Retrieved July 2009, from the National Adolescent Health Information Center Web site: http://nahic.ucsf.edu/downloads/ MentalHealthBrief.pdf

Kramer, T. L., Robbins, J. M., Phillips, S. D., Miller, T. L., & Burns, B. J. (2003). Detection and outcomes of substance use disorders in adolescents seeking mental health treatment. *Journal of the American Academy of Child & Adolescent Psychiatry, 42,*1318-1326.

Lakey, B. (2008). Social Support. Health Behavior Constructs: Theory, measurement & Research. Retrieved from http://cancercontrol.cancer.gov/brp/constructs/ social_ support/index.html

Lakey, B. & Cohen, S. (2000). Social support and measurement. In S. Cohen, L. G. Underwood, & B. J. Gottlieb (Eds.), *Social support measurement and intervention: A*

guide for health and social scientists (pp. 53-85). New York, NY, Oxford University Press.

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping.* New York: Springer.

Lewinsohn, P. M., Hops, H., Roberts, R. E., Seeley, J. R., & Andrews, J. A. (1993). Adolescent psychopathology: I. Prevelence and incidence of depression and other DSM-III-R disorders in high school students. *Journal of Abnormal Psychology, 102*, 133-144.

Little, R.J.A. (1988). A test of missing completely at random for multivariate data with missing values. *Journal of the American Statistical Association, 83,* 1198-1202.

Lovell, A. M. (1984). *Modified Life Events Interview.* Unpublished manuscript, New York State Psychiatric Institute, New York.

Marshal, M. P., & Chassin, L. (2000). Peer influence on adolescent alcohol use: The moderating role of parental support and discipline. *Applied Developmental Science. Special Issue: Familial and peer influences on adolescent substance use, 4*, 80-88.

McCaskill, J. W., Toro, P. A., & Wolfe, S. M. (1998). Homeless and matched housed adolescents: A comparative study of psychopathology. *Journal of Clinical Child Psychology, 27*, 306-319.

McCoy, M. G., Frick, P. J., Loney, B. R., & Ellis, M. L. (1999). The potential mediating role of parenting practices in the development of conduct problems in a clinic-referred sample. *Journal of Child and Family Studies, 8,* 477-494.

McGue, M., & Iacono, W. G. (2005). The association of early adolescent problem behavior with adult psychopathology. *The American Journal of Psychiatry, 162,* 1118-1124.

Milburn, N. G., Rotheram-Borus, M. J., Batterham, P., Brumback, B., Rosenthal, D., & Mallett, S. (2005). Predictors of close family relationships over one year among homeless young people. *Journal of Adolescence, 28,* 263-275.

Monroe, S. M., Imhoff, D. F., Wise, B. D., & Harris, J. E. (1983). Prediction of psychological symptoms under high-risk psychosocial circumstances: Life events, social support, and symptom specificity. *Journal of Abnormal Psychology, 92,* 338-350.

National Alliance to End Homelessness. (2006). *Fundamental Issues to Prevent and End Youth Homelessness.* Retrieved October 2010, from http://www.endhomelessness.org/files/1058_file_youth_brief_one.pdf

Orth-Gomér, K., Rosengren, A., & Wilhelmsen, L. (1993). Lack of social support and incidence of coronary heart disease in middle-aged Swedish men. *Psychosomatic Medicine, 55,* 37-43.

Pikó, B. (1998). Social support and health in adolescence: A factor analytical study. *British Journal of Health Psychology, 3,* 333-344.

Pittenger, C., & Duman, R. S. (2008). Stress, depression, and neuroplasticity: A convergence of mechanisms. *Neuropsychopharmacology, 33,* 88-109.

Raudenbush, S.W., Bryk, A.S., Cheong, Y.F., & Congdon, R.T. (2009). *HLM 6.02: Hierarchical linear andnonlinear modeling*. Chicago, IL: Scientific Software International.

Robertson, M. J., & Toro, P. A. (1999). Homeless youth: Research, intervention, and policy. Chapter 3 in L. B. Fosburg & D. L. Dennis (Eds.), *Practical lessons: The 1998 National Symposium on Homelessness Research.* Washington DC: U.S. Department of Housing and Urban Development and U.S. Department of Health and Human Services.

Sarason, B. R., Sarason, I. G., & Gurung, R. A. R., (2001). Close personal relationships

and mental health outcomes: A key to the role of social support. In B. R. Sarason & S. Duck (Eds.), *Personal relationships: Implications for clinical and community psychology* (pp. 15-41). New York, NY, John Wiley & Sons Ltd.

Shaffer, D., Fisher, P., Lucas, C. P., & Dulcan, M. K. (2000). NIMH Diagnostic Interview Schedule for Children Version IV (NIMH DISC-IV): Description, differences from previous versions, and reliability of some common diagnoses. *Journal of the American Academy of Child and Adolescent Psychiatry, 39,* 28-38.

Singer, J.D., & Willett, J.B. (2003). *Applied longitudinal data analysis: modeling change and event occurrence.* New York, NY, US: Oxford University Press.

Shinn, M., Knickman, J. R., & Weitzman, B.C. (1991). Social relationships and vulnerability to becoming homeless among poor families. *American Psychologist. Special Issue: Homelessness, 46,* 1180-1187.

Shinn, M., Schteingart, J. S., Williams, N. C., Carlin-Mathis, J., Bialo-Karagis, N., Becker-Klein, R., & Weitzman, B. C. (2008). Long-term associations of homelessness with children's well-being. *American Behavioral Scientist, 51,* 789-809.

Shye, D., Mullooly, J. P., Freeborn, D. K., & Pope, C. R. (1995). Gender differences in the relationship between network social support and mortality: A longitudinal study of an elderly cohort. *Social Science & Medicine, 41,* 935-947.

Slesnick, N., & Prestopnik, J. L. (2004). Perceptions of the family environment and youth behaviors: alcohol-abusing runaway adolescents and their primary caretakers. *The Family Journal: Counseling and Therapy for Couples and Families, 12,* 243-253.

SPSS for Windows, Rel. PAWS Statistics 18. 2009. Chicago: SPSS Inc.

Starfield, B., Riley, A. W., Witt, W. P., & Robertson, J. (2002). Social class gradients in health during adolescence. *Journal of Epidemiological Community Health, 56,* 354-361.

Steptoe, A., O'Donnell, K., Marmot, M., & Wardle, J. (2008). Positive affect and psychosocial processes related to health. *British Journal of Psychology, 99,* 211-227.

Stone, A. A., & Neale, J. M. (1984). Effects of severe daily events on mood. *Journal of Personality and Social Psychology, 46, 137-144.*

Substance Abuse and Mental Health Services Administration. (2008, May). *Prevalence of Substance Use Among Racial & Ethnic Subgroups in the U.S.* (Office of Applied Studies). Rockville, MD. Retrieved from http://www.oas.samhsa.gov/NHSDA/ethnic/ethn1006.htm

Substance Abuse and Mental Health Services Administration. (2009). *Results from the 2008 National Survey on Drug Use and Health: National Findings* (Office of Applied Studies, NSDUH Series H-36, HHS Publication No. SMA 09-4434). Rockville, MD. Retrieved from http://www.oas.samhsa.gov/nsduhLatest.htm

Tompsett, C.J., & Toro, P.A. (2010). Predicting overt and covert antisocial behaviors: parents, peers and homelessness. *Journal of Community Psychology, 38,* 469-485.

Toro, P.A., Dworsky, A., & Fowler, P.J. (2007). Homeless youth in the United States: Recent research findings and intervention approaches. In D. Dennis, G. Locke, & J. Khadduri (Eds.), *Toward understanding homelessness: The 2007 National Symposium on Homelessness Research.* Washington DC: U.S. Department of Housing and Urban Development and U.S. Department of Health and Human Services. Available on the internet at *http://aspe.hhs.gov/hsp/homelessness/symposium07/.*

Toro, P.A., Tulloch, E., & Ouellette, N. (2008). Stress, social support, and outcomes in

two probability samples of homeless adults. *Journal of Community Psychology, 36*, 483-514.

Uchino, B.N., Cacioppo, J.T., & Kiecolt-Glaser, J.K. (1996). The relationship between social support and physiological processes: a review with emphasis on underlying mechanisms and implications for health. *Psychological Bulletin, 119*, 488-531.

United States Department of Health and Human Services. (1985, September). Current estimates from the National Health Interview Survey: United States, 1982. Data from the National Health Survey, Series 10, No. 150, DHHS Publication No. (PHS) 85-178, National Center for Health Statistics, Hyattsville, MD.

Wight, R. G., Botticello, A. L., & Aneshensel, C. S. (2006). Socioeconomic context, social support, and adolescent mental health: A multilevel investigation. *Journal of Youth and Adolescence, 35*, 115-126.

Homeless youth in Minnesota. (2005). *2003 Statewide survey of people without permanent shelter*. Retrieved October, 2010, from http://www.wilder.org/download.0.html?report=410

Windle, M. (1992). Temperament and social support in adolescence: Interrelations with depression symptoms and delinquent behaviors. *Journal of Youth and Adolescence, 21*, 1-21.

Zahn-Waxler, C. (1993). Warriors and worriers: Gender and psychopathology. *Development and Psychopathology. Special Issue: Toward a developmental perspective on conduct disorder, 5*, 79-89.

Zimmerman, M.A., Ramirez-Valles, J., Zapert, K.M., & Maton, K.I. (2000). A longitudinal

study of stress-buffering effects for urban African American male adolescent problem behaviors and mental health. *Journal of Community Psychology, 28,* 17-33.

ABSTRACT

SOCIAL SUPPORT AND HEALTH OUTCOMES IN ADOLESCENTS EXPERIENCING HOMELESSNESS AND POVERTY: A TEST OF THE MAIN EFFECT AND STRESS-BUFFERING HYPOTHESES

by

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The health benefit and stress-buffering effects of social support were examined. Homeless (*N*=250) and housed (*N*=148) adolescents were assessed in adolescence and again in early adulthood, providing longitudinal data to help understand how these social constructs may change and influence health. The study was designed to test Cohen and Wills (1985) main effect and stress-buffering hypotheses. Current findings provide some support for the main effect hypothesis and some more limited support for the stress-buffering effect of perceived social support on mental health. Specifically, a main effect was found at baseline for network social support on number of substance abuse symptoms. Other findings include main effects for perceived social support on physical and mental health outcomes, which are consistent with major findings in the field. Also, an interaction effect was found for perceived social support and physical health symptoms; however, it was an inverted stress-buffering effect.

AUTOBIOGRAPHICAL STATEMENT

DANIJELA ZLATEVSKI

I am a 34 year-old optimist, working to improve the lives of children and families. I appreciate the company and wisdom provided by my family and friends. In quieter times, I enjoy making sounds with my guitar, images with words, and feelings (emotions and textures) with paint. My hope is to make the world a happier, safer, cleaner and more beautiful place to live.