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Behavioral Mediators And Moderators Of Adolescent Victimization And Suicidal Behavior

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BEHAVIORAL MEDIATORS AND MODERATORS OF ADOLESCENT VICTIMIZATION AND SUICIDAL BEHAVIOR

BY

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THESIS

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Abstract

This study examined the relationship between victimization and suicide in adolescents. It was hypothesized that substance use, violent behavior, and risky sexual behavior would all increase adolescent suicide risk and mediate the relationship between adolescent victimization and suicide. It was further hypothesized that parental support, dietary nutrition, and physical activity would decrease suicide risk and moderate the relationship between adolescent victimization and adolescent suicide. To test these hypotheses, self-report surveys were administered to 4,700 public high school students. Regression analyses of data indicated that the amount of victimization significantly predicted the amount of suicidal behavior reported. Similarly, substance use, violent behavior, and risky sexual behavior also individually predicted the amount of suicidal behavior. Substance use was the only risk factor found to significantly mediate the relationship between victimization and suicidal behaviors. Parental support, dietary nutrition, and physical activity were not found to moderate the relationship between victimization and suicide risk. Results further clarify the relationship between victimization and adolescent suicide and offer several significant directions for future research. Moreover, findings from the study also underscore the importance of research and practice related suicide assessment, intervention, and prevention in school settings.

BEHAVIORAL MEDIATORS AND MODERATORS OF ADOLESCENT VICTIMIZATION AND SUICIDAL BEHAVIOR

Suicide remains one of the leading causes of death worldwide for adolescents. Despite recent reductions in suicide rates, a significant need continues to exist for

research regarding the assessment, treatment, and prevention of adolescent suicidal behavior (Burzstein & Apter, 2009). A widely accepted nomenclature exists to explicitly define forms of suicide related communications and behaviors (Silverman, Berman, Sanddal, O'Carrol, & Joiner, 2007). Classified as suicide related communication, a suicide threat consists of any interpersonal action that suggests a future occurrence of suicidal behavior and a suicide plan consists of a proposed method to achieve a potentially self-injurious outcome. Non-suicidal self-injury, suicide attempts, and suicide all represent suicidal behaviors. Non-suicidal self-injury describes a self-inflicted behavior with no evidence of intent to die, suicide attempt describes a self-inflected behavior with intent to die that does not result in death, and completed suicide refers to a suicide attempt that results in death.

Adolescent Suicide

The phenomenology of adolescent suicide has received significant attention in recent years. Interactions between sociocultural, developmental, psychiatric, psychological, and environmental variables have been linked to suicide related behaviors in adolescents (Bridge, Goldstein, & Brent, 2006). Numerous explanatory models have been developed to clarify the relationship between these variables and suicidal behavior in people of all ages. The diathesis-stress-hopelessness model of suicidal behavior provides the basis for many recent models that have examined how various factors account for variance in the amount of suicidal behavior exhibited by adolescents (Schotte & Klum, 1982; 1987). According to the diathesis-stress-hopelessness model, deficits in interpersonal problem solving skills greatly increase the probability that individuals

experiencing chronic stress will develop depression, hopelessness, and suicidal ideation (Schotte, Cools, & Payvar, 1990).

Attempts to extend this adult-based model to adolescents have indicated that the psychopathology of adolescent suicide differs significantly from the psychopathology of adult suicide. In adolescents, hopelessness and depression both associate with suicidal behavior (Rich, Kirkpatrick-Smith, Bonner, & Jans, 1992). Depressive symptoms, in particular, comprise a frequently identified predictor of past and future suicidal behavior for adolescents (Gould et al., 1998; Reinherz et al., 1995). In some longitudinal studies, adolescents who reported depressive symptoms at baseline were significantly more likely to report suicidal communications and behaviors a year later (Mazza & Reynolds, 1998; Reifman & Windle, 1995). After controlling for depressive symptoms, the relationship between adolescent hopelessness and adolescent suicide often diminishes in community and clinical samples (Goldston, Kovacs, Ho, Parrone, & Stiffler, 1994; Lewinsjohn, Gotlib, & Seeley, 1997; Shaffer et al., 1996).

Ecological circumstances and cognitive characteristics that are more prevalent during adolescence have been shown to attenuate the relationship between hopelessness and suicidal behavior and increase the importance of an adolescent's belief in their own self-efficacy and ability to cope with environmental stress (Cole, 1989). For adolescent suicide assessment and intervention, the examination of adolescent-specific stressors carries significant clinical utility (Berman, Jacobs, & Silverman, 2007). In particular, a clinical need exists for research that identifies measurable behaviors that increase or diminish the risk of suicidal behavior amongst adolescents experiencing ecological stress.

Adolescent Victimization

Victimization is an example of an ecological stress that occurs commonly during adolescence and associates with low self-esteem (Juvonen, Nishina & Graham, 2000), anxiety or avoidance (Kumpulainen et al., 1998), and depression (Fekkees, Pijpers, & Verloove-Vanhorick, 2004). Like suicidal behavior, the number of adolescents experiencing victimization has risen dramatically in the last quarter of a century. In the United States, approximately 10% to 20% of adolescents report frequently experiencing belittlement, physical aggression, rumor spreading, or sexual comments/gestures from peers (Nansel, et al., 2001). The definition of victimization varies considerably across studies.

Categorically, victimization is often defined in terms of physical, verbal, relational, indirect, or general behavior (Bjorkvist, 1994; Crick, et al., 1999; Rivers & Smith; 1994). Physical victimization refers to peer actions that attack the physical well-being of a victim. Operational definitions of physical victimization often consist of the victim being physically punched, kicked, or forced into an unwanted position. During verbal victimization, adolescents are demeaned or attacked with words. Behavioral examples of the verbal category generally include the victim having been teased, ridiculed, or threatened directly by another peer. In relational victimization, a peer purposely threatens or damages another peer's relationships or feelings of acceptance. Occurrences of relational aggression often feature behaviors like exclusion, rejecting, or ignoring. Distinct from relational aggression, indirect victimization is aggression enacted by a third party towards the victim so that the victim cannot identify the aggressor. Behavioral examples of indirect victimization may include rumor spreading, posting of information on the internet, and sending hurtful notes or messages covertly. General or

generic victimization describes non-specific measure of victimization and may include any more specific form of victimization.

A 2000 study performed a meta-analysis of cross-sectional studies conducted between 1978 and 1997 that examined the relationship between the five aforementioned forms peer victimization and different forms of psychological maladjustment (Hawker & Moulton, 2000). The categories of psychological maladjustment included in the study were depression, loneliness, general self-esteem, social self-esteem, generalized anxiety, social anxiety, and overall anxiety. Of all forms of psychology maladjustment, results of the meta-analysis showed that peer victimization related most strongly to depression and least strongly to anxiety (Hawker & Moulton, 2000). The results of this meta-analysis indicated that a positive association between depression and adolescent victimization has appeared in many studies with varied populations and different definitions of victimization.

A longitudinal study of 2,586 Scottish adolescents also found a positive relationship between general peer victimization and depression. According to the study, the directionality of the relationships between the two variables changed as adolescents became older. At age 13, a stronger pathway existed from victimization to depression. For 15-year old boys, the pathway had an opposite directionality and depression began a path towards victimization (Sweeting, Young, West, & Der, 2006). The results of this longitudinal study provide evidence indicating that experiences of victimization may cause adolescents to develop symptoms of depression.

Adolescent Victimization and Suicidal Thoughts

As a possible pathway to depression, adolescent victimization has received significant attention in recent investigations of adolescent suicide. Approximately ten studies have examined the relationship between adolescent victimization and suicidal communications and behaviors. The definition and measurement of victimization differs considerably across these ten studies. Several early studies used a definition created by the World Health Organization (WHO) that defined victimization as occurring when a adolescent is teased repeatedly in a disliked way or has unpleasant things said or done to them by other adolescents (King, Wold, Tudor-Smith, & Harel, 1996). In the first study using this definition, 16,410 Finnish adolescents between the ages of 14 and 16 completed measures related to victimization and depression. Adolescents who reported being frequently victimized were more likely to report experiencing suicidal ideation than adolescents who were uninvolved in bullying (Kaltaiala-Heino, Rimpela, Marttunen, Rimpela, & Rantanen, 1999). The finding established a clear relationship between victimization and suicidal ideation. However, the study used minimal measures of victimization and suicidal ideation. Only one item was used to assess how frequently adolescents were victimized or bullied. Similarly, adolescent's scores on the construct of suicidal ideation were derived solely from one item related to suicidal ideation on a depression inventory. As another limitation, findings obtained from the sample of Finnish adolescent may not generalize to the behavior of adolescents in the United States.

A second early study used self-report items and peer-nomination procedures based on the WHO definition of bullying to investigate the relationship between suicidal ideation, involvement in bully-victim problems, and perceived social support. The study obtained data from 1,948 adolescent students in South African secondary schools and

found that being a victim of bullying and having an absence of social support both related significantly to the amount of suicidal ideation reported by adolescents between the ages of 12 and 18 (Rigby & Slee, 1999). These findings provide additional support for the relationship between general victimization and suicidal ideation. Nevertheless, the generality of the victimization measure, expansive age range measured, and the nationality of the sample limits the external validity of the findings. The findings cannot be easily extended to describe U.S. adolescents of a specific age who have been victimized by specific behaviors.

The results of this study were further supported by a study that defined bullying as "one or more students being unfriendly or unpleasant towards an adolescent who cannot defend him/herself very easily" and used a more valid and reliable four item measure of victimization. In the study, 2,088 Norwegian adolescents of approximately 14 years of age rated how frequently they had been a victim of teasing, isolation, and physical aggression. These eighth grade adolescents also rated how frequently they experienced "suicidal thoughts." In this study, adolescents who were identified as victims of bullying exhibited a higher base rate of suicidal thoughts than adolescents who were identified as perpetrators of "bullying" behavior. Victimized females also exhibited higher rates of suicidal ideation than victimized males (Roland, 2002). With a more robust measure of general victimization, this study offers additional evidence for the link between adolescent victimization and adolescent suicide. Nevertheless, the study's Norwegian sample, use of only one item to assess suicidal ideation, and general categorization of victimization limits its applicability to current research about adolescents suicide in the U.S. or more specific forms of victimization.

In a study conducted with 4,811 Dutch children between the ages of 9 and 13, victims of direct and indirect bullying also reported suicidal ideation and depressive symptoms more frequently than children who were not victims of frequent bullying. Victimized children's responses to 20 items about being bullied also associated with their responses to two survey items measuring suicidal ideation (van der Wal, de Wit, & Hirasing, 2003). This study's findings indicate that different forms of victimization may relate similarly to suicidal ideation. Nevertheless, the study possesses several limitations to its utility. The youth and nationality of the sample limits comparisons to similar research conducted in the U.S. with older adolescents. Furthermore, the use of only two items to assess suicidal ideation and the absence of any item measuring suicidal behavior fails to explain how adolescent victimization relates to the clinically significant issues of adolescent self-injury and attempted suicide.

Adolescent Victimization and Suicidal Behavior

In recent years, a number of different studies have expanded examination of how experiences of victimization relates to an adolescent's suicide risk. More specifically, five studies have used measures related to suicidal behavior to determine if victimization increased the probability that an adolescent would perform behaviors motivated by an intent to die. Findings from each of these five studies has contributed to an increased understanding of how experiences of victimization increases an adolescent's risk for engaging in suicidal behavior. Using a peer nomination system to identify victims, a study of 1718 Korean middle school students found that victimization also associated with suicidal behavior. Being identified as a victim by peers on the Korean Peer Nomination Inventory (K-PNI; Kim, Koh, & Noh, 2001) related positively to responses

on two items measuring suicidal ideation and suicide attempts. A stronger association existed between victim status and the frequency of suicidal ideation and suicide attempts disclosed by females (Kim, Koh, & Leventhal, 2005). Hierarchical analyses indicated that responses to items measuring perceptions of safety at school, being threatened or injured at school, having property stolen or damaged at school, and fighting outside of school all significantly predicted the number of suicidal thoughts and behaviors experienced by victimized adolescents. Findings from this study indicated that experiences of adolescent victimization may relate significantly to both suicidal thoughts and suicidal behaviors. Though it makes a significant scholarly contribution, the nationality of the study's sample and its peer nomination survey limits its applicability to research about adolescent suicide and victimization in the United States. Additionally, the single-item measurement of suicidal behavior, "I deliberately try to hurt or kill myself," may limit the validity of the study's findings related to suicidal behavior.

Nevertheless, the relationship between victimization and suicidal behavior remained consistent in a study that administered more robust measures of suicidal ideation and behavior to 209 Irish adolescents between ages of 12 and 15. On the 19-item Scale for Suicide Ideation (SSI; Beck, Kovacs, & Weissman, 1979) and the 19-item Suicide Intent Scale (Beck, Schuler, & Herman, 1974), adolescent reports of victimization associated positively with suicidal ideation and intent. Results of a standardized structured interview for mood disorders also revealed that victimization associated strongly with the number of depressive symptoms and previous suicide attempts reported by bullied adolescents (Mills, Guerin, Lynch, Daly, & Fitzpatrick, 2004). The findings from this study provide methodologically rigorous support for the

relationship between general victimization and suicidal behavior. However, the study's general categorization of adolescents based on their responses to a structured interview question about peer problems does not provide a precise definition of the specific form of victimization experienced by the adolescents in the study. Consequently, the study's findings only provide information about the relationship between general victimization and suicidal behavior and cannot explain how specific and measurable forms of victimization may relate to suicidal behavior.

Several studies of suicidal behavior and adolescent victimization have attempted to operationally define victimization in terms of overt and measurable behaviors. A 2000 study attempted to measure victimization solely in terms of overt physical aggression by examining adolescent's responses to three items on the Youth Risk Behavior Survey (CDC, 2007). These items asked 1,569 New York high school students to objectively rate the frequency with which they avoided school out of fears for their own safety, were threatened with a weapon at school, or experienced theft and vandalism of their personal property at school. The majority of adolescents who reported being frequently victimized also reported thinking about, planning, or attempting suicide in the year preceding the study (Cleary, 2000).

A more recent study also used the 2005 Youth Risk Behavior Survey (CDC, 2007) to measure the frequency of victimization and suicidal behavior reported by 11,113 adolescents. In this study, the definition of victimization was expanded to include violent behaviors occurring in both school and community settings. Victimization consisted of four items measuring how frequently adolescents felt unsafe at their school, incurred threats or injuries, had property stolen or damaged, and got into fights outside of school.

Results of hierarchical analyses indicated that adolescent's responses to each item predicted the likelihood that they had experienced suicidal ideation, made a suicide plan, and engaged in a suicide attempt (Nickerson & Slater, 2009). Findings from the two studies that used the Youth Risk Behavior Survey to study adolescent victimization and suicidal behavior indicated that a significant relationship exists between physical victimization and the suicidal behavior of U.S. adolescents.

Nevertheless, both studies possess significant limitations. Neither study attempted to measure forms of victimization unrelated to physical aggression. This narrow definition of victimization excludes other more prevalent forms of victimization that may also relate significantly to suicidal behavior, such as verbal and relational victimization. For example, responses to items measuring relational victimization uniquely predicted adjustment problems unaccounted for by items measuring overt and aggressive victimization in fourth and fifth graders in a 1998 study (Cricki & Bigby). By not measuring other forms of victimization that may significantly predict suicidal behaviors, the results of both studies using the YRBS may under represent the relationship between adolescent victimization and adolescent suicidal behavior.

Increased understanding of the complexity of victimization has spurred an interest in examining how specific forms of victimization associate with specific negative outcomes. Using six specific question regarding victimization derived from the WHO study on youth health (Nansel et al., 2001), a 2008 study asked 2342 high school students to identify how frequently they were belittled as a result of their religion or race, belittled about looks or speech, victims of rumors or lies, the subject of sexual jokes or gestures, physically hit or punched, and victimized through e-mail or the internet. For both males

and females, every form of victimization predicted responses to items on the Beck Depression Inventory (Beck & Steer 1993), Suicide Ideation Questionnaire (SIQ-JR; Reynolds 1988), and Suicide Attempt Measure. Increases in the number of types of victimization experienced corresponded with greater risk for depression, suicidal ideation, and suicidal behavior (Klomek, Marrocco, Kleiman, Schonfeld, & Gould, 2008).

This recent study stands out as the only investigation of the association between specific forms of peer victimization and adolescent suicidality. Its findings clarify how specific forms of victimization relate to an adolescent's risk of experiencing suicidal thoughts or behaviors. Although it attempted to measure many different forms of victimization, the study only used six items related to the construct. Measuring each form of victimization with only one item may have resulted in invalid measurement of the amount of victimization experienced by some adolescents. Like other studies of adolescent victimization and suicidal behavior, this recent study also failed to account for the function of adolescent-specific risk and protective factors in determining the probability that a victimized adolescent will exhibit suicidal behavior.

Victimization, Suicide, and Associated Risk Behaviors

Across the reviewed studies regarding victimization and suicide, depression related significantly to experiences of adolescent victimization. In other studies with very general definitions of victimization, several other hypothesized risk behaviors have been associated with adolescent victimization. Alcohol and illicit drug use have been frequently found to associate positively with the amount of victimization experienced by an adolescent. In a survey of 500 adolescent residents of a chemical dependency

treatment center, a higher base rate of reported sexual and physical abuse existed than in a sample of non-chemically dependent adolescents (Cavaiola & Schiff, 1988). A cross-sectional study of 1100 eight and tenth grade students found that the amount of alcohol and illicit drug reported by adolescents predicted the amount of physically violent victimization that they disclosed (Windle, 1994). A similar study examined the relationship between substance use and victimization amongst 4,023 adolescents between the ages of 12 and 17 and found that adolescents who reported witnessing violence or being a victim of physical or sexual assault were more likely to exhibit symptoms of substance abuse and dependence disorders than non-victimized adolescents (Kilpatrick, et. al, 2003). In addition to physical victimization, indirect and relational victimization have also been shown to relate to adolescent substance use. A 2007 study of 1,501 adolescents between the ages of 10 and 17 found that adolescents who reported experiencing online victimization were twice as likely to report high substance use as adolescents who did not report online victimization (Mitchell, Ybarra, & Finkelhor, 2007).

Like substance use, the amount of violent or aggressive behavior reported by adolescents has also been associated with adolescent victimization in a number of studies. A study of 6,883 Canadian sixth graders and 6,868 Canadian eighth graders found that a victim-bully cycle existed between bullies and victims. A cyclical relationship existed because adolescents experiencing general victimization were more likely to bully other adolescents than adolescents who did not report engaging in bullying or experiencing victimization. In the study, victimized adolescents exhibited similar affective conditions and physical conditions as adolescents who bullied (Ma, 2001). In addition to general

victimization, a relationship has been identified been violent victimization and violent behavior in several studies. A 2000 study of 1,569 high school students, found that adolescents identified as victimized were over twice as likely to exhibit violent and aggressive behavior as adolescents identified by the authors as non-victimized (Cleary, 2000). In a similar cross-sectional study of 11,113 high school students, adolescents who reported experiencing high amounts of violent victimization were more likely to report violent behavior, such as fighting or carrying a weapon, than adolescents who did not experiencing a large volume of victimization (Nickerson & Slater, 2009). In both of these studies, males were significantly more likely to report violent behavior than females regardless of victimization status.

Like violence, risky sexual behavior stands out as another adolescent behavior that studies have shown to be increasingly prevalent and related to negative long-term outcomes (Turner, Ku, Rogers, Lindberg, Pleck, & Sonenstein, 1998; Santelli, Lindberg, Abma, Mcneely, & Resnick, 2000). However, limited research examination of the relationship between adolescent victimization and adolescent risky sexual behavior has occurred. One longitudinal study conducted with 237 young adolescents and young women found that a higher frequency of sexual behavior during adolescence increased the risk for experiencing forced or coerced sex (Zweig, Sayer, Crokcett, & Vicary, 2002). A 2001 cross sectional study also examined the relationship between risky sexual behavior and dating violence amongst 4163 female high school students. This study used the Youth Risk Behavior Survey (YRBS; CDC, 2007) and found that a positive relationship existed between the volume of dating violence reported by adolescent

females and the amount of risky sexual behavior they reported (Silverman, Raj, Mucci, & Hathaway, 2001).

This 2001 study also found that a positive relationship existed between the amount of dating violence reported by adolescent females and the amount of suicidal behavior disclosed by adolescents (Silverman, et al., 2001). In a study unrelated to adolescent victimization, risky sexual behavior also constituted a health factor that increased the probability that an adolescent would attempt suicide. Specifically, adolescents who reported infrequent condom use or contracting a sexual disease were almost twice as likely to have attempted suicide as adolescents who did not report any of these risky sexual behaviors (Houck, Hadley, Lescano, Pugatsch, & Brown, 2008). Beyond these two studies, little other examination of the relationship between risky sexual behavior and adolescent suicidal behavior has occurred.

Nevertheless, a significant amount of research has examined the relationship between substance abuse and adolescent suicide behaviors. Substance use has been repeatedly shown to be one of the more prevalent risk factors experienced by adolescents who think about or attempt suicide. The findings of a study of 6,091 British adolescents referred to psychiatric services over a 21-year period found that both suicidal behavior and substance misuse doubled between 1970 and 1990. Additionally, the study found that the amount alcohol misuse reported by adolescents associated positively with the amount of suicidal behavior they reported (Fombonne, 1998). An earlier study conducted with 300 chemically dependent adolescents between the ages of 15 and 19 found that suicidal ideation and attempts appeared with much higher prevalence in chemically dependent adolescents than in the general population (Deykin & Buka, 1994). A similar study of

1491 French and Swiss adolescents who attempted suicide showed that 225 of the adolescents who had attempted suicide also met the criteria for a DSM-IV diagnosis of substance abuse or dependency.

Moreover, this study also found that adolescent substance use related to a number of environmental circumstances and personality characteristics that have been shown to be predictive of suicide (Bolognini Plancherel, Laget, & Hafnon, 2003). A more recent study expanded on this finding by administering several self-report measures of psychopathology to 109 adolescents hospitalized for attempting suicide. The study's findings showed that substance use related significantly to suicidal behavior and that many adolescents reported attempting suicide while under the influence of a substance. The study also found that adolescent substance use related more significantly to adolescent conduct problems than adolescent mood problems (Spirito, Mehlendbeck, Barnett, Lewander, & Voss, 2003). To further support the relationship between substance use and other predisposing risk behaviors, a 1999 study performed psychological autopsies of 140 adolescent suicide victims. In comparison with 131 community controls, this study found that substance use disorders frequently co-occured with mood disorders in older adolescent males (Brent, Baugher, Bridge, Chen, & Chiapetta, 1999).

Like substance use, violent and threatening behavior represents another factor that research has shown to increase the probability that an adolescent will engage in suicidal behavior. A 2001 cross-sectional study of 13,110 adolescents found that the frequency with which adolescents reported carrying a weapon and perpetrating violence against other peers accounted for a significant amount of variance in the number of suicide attempts they performed or planned (Borowsky, Ireland, & Resnick 2001). These

findings gain additional support from another study of 913 eighth grade students. This 2001 study found that adolescents who reported initiating fights, threatening to use weapons, and using weapons to assault others were significantly more likely to meet the criteria for the high-risk suicide group than adolescents who did not report these violent behaviors. Previous research also found that the amount of violence or fighting behavior reported by an adolescent increased the risk that they would attempt suicide (Evans, Marte, Betts, & Silliman, 2001). A 2008 study attempted to clarify the relationship between violent behavior and adolescent suicide by examining the relationship between date violence victimization, peer violence perpetration, date violence perpetration, and suicidal behavior. The study found that all forms of violent behavior related to suicidal behavior and that many adolescents reported experiencing or performing multiple categories of violent behavior (Swahn, et al., 2008). The findings of this study indicate a need to clarify the relationship between victimization, violent behavior, and adolescent suicide behavior.

Victimization, Suicide, and Associated Protective Factors

Although a significant amount of research has focused on identifying behaviors that put adolescents at risk for suicidal behavior, the identification of behaviors that reduce the probability that an adolescent will exhibit suicidal thoughts or behaviors has gained increased attention in recent years. Several overt behaviors have been shown to mitigate the risk that adolescents will exhibit suicidal behavior. For example, the amount of supportive parental behavior reported by adolescents associated negatively with adolescent suicide in several studies. In a cross sectional study of 13,100 adolescents, the amount of connection that adolescents reported having with their parents associated

negatively with the amount of suicidal behavior they reported. For white adolescents, more frequent activities with parents and higher perceived parental expectations also reduced the probability that they would report suicidal behavior (Borowsky, et al., 2001).

In another cross-sectional study of 2722 of British adolescents between 14 and 18 years of age, adolescents who reported having less involved and interested parents were also more likely to engage in suicidal behavior (Flouri & Buchanan, 2002). A similar study sampled 1,083 adolescents identified as students at risk of dropping out of high school. These adolescents completed several self-report measures and were divided into groups based on the amount of suicide risk exhibited in their responses. The study found that parental conflict associated positively with an adolescent's suicide risk and the amount of available parental support associated negatively with adolescent suicide risk (Randell, Wang, Herting, & Eggert, 2006).

Like parental support, the nutritional content of an adolescent's diet has also been shown to reduce the probability that they will exhibit suicidal behavior in several studies. In a cross-sectional study of 36,284 adolescents, the adequacy of adolescent's fruit and vegetable intake associated negatively with the number of suicide attempts that they disclosed. Forty percent of adolescents who reported inadequate fruit and vegetable intake also identified their socioeconomic status as low (Neumark-Sztainer, Story, Resnick, & Blum, 1996). Using a regression model to identify predictors of depressive symptoms and suicidal behaviors symptoms, a related study found that the amount of nutritional food adolescents reported receiving from family members predicted the amount of depressive symptoms and suicidal behavior they exhibited. The socioeconomic status reported by adolescents did not associate with or predict the amount

of depressive symptoms and suicidal behaviors reported by adolescents (Alaimo, Olson, & Frongillo, 2002). By controlling for socio-economic status, the study's findings suggest that the difference between the nutritional content of fruits and vegetables and other foods may have accounted for the differing levels of depressive symptoms and suicidal behaviors displayed by participants in the study.

A 2007 study attempted to further determine how dietary nutrition relates to suicide by conducting structured clinical interviews with 6680 young adults and administering individuals' phlebotomies to measure the amount of antioxidants and carotenoids in participant's bodies. The study found that people with a history of attempting suicide possessed significantly lower amounts of antioxidant vitamins and carotenoids than people who denied ever attempting suicide. Fruits and vegetables contain dense amounts of antioxidant vitamins and carotenoids (Li & Zhang, 2007).

This finding showing lower amount of antioxidants and carotenoids in the blood of people with a history of suicidal behavior suggests that an adolescent's dietary intake may affect biochemical factors that increase the probability that they will exhibit suicidal behavior. In a 2000 meta-analysis of 22 studies that examined the relationship between suicidal behavior and serum cholesterol, a significant negative association existed between people's cholesterol serum levels and their risk for performing suicidal behavior in the future. Additionally, the meta-analysis found that cholesterol serum levels of people who had attempted suicide in the past or engaged in other aggressive behavior were significantly lower than the serum levels of control groups consisting of participants who met the criteria for a psychiatric diagnosis (Lester, 2000). Findings from this meta-analysis suggest that behaviors that elevate adolescent's serum cholesterol levels may

mitigate their risk for suicidal behavior. The amount of serum cholesterol in a participant's blood may reflect central nervous system cholesterol levels. Central neviours system cholesterol levels have been to shown to affect the serotonergic system and the functioning of the serotonergic system has been linked to aggressive behavior, impulse control, and depression (Conroy, 1993).

Similar to dietary nutrition, physical activity provides a physiological stimulus that has been shown to reduce the probability that an adolescent will report performing suicidal behaviors. In a study that sampled 4,728 college students, a negative association was found between participation in regular physical activity, sporting activities and the amount of suicidal thoughts or behaviors reported over the last year (Brown & Blanton, 2002). Another study examined the relationship between these two variables amongst 16,000 US public and private high school students. Findings from the study showed that athletic participation during high school associated negatively and accounted for a significant amount of variance with the number of suicidal thoughts experienced by both males and females and the number of suicide attempts made by females (Sabo, Miller, Melnick, Farrell, & Barnes, 2005). A 2000 study of 4,504 adolescents between the ages of 14 and 19 years old also found a negative relationship between the frequency of sporting behavior reported by adolescents and the amount of suicidal behavior they exhibited. This study found that athletic involvement was associated with the approaches adolescents used to cope with stress (Tomori, 2000). In addition to creating biological changes in an adolescent, several other changes facilitated by physical activity may account for its negative relationship with adolescent suicide risk. Involvement in physical exercise could potentially help adolescent's manage stress, develop a positive self-

concept, and build relationships with peers. Additionally, psychological traits, environmental characteristics, personal experiences associated with both physical activity and suicidal behavior may account for the negative relationship between suicidal behavior and physical activity.

Adolescent victimization stands out as an experience that has associated with both suicidal behavior and physical activity. In several studies, physical activity has also been shown to relate to the amount of victimization reported by adolescents. Within a cross-sectional sample of 7,990 adolescents, the amount of participation in sports reported by adolescents associated negatively with the amount of victimization that they reported (Peguero, 2008.) In a sample of 92 overweight children and adolescents, physical activity negatively related to the amount of victimization reported by subjects in the sample. For these children and adolescents, symptoms of depression mediated the relationship between the amount of victimization reported and the amount of exercise reported (Storch et. al., 2007). This finding indicated that that victimization accounted for variance in the amount of physical activity reported by adolescents because victimization increased the likelihood they would exhibit depressive symptoms. A similar 2008 study also tested a mediated model that included victimization, depressive symptoms, and the number of barriers to physical exercise for adolescents. This study of 95 overweight adolescents found that adolescent reports of victimization associated with the number of barriers to exercise that adolescents identified in their life and the number of depressive symptoms they exhibited. Moreover, the number of barriers to exercise identified by adolescents mediated the relationship between victimization and depressive symptoms (Gray, Janicke, Ingerski, & Silverstein, 2008).

This finding indicated that the number of barriers to physical activity reported by an adolescent accounted for the variance in depressive symptoms reported by these adolescents. Moreover, adolescents who reported large amounts of victimization were more likely to have experienced multiple barriers to physical activity than adolescents who reported less amounts of victimization. These findings suggest that experiences of victimization negatively impact an adolescent's ability or motivation to engage in regular physical exercise. Additionally, psychological consequences experienced as a result of victimization may further place some already anxious or depressed adolescents in a cycle of negative feedback that prevents them from engaging in wellness bolstering behaviors.

For example, previous research has also found that negative eating behaviors associate with the amount of victimization experienced by adolescents. In particular, a strong relationship exists between disordered eating behavior and adolescent victimization in several studies. A 2001 study compared the prevalence of disordered eating behavior in adolescent victims of sexual violence or physical abuse compared to adolescents who did not report any history of abuse. In the community sample of 1769 high school adolescents, disordered eating occurred with significantly higher prevalence amongst male and female victimized adolescents than male and female non-victimized adolescents (Lock, Reisel, & Steiner, 2001).

Another study with a community sample of 40,946 adolescent girls and 40,301 adolescent boys produced similar findings. This study's findings showed that more experiences of sexual victimization increased the probability that an adolescent would exhibit disordered eating behavior (Ackard & Sztainer, 2003). A 2008 study attempted to clarify the relationship between victimization and disordered eating by examining

pathways to disordered eating for 739 adolescents. The study found that the frequency of victimization experienced represented a risk factor for male development of disordered eating behaviors (Aime, Craig, Pepler, Jiang, & Connoly, 2008). Collectively, findings from these three studies suggest that experiences of victimization may increase the risk that an adolescent will develop disordered eating behavior. This relationship may exist because victimization negatively impacts adolescent's thoughts about themselves and their bodies. For some victimized adolescents, disordered eating behavior may appear to be a way to reduce the probability of future victimization and increase the amount of positive feedback received from others.

Although numerous studies have found that victimization relates to disordered eating behavior, no study has looked at how victimization affects the food content and nutritional quality of an adolescent's diet. The relationship between disordered eating and victimization suggests that experiences of victimization may also associate with changes in the foods that an adolescent consumes. As previous studies of the relationship between serum cholesterol and suicidal behavior have shown (Lester, 2002), the chemical content of an adolescent's brain and blood can increase their risk for suicidal behavior. Therefore, the consumption of foods that meet victimized adolescent's nutritional needs may attenuate their risk for adolescent's who are experiencing psychological consequences of suicidal behavior.

Like physical activity and dietary nutrition, parental support is another behavior that has been shown to associate negatively with adolescent victimization in several studies. A 2005 study examined how adolescents' attachment to their parents related to their fear of criminal victimization. In a sample of 2,136 adolescents, fear of criminal

victimization associated negatively with the amount of parental attachment perceived by adolescents (Wallace & May, 2005). Another 2005 study further examined the relationship between adolescent victimization and a component of parental support, referred to as parental monitoring, by testing several models that predicted the amount of victimization reported by adolescents. Although the study did not find any protective factors to be predictive of victimization, its findings did show that the amount of parental monitoring that adolescent's reported receiving associated negatively with the amount of victimization that they reported. This finding indicates that the amount of victimization reported by adolescents may predict the amount of time and energy that parents and guardians invest in observing the daily behavior (Christiansen & Evans, 2005).

An Australian study containing 1432 adolescents between the ages of 12 and 16 found a similar relationship between perceived parental care and the amount of victimization reported by adolescents. The study's findings showed that low amounts of perceived parental care associated negatively with victimization. Additionally, the amount of perceived parental care reported by adolescents significantly predicted symptoms of anxiety and depression (Rigby, Slee, & Martin, 2007). The findings of this and other studies suggest that parental support decreases the risk that an adolescent experiences victimization. This relationship may exist because parental support may help adolescents avoid high-risk situations and provides a stable environment that minimizes the frequency and significance of events that an adolescent will perceive as victimizing. Evidence from a number of studies showing parental variables to associate separately with victimization and suicidal behavior supports the importance of examining a measure

of parenting behavior, such as parental support, may moderate the relationship between adolescent victimization and suicidal behavior.

The Present Study

Over the last several decades, reports of adolescent victimization and adolescent suicide have become more prevalent. Theoretical models of adolescent suicide indicate that the etiology of adolescent suicide differs significantly from the etiology of adult suicide. Environmental circumstances unique to adolescence increase the importance of specific risk and protective factors for adolescent suicide assessment and intervention. Victimization represents an example of an ecological circumstance that exists with greater prevalence during adolescence than during adulthood. Operational definitions vary significantly in how they typify victimization. Prior examinations of the relationship between victimization and suicide feature a general definition of victimization that includes a wide variety of demeaning, hurtful, and insulting experiences. Recent research indicates that all specific forms of victimization also associate positively with the volume of suicidal thoughts and behaviors reported by adolescents. Moreover, an adolescent's risk for exhibiting suicidal thoughts and behaviors has been found to increase as they experience more forms of victimization.

Although a link between all forms of victimization and suicidal ideation/behavior has been established, no models had attempted to identify variables that mediate or moderate the relationship between the two variables of interest. Numerous adolescent risk and protective factors have been shown to associate with both victimization and suicide. In particular, six specific health behaviors have been found to co-vary with general adolescent victimization and adolescent suicide. These behaviors include drug

use, risky sexual behavior, violent behavior, parental support, dietary nutrition, and physical activity. No existing study has attempted to clarify the role that these shared risk and protective factors have in determining the likelihood that an adolescent victim will experience suicidal ideation or attempt suicide. This study attempted to make this clarification by testing six models to account for variance in suicidal thoughts and behaviors in a large community sample of high school students.

Several different forms of victimization were measured in the study: sexual victimization, physically aggressive victimization, relational victimization and indirect victimization communicated through electronic modalities. These forms of victimization were all part of a singular subscale measuring of victimization. As part of a regional mental health screening, adolescents rated how frequently they experienced each form of victimization and exhibited any suicidal thoughts or behaviors. Hypotheses tested in the study proposed that numerous overt risk behaviors would mediate the relationship between victimization and suicidal behavior and that multiple protective factors would moderate the relationship between victimization and suicide.

Conceptualization of Victimization

In this study, victimization is conceptualized as a composite of aggressive behaviors performed by members of an adolescent's peer group or community that inflict psychological and/or physical harm on the adolescent. Using items selected from the Youth Risk Behavior Survey (YRBS; CDC, 2007), the prevalence of several different forms of victimization will be measured. Adolescents' responses to items related to physically aggressive victimization, relational victimization, sexual victimization, indirect victimization, and verbal victimization will be summed to create a continuous

victimization score. This measure of victimization will be significantly more comprehensive and reliant on specific behavioral definitions than victimization measures used in previous studies that examined the relationship between adolescent suicide and adolescent victimization. Specific behaviors considered to be reflective of victimization will include being threatened, hit, physically forced to perform a sexual act, having a rumor spread about onseself on the internet, receiving a threatening text message, having an inappropriate photo posted online without permission, experiencing emotional pressure to perform sexual acts, and reporting fear of another adolescent.

Conceptualization of Suicidal Behavior

In this study, the construct of suicidal behavior was conceptualized as a composite of four criterion behaviors that characterize an established definition of suicidal behavior used widely in existing suicide literature (Silverman, et al. 2007). These criterion behaviors include thinking about suicide, planning suicide, intentional bodily harm, and the action of attempting suicide. The four criteria behaviors were assessed with five items from the YRBS. Two of these items assessed whether or not an adolescent had attempted suicide and the severity of their suicide attempt. The additional three items assessed the frequency of ideation, suicide plans, and self-injury experienced by adolescents during the past 12 months. Adolescent's scores on all five items were summed to create a suicidal behavior subscale.

Hypothesized Risk Behaviors

A conceptual model depicting the proposed relationships between adolescent victimization, risk behaviors, and suicidal behavior appears in Figure 1. In this model, risk behaviors were operationally defined as behaviors that significantly increase the

probability that a victimized adolescent will engage in suicidal behavior. Without the presence of mediators, the amount of victimization and the amount of suicidal behavior reported by adolescents was expected associate positively. These behaviors include, drug use, violence, and risky sexual behavior. Each one of these three risk behaviors was hypothesized to associate positively with the amount of suicidal behavior exhibited by adolescents. Individually, drug use, violence, and risky sexual behavior were also hypothesized to associate positively with the magnitude of victimization reported by adolescents. By itself, the volume of victimization reported by adolescents was expected positively predict a significant amount of adolescent of adolescent suicidal behavior

It was further hypothesized that each risk factor would mediate the relationship between victimization and suicidal behavior. As a hypothesized mediator, the frequency and volume of an adolescent's substance use would significantly and positively predict the amount of suicidal behavior they exhibit and offer a unique contribution to the measurement of suicidal behavior above and beyond victimization. Similarly, the amount of violent behaviors reported by adolescents was hypothesized to positively predict the amount of reported suicidal behavior and account for variance in suicidal behavior that victimization does not predict. Also acting as a hypothesized mediator, the volume of risky sexual behavior reported by adolescent would positively predict the amount of suicidal behavior they exhibit and offer a unique contribution the measurement of suicidal behavior. Risk behaviors would be identified as mediators of the relationship between victimization and suicidal behavior if they met two criteria. To be a mediator, any risk behavior must have significantly predicted the amount of suicidal behavior

reported by adolescents and reduced the significance of the relationship between victimization and suicidal behavior when inserted into a regression model.

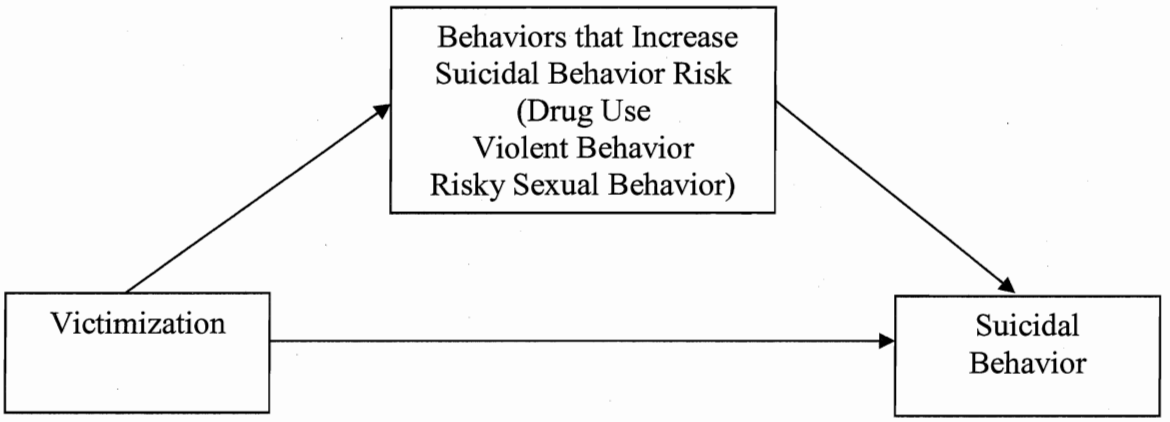

Figure 1. Conceptual model of the hypothesized risk behaviors in this study.

Hypothesized Protective Behaviors

Figure 2 depicts a conceptual model of the proposed relationships between adolescent victimization, protective behaviors, and adolescent suicidal behavior. In operational terms, protective behaviors significantly reduce the strength of the relationship between victimization and suicidal behavior. Without the presence of any protective behaviors, the amount of victimization reported by adolescents would associate positively with amount of suicidal behavior they report. Hypothesized protective behaviors include: perceived parental support, dietary nutrition, and physical activity. Individually, each protective behavior was hypothesized to associate negatively with the amount of victimization reported by adolescents. The amount of parental support, dietary nutrition, and physical activity reported were also expected to predict the amount of suicidal behavior reported by adolescents.

Hypotheses tested by the study proposed that each protective factor would moderate the relationship between victimization and suicidal behavior. Without the presence of moderators, the amount of victimization reported by adolescents would significantly predict the amount of suicidal behavior they report. Individually, perceived parental support, physical activity, and dietary nutrition were hypothesized to significantly predict the amount of suicidal behavior exhibited by adolescents. As moderators, each one of these protective behaviors would also alter the strength of the relationship between victimization and suicidal behavior. Specifically, the hypothesis asserted that adolescents reporting high amounts of parental support, dietary nutrition, and physical activity would be significantly less likely to exhibit suicidal behavior than adolescents who reported low amounts of the same protective behaviors. Therefore, a behavior would be identified as protective if it significantly predicted the amount of suicidal behavior displayed by adolescents and if the amount of suicidal behavior it predicted interacted significantly with the amount of suicidal behavior predicted by victimization.

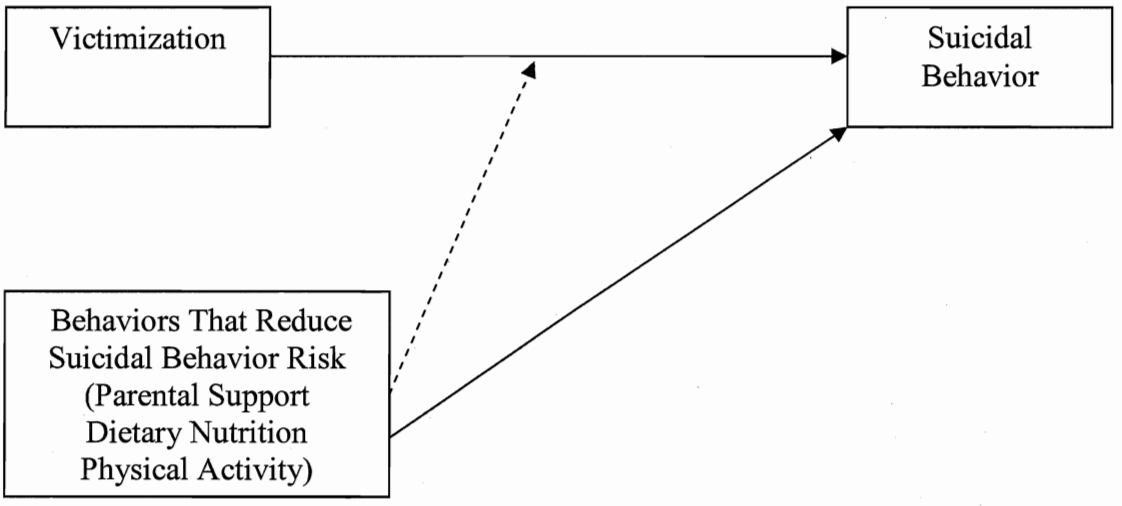

Figure 2. Conceptual model of the hypothesized protective behaviors in this study.

Method

Participants

The sample contained 4,700 adolescents recruited from public schools in a seven county area s part a large regional mental health-screening project. The adolescents were between the ages of 14 and 19 years old ($M = 16.11$, $SD = 1.20$) and were all high school students. Twenty-eight percent of the subjects identified themselves as freshmen ($n = 847$), 26% identified themselves as sophomores ($n = 781$), 23% identified themselves as juniors ($n = 698$), 20%of students identified themselves as high school seniors ($n = 622$), and 1% of students identified did not identify a grade ($n = 35$). In terms of sex, 47% of the participants were female and 47% were male; about 6% of participants had missing data for sex. Eighty-nine percent of adolescents identified their ethnicity as "White" ($n = 4167$), 1.5% of adolescents identified themselves as "Black or African-American" ($n = 69$), 1.5% of adolescents identified themselves as "Hispanic or Latino" ($n = 89$), 2.0% of adolescents identified themselves as "American Indian or Alaska Native" ($n = 93$), 1.0 % of adolescents identified themselves as "Asian" ($n = 48$), 1.0% of adolescents identified themselves as "Native-Hawaiian or other Pacific Islander" ($n = 46$), and 3.6% of adolescents identified themselves as "Multi-racial" ($n = 168$).

Measures

While participating in the study, adolescents completed items from three different self-report measures: the Youth Risk Behavior Survey, the Monitoring the Future Survey, and the Illinois Youth Survey. All three measures appeared with a single packet.

The Youth Risk Behavior Survey (YRBS; CDC, 2007) is a scale created by the Centers for Disease Control and Prevention (CDC) to assess the prevalence of risk

behaviors that contribute to the leading causes of death, disability, and social problems among youth and adults in the United States. The scale contains approximately 98 self-report items designed to measure the frequency and severity of behaviors within six categories: violent and self-injurious behavior, tobacco use, alcohol and other drug use, sexual behavior, unhealthy dietary behaviors, and physical inactivity (CDC 2007). Several studies have examined the psychometric properties of the YRBS. In an early examination of the measure's test-retest reliability, no significant difference existed in prevalence estimates generated by the two administrations and approximately three fourths of the items had a test-rest reliability greater than 61% (Brener, et. al., 1995). In a second examination of test-retest reliability, the mean kappa value for all items on the YRBS was 60.7% and the median kappa value was 60.0% (Brener, et. al., 2002). On items assessing height and weight, adolescents overreported their actual height by 2.7 inches and underreported their actual weight by 3.5 pounds (Brener, et. al., 2003). No formal subscales or scoring procedure exists for the YRBS.

The Monitoring the Future Survey (MTF; Johnston, O'Malley, Bachman, & Schulenberg, 2009) contains approximately 97 items designed to assess high school student's substance usage levels and attitudes about substance use. Specifically, the survey monitors the use of alcohol, marijuana, inhalants, LSD, ecstasy, cocaine, crack, heroine, methamphetamine, tranquilizers, cigarettes, and smokeless tobacco. The survey has been administered since 1976 as part of an ongoing research project funded by the National Institute on Drug Use and the National Institutes of Health. Each year, approximately 50,000 8th, 10th, and 12th grade students complete the survey. MTF substance use items have been used frequently outside of the project as well. Significant

psychometric evidence exists to support the validity and reliability of the items used in the MTF (Johnston & O'Malley, 1985; O'Malley, Bachman, & Johnston, 1983).

The CSAP Substance Abuse Risk and Protective Factors Student Survey (SARPF) contains 192 items designed to assess high and junior highs school students attitudes regarding alcohol, tobacco and other drug use. The self-report measure was normed with middle school and high school populations in six states. The survey demonstrates high concurrent validity for drug use, alcohol use, and delinquency (2010).

In addition to three subscales frequently used to assess adolescent risk behavior, approximately 48 community-authored items were used in this study to obtain information that was deemed clinically useful by clinicians and public school officials, other human service professionals, and the staff managing the research project. These items measured constructs such as dating violence, cyber-aggression, illicit drug use, sexual behavior, parental participation, and basic demographic information. All community-authored items were either adapted from existing measures or written by subject matter experts.

In the present study, subscales were created through the use of internal consistency analyses. Items with similar scales and content were considered to be part of informal subscales. Any item that lowered a subscale's alpha value below .50 was discarded. Through internal consistency analyses, 8 subscales were derived. These subscales measure overall victimization, suicidal behavior, drug use, violence, risky sexual behavior, parental support, diet, and exercise.

Generated Subscales

The *Overall Victimization* subscale consisted of 6 items from the Youth Risk Behavior Survey (YRBS; CDC 2007) and 7 community authored items intended to measure the amount victimization experienced by an adolescent (see Appendix A). The subscale contained items assessing a number of different forms of victimization. To assess verbally threatening and physically violent victimization, 6 items were used. These items contained a five point likert scale and asked adolescents to rate how frequently they experienced victimization or fears of victimization during the past 30 days (e.g. "On how many days did you not go to school because you felt you would be unsafe on your way to or from school?" and "How many times were you in a physical fight in which you were injured and had to be treated by a doctor or nurse?"). High ratings corresponded with more frequent experiences of physically violent victimization.

On the overall victimization subscale, adolescents also rated how frequently they experienced relational and sexual victimization on five items. These items measured adolescent's relationships with romantic partners and the occurrence of coerced sexual activity. (e.g., "Have you ever been emotionally pressured, threatened, or physically forced to perform a sexual act when you did not want to?"). Three items on the overall victimization subscale also asked adolescents to report indirect and relational victimization communicated through the use of technology (e.g. "Has someone spread a rumor about you online, in a chat room, through a social networking website, in emails, or through text messaging?").

The *Suicidal Behavior* subscale contained four items from the Youth Risk Behavior Survey (YRBS; CDC, 2007), which were used to assess the amount of suicidal thoughts and behaviors experienced by adolescents over the past 12 months (see

Appendix B). The items asked adolescents to respond "no" or "yes" to items measuring suicidal ideation (e.g., "During the past 12 months, did you ever seriously consider attempting suicide?"), suicide planning (e.g., "During the past 12 months did you make a plan about how you would attempt suicide?"), self-injury (e.g., "During the past 12 months, did you cut yourself or hurt yourself in some other way, on purpose?"), and suicide attempts (e.g., "During the past 12 months, how many times did you actually attempt suicide?").

The *Substance Use* subscale consisted of 17 items from the Youth Risk Behavior Survey (YRBS; CDC, 2007) and 7 community authored items designed to assess adolescent's history of using alcohol, marijuana, inhalants, LSD, ecstasy, cocaine, crack, heroine, methamphetamine, tranquilizers, cigarettes, and smokeless tobacco. Adolescent's rated their responses on likert scales (see Appendix C). Higher ratings indicated more frequent, reckless, or earlier use of a specific substance (e.g. "During your life how many times have you used methamphetamines?").

The *Violent Behavior* subscale contained five items from the YRBS used to measure the amount of violent or threatening behavior exhibited by adolescents (see Appendix D). The items asked adolescents to rate how frequently they hurt another, threatened another, and carried a weapon during the last 30 days (e.g. "During the past 30 days, on how many days did you carry a gun").

The *Risky Sexual Behavior* subscale consists of 5 items from the YRBS and two community authored items intended to assess adolescent's history of sexual behavior (see Appendix E). These items measured how early adolescent's began having sex, the number of sexual partners they possessed, their history of sexually transmitted disease,

pregnancy, and the amount of protection they used while having sex. Adolescents rated their history of sexual behavior with likert scales. A lower score indicated a lower amount of sexual risk (i.e. "The last time you had sexual intercourse, what one method did you or your partner use to prevent pregnancy?").

The *Parental Support* subscale contains 5 community authored and 4 items from the CSAP Substance Abuse Risk and Protective Student Survey (SARPF) that are intended to measure the amount of parental support available to an adolescent (see Appendix F). These items assess a number of different aspects of parental support, including perceived parental attitudes about drug use (e.g., "How wrong do your parents feel it would be for your to smoke marijuana?"), perceived parental involvement in school activities (e.g., "How often do your parents (step-parents or guardians) work with you when you need help with your homework?"), and perceived parental awareness of the child's social behavior (e.g., "My parents (step-parents or guardians) know who I'm with when I'm out of the house."). Students responded to these items using likert scales. Higher ratings indicated lower amounts of perceived parental support.

The *Dietary Nutrition* subscale contains four items from the YRBS intended to measure the amount of nutritional food consumed by an adolescent during the past seven days. For each item, adolescents use a seven point likert scale to indicate the amount of fruit juice, milk, fruit and vegetables that they have consumed in the past week (see Appendix H). Lower ratings indicate that they have consumed less of these nutritious substances (e.g., "During the past 7 days, how many times did you eat other vegetables such as carrots, peas, broccoli, etc.?"). Adolescents' total scores on the nutrition subscale reflect the frequency with which they drank or ate fruits, vegetables, milk, and juice. A

higher subscale score indicates that an adolescent frequently consumes healthy foods. No items were included to measure adolescent's consumption of unhealthy foods.

The *Physical Activity* subscale consists of eight items from the YRBS used to measure the amount of physical activity engaged in by an adolescent. Specifically, these items measure the amount of time and energy an adolescent devotes to physical education, team sports, manual labor, recreational exercise, and sedentary behavior that does not provide any physical benefit (see Appendix H). Adolescents rate the amount of time and energy they devote to each activity on a likert scale. Higher ratings on items measuring physical activity indicate a higher amount of activity (e.g., "On how many of the past 7 days did you participate in physical activity for at least 30 minutes that did not make you sweat or breathe hard, such as fast walking, slow bicycling, skating, pushing a lawn mower, or mopping floors?"). Higher ratings on items measuring sedentary behavior indicate lower amounts of physical activity (e.g., "On an average school day, how many hours do you sit or lie down watching TV, using a computer, playing video games, using an IPOD or telephone?"). On this subscale, items measuring sedentary behavior were reversed scored so that higher scores reflected a higher volume of reported physical activity and a lower volume of reported sedentary behavior.

Procedure

A coalition of individual and organizations in east-central Illinois called "I Sing the Body Electric" collected the data used in this study from adolescent's who attended high schools in a seven-county rural area (ISBE, 2010). Over a two-year period, members of this project administered surveys to adolescents as part of a larger project that focused on creating safer and healthier environments for area adolescents. The

leaders of the "I Sing the Body Electric" coalition allowed the researchers in this study to use their data because they felt findings from the study would be of value to local adolescents. The ISBE administrators implemented survey procedures that protected students' privacy and allowed for anonymous and voluntary participation. Data was collected from public high schools in a seven-county region in East-Central Illinois area. The largest town in the seven-county area had approximately 20,000 residents. Parents of adolescents at participating schools received letters explaining the purpose and procedure of the data collection. If a parent did not want their child to participate, they signed a form attached to the letter and returned it to the school by the stated deadline. Administrators identified adolescents who would not be participating in advance and provided these adolescents with a different activity during the survey. A passive consent procedure was be used and no documented informed consent was obtained from parents or adolescents. This consent procedure protected the anonymity of subjects at schools with enrollments below 100 students and limited the possibility that their responses to items would be traced back to them.

Data collection took place during the school day at schools attended by the adolescents. Coalition staff members communicated with school administrators to identify locations for data collection. Generally, data was collected from large groups of students who sat at individual desks in classrooms. Before beginning the survey, project staff read aloud and provided written instructions telling adolescents that their participation was completely voluntary and that they could stop at any time for any reason without experiencing any penalty. Students were told to mark their responses on a scantron and avoid marking any identifying information on the response sheet or survey

packet. Throughout the survey, project staff members were available to answer concerns or questions that students might have. Following the administration of the survey, monitors collected all materials and erased or shredded any identifying marks that appeared on student's response sheets.

Data Management

A criterion was used to differentiate participants whose responses would be included in the hypothesis from participants whose responses would not be included in the hypothesis testing. Only participants who completed every single item from the subscales used in the study was included in the study analyses. These participants were placed in a "complete" data group. Adolescents who missed atleast one item from any of the subscales used in the study were placed in a "missing data" group. Individual difference testing was conducted to compares scores on select items amongst the "complete" and "missing data" groups. This method of data management excluded 1657 participants from the hypothesis testing process and created a "complete" group of 3043 adolescents who were included in the study analyses.

Results

Prior to hypotheses testing, values were derived and analyses were performed with the intent of determining whether significant differences existed in the subscale scores obtained from participants of different ages, sexes, and grades in the study. Subscales derived from the Youth Risk Behavior Survey (YRBS) and the Monitoring the Future Survey (MTF) demonstrated varying levels of internal consistency (see Table 1). Although the parental support and physical activity subscales had lower internal consistencies (a = .53 and .57, respectively), they were still within the satisfactory range.

Means and standard deviations were derived for each individual subscale (see Table 1). No previous study has generated subscales from items on the MTF and YRBS. Therefore, no comparisons could be made between means and standard deviations derived from the current subscales and norms derived in previous studies. Skewness and kurtosis values were also calculated for each subscale. The skewness value for each subscale indicated that subscale values were sufficiently equal in their distribution on both sides of the mean and the kurtosis values for each subscale indicated that no extreme deviations existed in the distribution of any of the subscale scores.

Group Differences

Two t-tests for independent means were conducted to determine if male and female participants reported significantly different amounts of suicidal behavior or victimization. All tests were two-tailed. Results indicated that females (M=18.18, SD = 4.07) reported a significantly higher volume of victimization than males (M=17.28, SD = 3.61), $t(2878) = -6.12$, $p < .001$. Females (M=5.54, SD = 1.08) also reported experiencing significantly more suicidal thoughts and behaviors than males (M=5.40, SD = .87), $t(2878) = -4.03$, $p < .001$. Although statistically significant differences existed between means, the similarity in the mean magnitudes of victimization and suicidal behavior reported by females indicates that the differences may occur as a result of a large sample size and be clinically insignificant. Two one-way analyses of variance were also conducted to determine if significant differences in suicide scores existed across age groups and grade levels. Results of the first one-way analysis of variance showed no statistically significant differences for adolescents by age group. The second one-way ANOVA was conducted to compare differences in the amount of suicidal behavior

reported by adolescents of different grade levels. Adolescents in the ninth, tenth, eleventh, twelfth grade, or "ungraded or other grade" level were included in the comparison. Results indicated that some statistically significant differences in suicidal behavior existed across grade levels, F (1,2978) = 2.16, p= .02 (one-tailed). However, the differences in the magnitude of mean scores for adolescents from different grades was not large enough to indicate clinical significance or a need for post-hoc testing.

In addition to comparing differences across age, sex, and grade groups, tests were also conducted to compare scores obtained from participants who completed the survey with scores obtained from participants who did not complete the survey. Adolescents who did not complete an item on any of the eight subscales used in the study were placed into an "incomplete survey" group and their scores on all subscales were excluded from the study in the main analyses. Adolescents who completed every item on every subscale were included in the analyses and placed in a "complete survey" group. Five t-tests for independent means were conducted to compare the average scores on depression and suicide items obtained from participants in the "complete group" with participants from the "incomplete" group. On all five suicide and depression items, participants who did not complete the survey reported significantly higher average scores than participants who completed the survey (see Table 2).

Relationships Between Study Variables

Pearson's correlations were conducted to examine relationships between the eight subscales used in the study (also see Table 1). The suicide subscale was significantly correlated with every subscale except the parental support and dietary nutrition subscales. Similarly, the victimization subscale correlated significantly with every subscale except

the nutrition subscale. The substance use subscale related significantly to every other subscale in the study, the risky sexual behavior subscale correlated with every subscale other than the physical activity subscale, and the violent behavior subscale related significantly with every subscale other than the parental support and dietary nutrition subscales. Of all the protective factors, the parental support subscale was the only subscale that significantly correlated with all other subscales. The physical activity subscale related significantly to every subscale other than the violent behavior subscale, and the dietary nutrition subscale correlated with every subscale other than the victimization and violent behavior subscales.

Victimization as a Predictor of Risk Behavior and Suicidal Behavior

After identifying that many relationships existed between the variables used in the study, formal testing of the study's hypotheses was conducted. Hypotheses tested in the study proposed that numerous overt risk behaviors would mediate the relationship between victimization and suicidal behavior and that multiple protective factors would moderate the relationship between victimization and suicide. To test the role of risk behaviors as mediators of the relationship between suicide and victimization, a series of seven simple regression analyses and three hierarchical multiple regression analyses were performed. Each regression model used an entry criterion of $F < .05$. In the first four regression models, victimization was entered as the independent variable and a different adolescent risk behavior subscale was used as the outcome variable. These models were tested to satisfy the first two criteria of mediation by showing the initial variable to be predictive of the outcome and mediator variables (Baron & Kenny, 1986).

The first simple regression model used scores on the suicide subscale as the outcome variable. This model was tested in an attempt to satisfy the criteria of mediation by showing the initial variable to be predictive of the mediator. Results showed that this model was significant, $F(1,3041) = 481.80 p < .001$, and accounted for 13.7 % of variance in scores from the suicide subscale (see Table 3). These findings supported the hypothesis that victimization would be a significant predictor of suicidal behaviors. This finding suggests that adolescents who reported experiencing more frequent and varied forms of victimization were more likely to experience suicidal thoughts and behaviors than adolescents who experienced less frequent victimization in fewer forms.

After testing suicide as outcome variable and satisfying the first criteria for mediation, three other regression models were tested to satisfy the second criteria of mediation by showing that the initial variable predicted the mediator. In the second regression model using victimization as the independent variable, adolescent substance use was entered as the outcome variable. The overall model was significant, $F(1, 3041) = 518.80$, $p < .001$ and accounted for 14.5% of variance in substance use scores (also see Table 3). Results from this model confirmed the hypothesis that victimization would be a significant predictor of substance use. The large proportion of substance using behavior accounted for by victimization suggests that adolescents experiencing significant victimization may rely on substances to cope with negative feelings related to victimization or ingratiate themselves with peers to avoid victimization (see Table 3).

Also using victimization as the independent variable, a third regression model was run with violent behavior as the outcome variable. The model was significant, $F(1,3041) = 238.60$, $p > .001$, and accounted for 7.3% of the variance in scores on the violent

behavior subscale (also see Table 3). Victimization was expected to be a significant predictor of violent behavior, which was also confirmed by the results. This significant result suggests that adolescents experiencing victimization may also be perpetrators themselves or that they may have begun engaging in violent behavior because they believe it reduces the chances that they will be victimized in the future.

To further examine the predictive significance of victimization, a fourth regression model used victimization as the independent variable and risky sexual behavior as the outcome variable. This overall model was also significant, $F(1,3041) = 329.40$, $p > .001$, and accounted for 9.7% of the variance in scores on the risky sexual behavior subscale (also see Table 3). Victimization was also hypothesized to be a significant predictor of risky sexual behavior, which was once again confirmed by the results. The large proportion of variance in sexual behavior accounted for by victimization suggests that significant conceptual overlap may exist between behaviors considered as victimization and behaviors that are considered to be risky sexual behaviors.

Risk Behaviors as Predictors of Suicidal Behavior

To satisfy the third criteria of mediation and show that the hypothesized mediator variables in the study also affected the amount of suicidal behavior reported by adolescents, the same risk behaviors from previous regression models were entered as independent variables in set of simple regression analyses that used suicidal behavior as the outcome variable in each model. In the first of these models, substance use was used as the independent variable. Results showed that this model was significant, $F(1,3041) = 214.40$, $p > .001$, and accounted for 6.7% of the variance in scores from the suicide

behavior subscale (see Table 4). The results of this model support the hypothesis that the amount of substance use reported by adolescents predicted the amount of suicidal behavior that they endorsed. This finding suggests that substance use may have cognitive, behavioral, physiological consequences that increase the probability that an adolescent will attempt suicide.

In a second regression model, violent behavior was entered as the independent variable. Results showed that this model was significant, $F(1,3041) = 61.809$, $p > .001$ and accounted for 2% of the variance in scores from the suicidal behavior subscale (alsosee Table 4). Although statistically significant, the low magnitude of variance in suicidal behavior accounted for by violent behavior suggests that violent behavior may not play a clinically significant role in predicting adolescent suicide. The clinically insignificant predictive validity of violent behavior in this model fails to support the hypothesis that claimed the amount of violent behavior performed by adolescents would predict the amount of suicidal behavior that they exhibited. In a third simple regression model using suicide as an outcome variable, risky sexual behavior was used as an independent variable. Results showed that this model was significant, $F(1,3041) = 67.7$, $p > .001$, and accounted for 2.3% of the variance in scores from the suicidal behavior subscale (also see Table 4). The magnitude of variance in suicidal behavior accounted for by risky sexual behavior in this model met the criteria for statistical significance, but does not appear clinically significant. The clinically insignificant magnitude of suicidal behavior predicted by risky sexual behavior does not support the hypothesis that risky sexual behavior would predict the amount of suicidal behavior exhibited by adolescents.

Risk Behaviors as Mediators of Victimization and Suicidal Behavior

Although several risk behaviors did not have a clinically significant affect on the outcome variable, three hierarchical multiple regression analyses were performed to determine if any of the risk behaviors mediated the relationship between victimization and suicidal behavior. Each hierarchical regression model entered victimization in the first block, a different risk behavior in the second block, and included suicidal behavior as the outcome variable. The enter method and an entry criterion of $F < .05$ was used. To further determine whether the mediator variables significantly carried the effect of victimization to suicidal behavior, three Sobel's tests were also conducted with path coefficients obtained from the three hierarchical regression models. The Sobel's test is a frequently used and conservative test of mediational effects that provides the most valid measurement for models with large sample sizes (Sobel, 1982).

In the first mediated model, substance use was examined as the mediator. The overall model was significant, $F(1,3041) = 273.23$, $p > .001$, and accounted for 15.2% of the variance in suicide subscale scores (see Table 5). Both victimization and substance use were significant predictors of suicidal behaviors, with substance use explaining an additional 1.6% of the variance. When substance abuse was added to the model, victimization remained a significant predictor, although the Beta weight decreased significantly (see Table 5). Results of a Sobel's test of mediational effect also showed that substance use transmitted a significant amount of the effects of victimization to adolescent suicidal behavior, ($t == 5.62$, $p > .001$). It was predicted that substance use would at least partially mediate the relationship between victimization and suicide. The reduction of the predictive magnitude of victimization in this model and the significant magnitude of substance use supports the hypothesis that substance use mediates the

relationship between victimization and suicidal behavior. This finding suggests that experiences of victimization increase the probability that an adolescent will engage in more frequent substance use. This more frequent substance use increases the probability that an adolescent will experience suicidal thoughts and behaviors.

In the second mediated model, violent behavior was examined as the mediator. The overall model was significant, $F(2,3041) = 244.60$, $p > .001$, and accounted for 13.0% of variance in suicide subscale scores (see Table 6). Both victimization and violent behavior were statistically significant predictors of suicidal behaviors, with violent behavior explaining an additional .2% of the variance. When violent behavior was added to the model, victimization remained a significant predictor and its beta weight did not decrease significantly. A Sobel's test was conducted with the path coefficients obtained from this mediated model. Results of the test showed that violent behavior did carry a statistically significant amount of the effects of victimization to suicidal behavior, ($t = 2.42$, $p = .016$). However, the minimal attenuation of the amount of variance accounted for by victimization in this model suggests that violent behavior does not play a clinically significant role in mediating the relationship between victimization and suicidal behavior. The clinically insignificant magnitude of suicidal behavior predicted by violent behavior in this model does not support the hypothesized role of violent behavior as predictor of suicidal that offers a unique contribution to the measurement of suicidal behavior.

A similar finding emerged from a third hierarchical model that examined risky sexual behavior as the mediator. The overall model was significant, $F(2,3041) = 243.13$, $p > .001$, and accounted for 13.0% of variance in suicide subscale scores (see Table 7). Both victimization and risky sexual behavior were statistically significant predictors of

suicidal behaviors, with risky sexual behavior explaining an additional .1% of variance. When risky sexual behavior was added to the model, victimization remained a significant predictor and its beta weight did not decrease significantly. A Sobel's test was conducted with the path coefficients obtained from this mediated model. Results of the test showed that risky sexual behavior did carry a statistically significant amount of the effects of victimization to suicidal behavior, ($t = 2.42$, $p = .013$). However, the low magnitude of variance accounted for by risky sexual behavior in this model suggests that risky sexual behavior does not play a clinically significant role in mediating the relationship between adolescent victimization and adolescent suicidal behavior. This finding that risky sexual behavior predicts a low magnitude of suicidal behavior unaccounted for by victimization is inconsistent with the original hypothesis that risky sexual behavior would predict suicidal behavior and identify a significant amount of suicide risk that victimization did not measure.

Protective Behaviors as Moderators of Victimization and Suicidal Behavior

In addition to testing for mediation, analyses were also conducted to test the effects of parental support, dietary nutrition, and physical activity on the causal relationship between victimization and suicidal behavior. Three separate regression analyses were conducted to examine the moderating effect of each variable individually. Each model entered mean-centered victimization scores and the mean-centered scores for an individual protective behavior in the first block of the regression. Mean-centering has been recommended to reduce the interaction between linear and interaction terms in moderated models and thereby reduce collinearity (Aiken & West, 1991). To measure the predictive significance of the interaction term in each regression model, the interaction

between the predictor and the moderator obtained in the first block of a regression model was entered as the second block in that regression model. This method of entering the interaction term between two variables on the second block is consistent with accepted methods for testing continuous causal, moderating, and outcome variables (Baron & Kenny, 1986). For each model, the enter method and an entry criterion of $F < .05$ was used.

In the first model, victimization and parental support scores were entered in the first block and the interaction term between these two variables was entered on the second block. The overall model was significant, $F(2,3041) = 163.96$, $p > .001$, and accounted for 13.9% of variance in suicide subscale scores (see Table 8). Both victimization and parental support were statistically significant predictors of suicidal behaviors, with parental behavior explaining an additional .2% of variance Although the interaction term, ($\beta = .02$, $p = .09$), for the two variables was entered into the regression model, it did not account for a statistically significant amount of variance or have a statistically significant magnitude. The low magnitude of suicidal behavior predicted by parental behavior and the insignificant effect of parental behavior on the relationship between victimization and parental behavior suggests that parental behavior does not play a significant role in predicting suicidal behavior or moderating the relationship between victimization and suicidal behavior. The findings of this regression model fail to provide support for hypotheses stating that parental behavior would predict suicidal behavior and moderate the relationship between victimization and adolescent suicide.

In the second model, victimization and physical activity scores were entered in the first block and the interaction term between these two variables was entered on the second block. The overall model was significant, $F(2,3041) = 249.65$, $p > .001$, and accounted for 14.1% of variance in suicide subscale scores (see Table 9). Both victimization and physical activity were statistically significant predictors of suicidal behaviors, with physical activity explaining an additional .4% of variance. The interaction term of these two variables did not account for a sufficient amount of variance to receive entry into the regression model. This exclusion fails to support the hypothesized role of parental behavior as a moderator and indicates that physical activity did not alter the strength of the causal relationship between victimization and suicidal behavior on any meaningful level. Furthermore, the statistically but nonetheless low magnitude of variance in suicidal behavior predicted by physical activity scores indicated that physical activity did not predict suicidal behavior on a clinically significant level. Moreover, the interaction term of these two variables did not account for a statistically significant variance worthy of receiving entry into the regression model. The low amount of suicidal behavior predicted by physical activity and the insignificant affect of physical activity on the relationship between victimization and parental behavior suggests that physical activity does not play a clinically significant role in predicting suicidal behavior or moderating the relationship between victimization and suicidal behavior.

In the third model, victimization and dietary nutrition scores were entered in the first block and the interaction term between these two variables was entered on the second block. The overall model was significant, $F(2,3041) = 162.72$, $p > .001$, and accounted for 13.8% of variance in suicide subscale scores (see Table 10). Both

victimization and dietary nutrition were statistically significant predictors of suicidal behaviors, with dietary nutrition explaining an additional .2% of variance in suicidal behaviors. Although the interaction term, (β =.01, p =.23), for the two variables was entered into the regression model, it did not account for a statistically significant amount of variance. The results of this regression model fail to support the hypothesized role of dietary nutrition as a moderator between suicidal behavior and. Furthermore, the low magnitude of variance in suicidal behavior accounted for by dietary nutrition suggests that dietary nutrition did not predict suicidal behavior in a clinically significant way.

Discussion

This study examined the hypothesized relationship between adolescent victimization and suicidal behavior. As part of the investigation of these frequently related variables, an attempt was also made to identify clinically significant behaviors that explained how experiences of victimization might increase an adolescent's suicide risk. Results from the current study supported findings from previous studies that the amount of victimization experienced by adolescents significantly increased their risk for exhibiting suicidal thoughts and behaviors.

Slightly weaker support emerged for a number of other hypotheses examined within the study. In addition to predicting suicidal behavior, findings showed that as victimization increased, so did the amount of substance use, violent behavior, and risky sexual behavior reported by adolescents. The status of substance use, violent behavior, and risky sexual behavior as predictors of suicide, and the role of victimization as a predictor of substance use, violent behavior, and risky sexual behavior, confirmed several study hypotheses and satisfied the first three criteria for testing mediation (Baron &

Kenny, 1986). The fourth step of testing mediation showed that substance use stood out as a statistically and clinically significant mediator in the relationship between victimization and suicidal behavior. Although statistically significant mediators, violent and risky sexual behavior did not appear to mediate the relationship between victimization and suicidal behavior on a clinically significant level as hypothesized.

Unlike the risk model, study findings showed that minimal support existed for hypothesized roles of parental support, dietary nutrition, and physical activity as moderators in the relationship between victimization and suicidal behavior. The amount of suicidal behavior disclosed by adolescents was predicted by the amount of parental support, dietary nutrition, and physical activity they reported experiencing. Although statistically significant, the low magnitude of variance accounted for by each protective behavior indicated that parental support, dietary nutrition, and physical activity may not have been clinically significant predictors of suicidal behavior in this study. In further tests of moderation, none of the protective factors significantly moderated the relationship between victimization and suicidal behavior.

Victimization and Adolescent Suicide

Victimization's role in this study as a significant predictor of adolescent suicidal behavior supported findings obtained from approximately ten other examinations of the relationship between the two variables (e.g. Cleary, 2000; Kaltaiala-Heino et. al, 1999; Klomek et. al, 2007; Nickerson et. al, 2009; van der Wal et. al, 2003). The significant relationship between adolescent victimization and adolescent suicidal behavior clarifies questions raised during previous investigations of how these two constructs may relate. With its overt behavioral definitions of victimizing behaviors, the current study showed

that more frequent reports of specific experiences of victimization increased the probability that an adolescent would experience suicidal thoughts or behaviors. The validity of victimization as a predictor of suicidal behavior in this study supports findings from previous studies that have shown victimization to associate with and predict suicidal behavior.Moreover, the operational definition of specific victimizing behaviors allowed the study to include novel forms of victimizing behaviors not traditionally studied in victimization research, like cyber-bullying and coercion from intimate partners, in addition to more traditionally studied victimizing behaviors, like threats and physical violence.

The satisfactory internal consistency of the of the victimization subscale showed that adolescents gave similar responses on items measuring different forms of victimization. This production of similar scores on items that measure different forms of victimization suggests that all victimization items in the study measured the same general construct. When summed into a single measure, newly recognized and long-studied victimizing behaviors combined to significantly predict adolescents' suicide risk. The use of a more comprehensive measure to predict victimization in this study than the more narrow measures of victimization used in previous studies suggests that a number of different victimizing behaviors may contribute to an adolescent' suicide risk. The diversity of behaviors included in the study's measure of victimization underscores the importance of researchers and clinicians broadening their understanding of victimization when assessing and intervening with adolescents who report being victimized and exhibit symptoms of victimization.

In addition to suggesting that novel forms of victimization can contribute to an adolescent's suicide risk, the prediction of suicidal behavior by a broad measure of many different forms of victimization adds to existing theory regarding how victimization increases adolescent suicide risk. As interrelated outcomes, victimization and suicidal behavior may be frequently experienced together as a result of underlying psychological traits and environmental circumstances that predispose adolescents to both of these outcomes. In this scenario, adolescents predisposed to victimization could become increasingly predisposed to suicidal behavior after experiencing psychological consequences shown to associate with victimization, such as low self-esteem, depression, and anxiety. These psychological consequences may increase the number of risk increasing behaviors performed by adolescents and decrease the number of risk mitigating behaviors. For example, findings from this study suggest adolescents who experience victimization could be more likely to use substances, act violently towards others, and engage in risky sexual behavior. These same adolescents may also be less likely to engage in behaviors that help them cope with stress and develop a positive self-concept.

Clinical Implications of Risk Models

Findings derived from the risk models also have significant implications for research and practice in the domains of adolescent suicide assessment, prevention, and intervention. Of the three mediators test, substance abuse stood out as the mediator that predicted the most variance in suicidal behavior and decreased the largest amount of variance accounted for by victimization.

Although many studies have identified a relationship between victimization and substance use (e.g., Brent, et. al, 1999; Bologni et. al, 2003; Kilpatrick, et. al, 2003; Spirito, et al, 2003), this model provides empirical evidence that victimization predicts substance use and may contribute to the development of substance use problems. Victimization may play a role in the etiology of adolescent substance use because environmental characteristics may co-vary with victimization and lead to substance use. Psychological and behavioral consequences of victimization may also account for its status as a predictor of substance use. For example, demonstrated correlates of victimization, such as low self-esteem (Juvonen, Nishina & Graham, 2000), anxiety or avoidance (Kumpulainen et al., 1998), and depression (Fekkees, Pijpers, & Verloove-Vanhorick, 2004), may cause adolescents to look for resources to cope with these unwanted feelings. The same environmental circumstances that may have resulted in an adolescent's victimization may also leave him or her with minimal healthy coping resources and the perception that substance use is their only way to cope with negative emotions resulting from victimization.

In addition to clarifying the consequences of victimization, substance use's role as a predictor of suicidal behavior in the study adds to a large existing body of literature that shows substance use to be one of the more prevalent risk factors for adolescent suicide (Bolognini, et al., 2003; Spirito, et al., 2003). This study added to the existing literature by using a thorough and well-validated measure of adolescent substance use that measured the usage of more substances than any previous study. By showing that adolescents sum use of alcohol, marijuana, inhalants, LSD, ecstasy, cocaine, crack, heroine, methamphetamine, tranquilizers, cigarettes, and smokeless tobacco predicted

their suicide risk, findings suggest that a large variety of substances can increase an adolescent's suicide risk. As a previous study has suggested (Gould, et. al., 1998), substance use may have acted as a 'facilitator" of suicidal behavior for adolescents who already experienced depressive symptoms.

This explanation of the relationship between substance use and suicidal behavior gains support from the first risk model's finding that substance use partially mediated the relationship between victimization and suicidal behavior. The existence of partial mediation suggests that experiences of victimization increase the probability that an adolescent will develop substance-using behavior, which in turn increases an adolescent's risk of engaging in suicidal behavior. Although victimized adolescents experience elevated suicide risk without using substances, the use of substances may facilitate the risk of suicidal behavior by exacerbating existing depressive symptoms or lowering impulse control, and potentially reducing the supportiveness of their environment. In the context of contemporary adolescent suicide models (Cole, 1989), victimization introduces an environmental stress into adolescents' lives and substance use decreases an adolescent's ability to cope with this stress, thereby increasing an adolescent's suicide risk.

Results of a second risk model testing the mediating role of violent behavior provided additional information about how victimization may lead to increased suicide risk. The significant magnitude of suicidal behavior predicted by violent behavior suggests that the same psychological traits and environmental circumstances that motivate an adolescent's violent behavior may also increase their suicide risk. This finding clarifies some questions about the directionality of the relationship between

adolescent suicide and violent behavior raised in previous studies (Swahn, et al., 2008). Another finding from the model that showed victimization to predict violent behavior also had clinical significance because it suggested that a cyclical relationship may exist between being victimized and victimizing others.

The test of the mediating effect of violent behavior for victimization and suicidal behavior supported the possible existence of this "victim-bully" cycle. In fact, the clinically insignificant amount of mediation performed by violent behavior in the model also supports previous findings about the nature of victimization. Specifically, the failure of violent behavior to mediate the relationship between victimization and suicidal behavior on a clinically significant level likely occurred because of the significant overlap that exists between "bullies" and "victims." In previous research, an adolescent's gender, affective condition, family characteristics, parental involvement and school climate have been shown to contribute to the "victim-bully" cycle that may have made violent behavior an insignificant mediator in this study (Ma, 2001). This finding that violent behavior does not mediate the relation between victimization and suicidal behavior represents the first attempt to test violent behavior's role as a mediator between the two variables. The non-mediating role of violent behavior in the model underscores the importance of recognizing the reciprocal nature of bullying and victimization and the fallacy of categorizing adolescents as simply "victims" or "bullies". In the study, adolescent who reported being victimized may have been simultaneously acting violently towards other. Both behaviors related significantly to each other and both behaviors increased adolescent's suicide risk.

Findings from the third risk model also have significant implications for research and practice related to adolescent suicide prevention. Previously, few examinations of the importance of risky sexual behavior to adolescent victimization or adolescent suicide had occurred. Results from this third risk model showed that victimization predicted risky sexual behavior, which adds to several previous studies that have found an association to exist between the two variables (Silverman, et al., 2001; Zweig, et al.,2002). This finding offers some evidence that victimization leads to risky sexual behavior. Victimization may cause adolescents to experience negative thoughts and feelings and in order to cope with these feelings, adolescents may attempt to act out sexually to assert their independence or receive approval from others. In a separate analysis, risky sexual behavior was also shown to predict suicidal behavior. This finding provides more methodologically robust and generalizable support for the small amount of previous research showing that risky sexual behavior increased an adolescent's suicide risk (Houck, Bradley, Lescano, Pugatsch, & Brown, 2008). By itself, risky sexual behavior may increase adolescent suicide risk because of consequences of risky sexual behavior that may range from life altering, such as pregnancy or the contraction of a sexually transmitted disease, to more abstract psychological consequences.

Risky sexual behavior was not found to mediate the relationship between the two variables, perhaps because risky sexual behavior and experiences of victimization have similar psychological consequences. In particular, risky sexual behavior and adolescent victimization may both have negative consequences for adolescent's self-esteem and interpersonal functioning. The possibility that risky sexual behavior may have similar

consequences to victimization provides important information about a less-studied but increasingly significant construct.

Clinical Implications of Protective Models

Although the protective models tested in the study did not produce as many significant findings as the risk models, these results still have several important consequences for the study of adolescent victimization and suicide. The first protective model's finding that parental support neither predicted a clinically significant amount of suicidal behavior nor affected the causal relationship between victimization and adolescent suicide represents an important finding. In the few investigations of the relationship between variables similar to parental support and suicide, variables such as the connection with parents (Borowsky, et al., 2001), parental involvement (Flouri & Buchanan, 2002), parental conflict, and parental support (Randell, et. al., 2006) have shown to associate with adolescent suicide risk. The insignificance of parental support in this study underscores a need for precise operational definitions and repeatable measurement of constructs related to various forms of parental behavior.

Previous studies examining how parental variables relate to victimization or suicide have used a variety of constructs, such as "parental expectations" (Borowsky, et. al., 2001), "parental involvement" (Flouri & Buchanan, 2002), parental support (Randell, et. al., 2006), parental care (Rigby, et. al, 2007), parental attachment (Wallace & May, 2005), and parental monitoring (Christiansen & Evans, 2005). The inconsistency in measuring parental variables and the insignificance of the regression model testing the predictive significance of parental behavior suggests that measurement error likely influenced the findings of this regression model.

Similarly insignificant results were derived from a protective model testing how physical activity predicts suicidal behavior and moderates the relationship between victimization and suicidal behavior. The failure of physical activity to predict a clinically significant amount of suicidal behavior or moderate the relationship between the two suggests that physical activity by itself may not represent a behavior that is protective of suicidal behaviors. Instead variables that could co-vary with the physiological stimulus of physical activity, such as social interaction, self-efficacy, and achievement, may mitigate adolescent suicide risk. This possible explanation draws credence from previous studies that examined suicide and physical activity and included involvement in organized athletics as part of the definition of physical activity (Brown & Blanton, 2002; Sabo, et al., 2005; Tomori, 2000).

Insignificant findings obtained from the third protective model also provide information about how dietary nutrition relates to victimization and adolescent suicide. The clinically insignificant amount of suicidal behavior predicted by dietary nutrition suggests that the quality and behavioral impact of an adolescent's dietary nutrition may be more conceptually complex than originally anticipated. For example, variables such as volume of food, timing of food consumption, and specific foods consumed may affect the biochemical variables, such as cholesterol serum levels, that have been shown to be related to suicidal behavior in some studies (Lester, 2000). Similarly, an adolescent's diet may interact with physiological and environment variables to influence their suicide risk. The current study only assessed how frequently adolescents consumed fruit, vegetables, milk, and fruit juice, which may explain why no relationship was found.

Limitations

A number of limitations existed in this study as a result of the sample obtained, measures used, and cross-sectional study design. In particular, the sample used in the study had characteristics that could undermine the validity of statistical tests used in the study. In particular, the large size of the sample likely inflated the statistical significance of several regression model findings. Although statistically significant, several findings from the study may possess lesser clinical significance than similar findings obtained from a smaller sample (Odgaard & Fowler, 2010). As a result of a cross-sectional design, the clinical significance of the findings is also slightly diminished because causality cannot be fully established. Without a longitudinal design, the associations between victimization and suicidal behavior cannot be clarified directionally.

In addition to sample and design limitations, the measures used in the study introduced some limitations to the interpretation of study findings. The use of self-report measures to assess victimization excluded other frequently used methods of collecting victimization data, such as reports from parents, teachers, and peers. These reports would have enhanced the validity of the victimization measure. In addition to the victimization subscale, the psychometric properties of several study subscales limited the robustness of the findings. The subscales were constructed from items on several different measures of youth risk behavior. Although internally consistent and face valid, little empirical support exists for the reliability and validity of several subscales used in the study. In particular, the parental support, dietary nutrition, and physical activity subscales consisted of items that may not reliably discriminate adolescents who engage in large amounts of protective behaviors from adolescents who engage in minimal amounts of protective behaviors.

Indicative of another limitation, the results of individual difference testing conducted during this study showed that adolescents who did not complete survey items were more likely to report being victimized, having depressive symptoms, and attempting suicide than adolescents who did complete survey items. This finding indicates that many of the most suicidal and depressed adolescents involved in the study were not included in the theoretical models tested in the study. Moreover, the method of excluding participants who did not complete survey items resulted in a loss of approximately 25% of the participants. A latent trait such, as lack of motivation or depressed cognitions, may account for the difference in suicidal behavior and depressive behavior prevalence rates amongst adolescents who completed the survey and adolescents who did not complete the survey. The skewed measurement of these behaviors limits the generalizability of the study's findings and introduces a need for future research.

Future Directions

Despite these limitations to the study's generalizability, its findings provided important information about the behavioral consequences of adolescent victimization and identified multiple risk and protective behaviors that associate with victimization and influence an adolescent's risk for suicidal behaviors. Moreover, its clinically significant findings provide several possible directions for future research related to adolescent victimization and suicide. As constructs often measured by state funded research projects in public school settings, the study of victimization and adolescent suicide would benefit immeasurably from the development of reliable, valid, and relatively brief measures of suicidal behavior, victimization, and other adolescent risk behaviors that could be easily administered and interpreted by people without advanced training in psychology.

To improve the assessment of risk behavior in public school settings, research could be also conducted to further explore findings from the study showing that adolescents reporting depressive symptoms and suicidal behavior are less likely to complete self-report surveys. This finding appears to be the first examination of the relationship between testing behaviors, adolescent victimization, and suicidal behavior. The possibility that victimization, depression, and suicidality may affect an adolescent's likelihood of responding to survey items has important consequences for the study of these constructs and intervention with adolescents. Many variables that co-vary with both depressive symptoms and test-taking behaviors may contribute to the higher rates of depressive symptoms and suicidal behavior amongst the adolescents who did not complete the survey in this study. Examples of such variables include a lack of motivation, difficulty concentrating, fear of disclosure, irritability, performance anxiety, and a lack of sleep. If adolescents with depressive symptoms are significantly less probable to complete tests and self-report measures, a need for behavioral intervention may be more difficult to identify and their academic performance may suffer. In this scenario, the absence of valid assessment and effective intervention would lead to in depressive symptoms for many adolescents. This finding showing adolescents with depression to be less likely to complete self-report measures underscores a need to create and use measures that ask for reports from teachers and peers. Additionally, this finding regarding survey completion rate underscores the importance of future research related to depressive symptomatology and academic performance.

Beyond measurement issues, findings from this study provide several specific clinical issues that could be examined further. The diverse behaviors included in the

victimization subscale and large amount of suicidal behavior predicted by this composite of diverse behaviors indicates that future work could be done to examine the functioning and psychological consequences the more novel forms of victimization included in the victimization measure. For example, work could be done to determine if acts of cyber-bullying fall into traditional categories of victimization (i.e., indirect, relational, physical), or if aggression communicated through electronic medium functions completely differently and merits its own category of victimization. To expand on victimization findings from this study, research could be also done to compare psychological and behavioral consequences of different forms of victimization. In particular, comparisons could be made between more traditional forms of victimization and more novel forms of victimization that involve technology.

Research could also be conducted related to the results of the mediational models tested in this study. Specifically, findings from the substance abuse area raise questions about how substance use increases the risk of suicidal behavior for adolescents experiencing victimization. With a longitudinal design, research studies could discern how victimization, substance use, and suicidal behavior lead to victimization. In the study of risk behaviors, work could be also be done to determine the psychological factors that cause risky sexual behavior to overlap with victimization in the prediction of suicidal behavior. In future study of adolescent protective behaviors, research could be conducted to measure different variables related to parental behavior and compare how these parental variables related to constructs such as victimization and suicidal behavior.

Findings from the study also offer direction for research examining the importance of cultural variables to victimization and suicide. The adolescent's measured

in the sample came exclusively from schools in rural Illinois. Many of the schools included in the study contained less than 100 students and the largest town in the seven county area used in the study had 20,000 residents. Future research could examine how experiences of victimization and suicidal behavior may differ amongst adolescents with different socioeconomic, ethnic, and cultural backgrounds.

On a more broad level, future research related to adolescent victimization and adolescent suicide could also focus on cognitive factors that may increase or mitigate the suicide risk for adolescent's experiencing significant amounts of victimization. As the first examination of factors that mediate and moderate the relationship between adolescent victimization and adolescent suicide, this study focused on behavioral variables that could be easily measured and altered by clinicians in the field. Findings from the study showed that victimization significantly increased an adolescent's suicide risk. Substance use, violent behavior, and risky sexual behavior also played a significant role in predicting adolescent's suicide risk. As a partial mediator, substance use predicted suicide risk in a way that could not be identified simply by measuring how much victimization an adolescent experienced. These findings have significant implications for clinicians and other professionals who work with adolescents. In particular, these findings underscore a need for programs that deter victimization and substance use in school settings and provide opportunities. By encouraging positive ways of coping with negative thoughts and feelings related to victimization, clinicians and other professionals can decrease the probability that an adolescent will engage in suicidal behavior.

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Tables

Table 1
Subscale Means, Cronbach's Alpha Values, and Zero-Order Correlations Between Adolescent Victimization, Risk Behaviors, Protective Behaviors, and Suicidal Behavior

	Scale	α	*M*	*SD*	1	2	3	4	5	6	7	8
1	VIC	.64	17.77	3.89	-							
2	SUB	.87	72.74	11.10	.38**	-						
3	VIO	.62	6.14	2.55	.27**	.27**	-					
4	RSB	.83	14.09	7.14	.31**	.51**	.21**	-				
5	PSU	.53	19.96	3.80	.06**	-.19**	.07**	.15**	-			
6	PHY	.57	27.07	6.43	-.09**	-.12**	-.01	-.04*	.15**	-		
7	NUT	.66	11.60	4.32	.01	-.07**	-.001	-.05**	13**	.30**	-	
8	SUI	.63	5.49	1.0	.37**	.26**	.14**	.15**	-.02	-.10	-.04*	-

Note. VIC = Victimization Subscale; VIO=Violent Behavior Subscale; RSB = Risky Sexual Behavior Subscale; PSU = Parental Support Subscale; PHY = Physical Activity Subscale; NUT = Dietary Nutrition Subscale; SUI =Suicidal Behavior Subscale; SUB = Substance Use Subscale.
* $p<.01$, ** $p<.001$.

Table 2

Independent Samples T-Tests: Comparisons of mean suicide item scores between participants with complete and incomplete data

Item	Group	Mean	*df*	*t*	*p*
During the past 12 months, did you ever feel so sad or hopeless everyday for two weeks or more in a row that you stopped doing some usual activities?	Complete	1.72			
	Missing Data	2.52			
			4286	-49.00	>.001
During the past 12 months, did you every seriously consider attempting suicide?	Complete	1.15			
	Missing Data	2.17			
			4329	-73.06	>.001
During the past months, did you make a plan about how you would attempt suicide?	Complete	1.13			
	Missing Data	2.14			
			4309	-77.043	>.001
During the past 12 months, how many times did you actually attempt suicide?	Complete	1.14			
	Missing Data	2.27			
			4339	-56.03	>.001
If you attempted suicide during the past 12 months, did any attempt result in an injuring, poising, or overdoes that had to be treated by doctors?	Complete	2.07			
	Missing Data	3.02			
			4336	-61.685	>.001
During the past 12 months, did you cut yourself or hurt yourself in some other way, on purpose?	Complete	1.81			
	Missing Data	2.63			
			4294	-55.71	>.001

Table 3
Regression results for victimization as predictor of substance use, violent behavior, and risky sexual behavior

Model	Total R^2	β	*t*	*p*-value
1 Victimization & Substance Use	.146	.382	22.77	<.001
2 Victimization & Violent Behavior	.073	.270	15.45	<.001
3 Victimization & Risky Sexual Behavior	.096	.313	18.15	<.001
4 Victimization & Suicidal Behaviors	.137	.370	21.95	<.001

Note. Victimization = Victimization subscale; Substance Use = Substance use subscale; Violent Behavior = Violent behavior subscale; Risky Sexual Behavior = Risky sexual behavior subscale; Suicidal Behaviors = Suicide subscale.

Table 4
Regression results for substance use, violent behavior, and risky sexual behavior as predictors of suicidal behavior

Model	Total R^2	β	*t*	*p*-value
1 Substance Use & Suicidal Behavior	.146	.382	22.77	.001
2 Violent Behavior & Suicidal Behavior	.073	.270	15.45	.001
3 Risky Sexual Behavior & Suicidal Behavior	.096	.313	18.15	.001

Note. Victimization = Victimization subscale; Substance Use = Substance use subscale; Violent Behavior = Violent behavior subscale; Risky Sexual Behavior = Risky sexual behavior subscale; Suicidal Behaviors = Suicide subscale.

Table 5
Regression results testing substance abuse as a mediator between victimization and suicide

Step	Δ R^2	Total R^2	β	*t*	*p*-value
1 Victimization	.137	.137	.318	17.61	>.001
2 Substance Use	.016	.152	.135	7.48	>.001

Note. Victimization = Victimization subscale; Substance Use = Substance use subscale.

Table 6
Regression results testing violent behavior as a mediator between victimization and suicide

Step	Δ R^2	Total R^2	β	*t*	*p*-value
1 Victimization	.137	.137	.358	20.47	>.001
2 Violent Behavior	.002	.139	.045	2.55	>.001

Note. Victimization = Victimization subscale; Violent Behavior = Violent behavior subscale.

Table 7
Regression results testing risky sexual behavior as a mediator between victimization and suicide

Step	Δ R^2	Total R^2	β	*t*	*p*-value
1 Victimization	.137	.137	.359	20.24	>.001
2 Risky Sexual Behavior	.001	.138	.035	2.00	>.001

Note. Victimization = Victimization subscale; Risky Sexual Behavior = Risky Sexual Behavior subscale

Table 8
Regression results testing parental support as a moderator between victimization and suicide

Step	Δ R^2	Total R^2	β	*t*	*p*-value
1 Victimization	.136	.136	.372	22.09	>.001
Parental Support	.002	.002	-.049	-2.86	.004
2 Victimization X Parental Support	>.001	>.001	.023	1.34	.182

Note. Victimization = Mean-centered Victimization subscale Parental Support = Mean-centered Parental Support subscale

Table 9
Regression results testing physical activity as a moderator between victimization and suicide

Step	Δ R^2	Total R^2	β	*t*	*p*-value
1 Victimization	.132	.132	.364	21.56	>.001
Physical Activity	-.004	.132	-.066	-3.90	>.001
2 Victimization X Physical Activity	N/A	N/A	>.001	N/A	1.0

Note. Victimization = Mean-centered Victimization subscale Physical Activity = Mean-centered Physical Activity subscale

Table 10
Regression results testing dietary nutrition as a moderator between victimization and suicide

Step	Δ R^2		Total R^2	β	*t*	*p*-value
1 Victimization	.136	.136	.369	21.82	>.001	
Dietary Nutrition	-.002	.136	-.039	-2.33	.020	
2 Victimization X Dietary Nutrition	N/A		N/A	.012	-2.68	.472

Note. Victimization = Mean-centered Victimization subscale Dietary Nutrition = Mean-centered Dietary Nutrition subscale

Appendix A

Victimization Scale Items

1. During the past 30 days, on how many days did you not go to school because you felt you would be unsafe at school or on your way to or from school?
2. During the past 12 months, how many times has someone threatened you or injured you with a weapon such as a gun, knife, or club on school property?
3. During the past 12 months, how many times were you in a physical fight?
4. During the past 12 months, how many times were you in a physical fight in which you were injured and had to be treated by a doctor or nurse?
5. How safe do you feel in your neighborhood?
6. Have you ever been physically forced to have sexual intercourse when you did not want to?
7. During the past 12 months, how many times were you in a physical fight in which you were injured and had to be treated by a doctor or nurse?
8. Have you ever felt afraid of your boyfriend or girlfriend?
9. During the past 12 months, did your boyfriend or girlfriend ever hit, slap, or physically hurt you on purpose?
10. Who forced or pressured you into performing a sexual act when you did not want to?
11. Has someone spread a rumor about you online, in a chat room, through a social networking website, in emails, or through text messaging?
12. Has anyone sent you a threatening or aggressive e-mail instant message or text message?

13. Has there ever been an inappropriate photo of you online? (illegal activity or sexually compromising)

Appendix B

Suicidal Behavior Subscale Items

1. During the past 12 months, did you ever seriously consider attempting suicide?
2. During the past 12 months, did you make a plan about how you would attempt suicide?
3. During the past 12 months, how many times did you actually attempt suicide?
4. If you attempted suicide during the past 12 months, did any attempt result in an injury, poisoning, or overdose that had to be treated by a doctor or nurse?
5. During the past 12 months, did you cut yourself, or hurt yourself in some other way, on purpose?

Appendix C

Substance Use Subscale Items

1. How old were you when you smoked a whole cigarette for the first time?
2. During the past 30 days, on how many days did you smoke cigarettes?
3. During the past 30 days, on the days you smoked, how many cigarettes did you smoke per day?
4. During the past 30 days, on many days did you use chewing tobacco, snuff or dip.
5. During the past 30 days, on how many days did you smoke cigars, cigarillos, or little cigars?
6. During your life, on how many days have you had at least one drink of alcohol?
7. During the past 30 days, on how many days did you have at least one drink of alcohol?
8. During the past 30 days, on how many days did you have 5 or more drinks of alcohol in a row, that is, within a couple of hours?
9. During your life, how many times have you used marijuana?
10. During the past 30 days, how many times did you use marijuana?
11. During the past 30 days, how many times did you use marijuana?
12. During your life, how many times have you used methamphetamines?
13. During the past 30 days, how many times did you take prescription pain kills or prescription drugs that were not prescribed to you?
14. During your life, how many times have you used heroin (also called smack, junk, or China White)?

15. During your life, hoe many time you taken performance enhancing drugs without a doctor's prescription?
16. During your life, how many times have you used ecstasy (also called MDMA).
17. During your life, how many times have you used a needle to inject any illegal drug into your body?
18. The last time you used meth, what one method did you use to take it?
19. During the past 30 days, on how many days did you use cocaine?
20. How old were you when you sniffed glue, breathed contents of aerosol cans, or inhaled any pains or sprays to get high?
21. During the past 30 days, how many times have you sniffed glue, breathed the contents of aerosol spray cans, or inhaled paints or sprays to get high?
22. During the past 30 days, how many times did you drink cough syrup or swallow cold pills when did not have a cold – just to try to get high?
23. During the past 30 days, how many times did you take prescription pain kills or prescription drugs that were not prescribed to you?
24. During your life, how many times have you used any other type of illegal drug such as inhalants, LSD (acid), PCP, mushrooms, Ketamine (Special K), Rohypnol (Roofies), or GHB?

Appendix D

Violent Behavior Subscale Items

1. During the past 30 days, how many times did you ride in a car when you had been drinking alcohol?
2. During the past 30 days, how many times did you drive a car or other vehicle when you had been using marijuana?
3. During the past 30 days, on how many days did you carry a weapon, such as a gun, knife, or club?
4. During the past 30 days, on how many days did you carry a gun?
5. During the past 30 days, on how many days did you carry a weapon, such as a gun, knife, or club on school property?

Appendix E

Risky Sexual Behavior Subscale Items

1. How old were you when you had sexual intercourse for the first time?
2. During your life, with how many people have you had sexual intercourse?
3. During the past 3 months, with how many people did you have sexual intercourse?
4. Did you drink alcohol or use drugs before you had sexual intercourse the last time?
5. The last time you had sexual intercourse, what one method did you or your partner use to prevent pregnancy?
6. How many times have you been pregnant or gotten someone pregnant?
7. Have you ever been tested for HIV infection or other sexually transmitted diseases (STDs) such as genital herpes, chlamydia, syphilis, or genital warts?

Appendix F

Parental Support Subscale Items

1. How wrong do your parents (step-parents or guardians) feel it would be for to drink beer, wine, or hard liquor regularly (at least once or twice a month)?
2. How wrong do your parents feel it would be for you to smoke marijuana?
3. How wrong do your parents feel it would be for you to smoke marijuana?
4. How wrong do your parents feel it would be for you to smoke marijuana?
5. How wrong do your parents feel it would be for you to engages in sexual intercourse?
6. How often do your parents (step-parents or guardians) work with you when you need help with your homework?
7. Do your parents (or step-parents or guardians) limit the amount of time you spend watching TV?
8. How often do your parents (or step-parents or guardians) allow you to go out with friends on school nights?
9. How often do you spend time with your parents (or step-parents or guardians) taking and/ or doing activities together in an average week?
10. My parents (step-parents or guardians) know who I'm with when I'm out of the house.

Appendix G

Dietary Nutrition Scale Items

1. During the past 7 days, how many times did you eat fruit or drink 100% fruit juices? (Do not count punch, Kool-Aid, sports drinks, or other fruit-flavored drinks.)
2. During the past 7 days, how many times did you eat other vegetables such as carrots, peas, broccoli, etc.? (Do not count green salad or potatoes.)
3. During the past 7 days, how many times did you eat fruit?
4. During the past 7 days, how many glasses of milk did you drink? (Include the milk you drank in a glass or cup, from a carton, or with cereal. Count the half pint of milk served at school as equal to one glass.)

Appendix H

Physical Activity Scale Items

1. On how many of the past 7 days did you exercise or participate in physical activity for at least 20 minutes that made you sweat and breathe hard, such as basketball, soccer, running, swimming laps, fast bicycling, fast dancing, or similar aerobic activities?
2. On how many of the past 7 days did you participate in physical activity for at least 30 minutes that did not make you sweat or breathe hard, such as fast walking, slow bicycling, skating, pushing a lawn mower, or mopping floors?
3. On an average school day, how many hours do you sit or lie down watching TV, using a computer, playing video games, using an IPOD or telephone?
4. In an average week when you are in school, on how many days do you go to physical education (PE) classes?
5. During an average PE (physical education) class, how many minutes do you spend actually exercising or playing sports?
6. During the past 12 months, on how many sports teams did you play? (Include any teams run by your school or community groups.)