SUICIDAL IDEATION AND BEHAVIORS AMONG NINTH GRADERS:
AN EXAMINATION OF MIDDLE SCHOOL AND CONCURRENT PREDICTORS

by

JACLYN MICHELLE WETHERINGTON

(Under the Direction of Pamela Orpinas and A. Michele Lease)

Abstract

Given the prevalence of suicidal ideation and behaviors among adolescents, the current study was designed to examine whether different risk factors were associated with suicidal ideation and behaviors, experiencing multiple risk factors increased risk for suicidality, and early risk factors could be identified prior to ninth grade that increase suicidality in ninth grade. Using data gathered annually from *Healthy Teens Longitudinal Study*, this study investigated the influence of several individual, family, and school-level variables on suicidal ideation and behaviors in ninth grade. Although some gender differences were found, univariate analyses revealed that problem behaviors, parent involvement, school relationships, and life satisfaction scores were strong predictors of suicidality. Based upon results of the univariate analyses, a four-construct risk factor index (RFI) was created to examine the impact of experiencing multiple risk factors on self-reported suicidality. When RFI score, sadness, and gender were entered into multiple logistic regression models, gender was no longer a significant predictor of either suicidal ideation or behaviors. Latent growth mixture modeling was used to study whether student trajectory varied significantly from sixth to ninth grade as a function of self-reported risk factors. Significant findings and practical implications are discussed within Bronfenbrenner's (1977) Ecological Model of human development.

INDEX WORDS: adolescent suicide, suicidal ideation, cumulative risk, ecological model, latent growth mixture modeling

SUICIDAL IDEATION AND BEHAVIORS AMONG NINTH GRADERS: AN EXAMINATION OF MIDDLE SCHOOL AND CONCURRENT PREDICTORS

by

JACLYN MICHELLE WETHERINGTON

B.S., The University of Florida 2001

M.S., The University of Florida 2004

A Dissertation Submitted to the Graduate Faculty of The University of Georgia in Partial Fulfillment of the Requirements for the Degree

DOCTOR OF PHILOSPHY

ATHENS, GEORGIA

2012

SUICIDAL IDEATION AND BEHAVIORS AMONG NINTH GRADERS: AN EXAMINATION OF MIDDLE SCHOOL AND CONCURRENT PREDICTORS

by

JACLYN MICHELLE WETHERINGTON

Co-Chairs:	Pamela Orpinas A. Michele Lease
Committee:	Amy Reschly Xiao Song Robert Vandenberg

Electronic Version Approved:

Maureen Grasso
Dean of the Graduate School
The University of Georgia
August 2012

DEDICATION

This dissertation is dedicated to my parents, sister, and husband for their incredible love and support.

ACKNOWLEDGEMENTS

The completion of my dissertation would not have been possible without the guidance, support, and encouragement from several people. First, I would like to thank the members of my dissertation committee, Dr. Michele Lease, Dr. Pamela Orpinas, Dr. Amy Reschly, Dr. Xiao Song, and Dr. Robert Vandenberg, for their conceptual, theoretical, and statistical recommendations. Their insightful comments and suggestions elevated the quality of my dissertation.

I feel very lucky to have taken two structural equation modeling courses from Dr. Debbi Bandalos. Not only did I thoroughly enjoy her classes, but I would not have felt comfortable using advanced statistical analyses to examine the complex research questions in my dissertation. I would also like to thank Dr. Robert Vandenberg for providing his extensive expertise and guidance in structural equation modeling. For his thoughtful and wise guidance, I am deeply indebted to Dr. Stephen Hooper.

I would like to thank the members of the Youth Violence Prevention Workgroup. It has been an honor and privilege to work with such a thoughtful and intelligent group of people. I am also very appreciative for the support of the school psychology graduate students at the University of Georgia over the past five years and would like to thank the interns and supervisors in the Fort Worth Independent School District for their encouragement and support this past year. To my friends from St. Johns and the University of Florida, I thank them for their continued love and encouragement. Their comic relief and constant support have allowed me to persevere through many challenges.

My graduate school career would not have been the same and the completion of my dissertation would not have been possible without the support of my mentor, Dr. Pamela Orpinas. With her wealth of knowledge, enthusiasm for learning, and commitment to student development, Dr. Orpinas personifies the definition of a mentor. I am indebted to her for the countless hours she spent editing my dissertation and guiding my professional development; I am grateful for the impressive ideals she exemplifies.

Throughout my undergraduate and graduate school careers, I have been reminded continually of the amazing teachers I was fortunate enough to have had in elementary, middle, and high school at St. Johns. Although I have not always shown the same enthusiasm for academics as I do now, I am forever grateful for the many skilled, patient, and dedicated teachers who taught and inspired me.

To my husband, Dan, I thank him for his spectacular support and love throughout my dissertation. For his encouragement when I was fatigued, patience when I was stressed, and understanding when I was immersed in work, I will always be grateful. Words cannot fully capture the kindness and love that my sister, Crista, has selflessly given me nor the many ways in which she has supported me. I cannot imagine having a more generous or caring sister. She has been a fantastic role model that I have always strived to emulate in spite of her inimitable ways. None of my personal or professional accomplishments would have been possible without the incredible love and commitment of my parents. Through their words and actions, they instilled in me the importance of hard work, integrity, and education. I would also like to thank my extended family for their encouragement over the years.

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

Unlike other public health issues that may have unintended consequences, (e.g., vehicular manslaughter that results from driving while intoxicated), suicide and suicide-related behaviors are self-inflicted and intentional. Although preventable, suicide remains the third leading cause of death for adolescents aged 12 to 19 years (Centers for Disease Control and Prevention, 2010c, CDC). Moreover, for every suicide among 15- to 24-year-olds, the CDC estimates that 100 to 200 suicides are attempted (Centers for Disease Control and Prevention, 2010b).

Previous cross-sectional and longitudinal research findings suggest that suicidal ideation and behaviors have multiple risk factors, including depression, substance use, family conflict, child psychopathology, family history of suicide, interpersonal violence, gender, and social isolation (Aseltine, Schilling, James, Glanovsky, & Jacobs, 2009; Conner & Goldston, 2007; Dieserud, Røysamb, Ekeberg, & Kraft, 2001; Dori & Overholser, 1999; Eskin, Ertekin, Dereboy, & Demirkiran, 2007; Fairweather-Schmidt, Anstey, & Mackinnon, 2009; Foley, Goldston, Costello, & Angold, 2006; Gould, Greenberg, Velting, & Shaffer, 2003; Joiner, 2005; Joiner, Johnson, & Soderstrom, 2002; King, Kerr, Passarelli, Foster, & Merchant, 2010; D. N. Miller, Mazza, & Eckert, 2009; Rosenberg et al., 2005; Sourander et al., 2009; Tang et al., 2009; Yoder, Whitbeck, Hoyt, & LaFromboise, 2006). Few theories are specific to the development of suicidal ideation and behaviors in youth; however, some theories could be applied and tested with this population. One model that has been applied across a range of fields, including child development, is Bronfenbrenner's Ecological Model (1979). Simplistically stated,

Bronfenbrenner posits that individuals are affected by multiple factors at the intrapersonal, interpersonal, intra-contextual, and inter-contextual levels.

The large number of risk factors associated with suicidal thoughts and behaviors among youth evokes several questions that this study addresses. Given that half of the students who reported suicidal behaviors in the 2009 Youth Risk Behavior Survey (YRBS) reported suicidal thoughts, are different risk factors associated with thoughts and behaviors? When several predictors are included in a multivariate analysis of suicidality, which predictors continue to account for variance in the outcome variable? Do suicidal ideation and behaviors increase as the number of concurrent risk factors increases? Can researchers identify risk factors that occur *prior to* Grade 9 associated with increased risk for suicidality in ninth grade? Is adolescent development typically associated with negative behaviors and feelings or does a pattern of negative behaviors and negative feelings indicate risk?

Parent Study

The parent study for the current investigation is *Healthy Teens Longitudinal Study*, a project funded by the Centers for Disease Control and Prevention (CDC). To increase knowledge about risk and protective factors that influence child development from middle to high school, *Healthy Teens* collected data related to social, emotional, and academic functioning of a cohort of students followed annually from Grades 6 to 12. During middle school, students participated in the *Multisite Violence Prevention Project,* a study that examined the efficacy of two interventions designed to reduce sixth grade violence and aggression in 37 school across four states (Multisite Violence Prevention Project, 2004) . Students in Georgia were followed into high school, as part of the *Healthy Teens* study. Every spring from Grades 6 to 12, students completed a survey about their behaviors and affect and teachers rated each students using a

nationally-norm measure. Students answered suicide-related questions only in high school. Trained research assistants surveyed students who dropped out of high school. The current study uses data from Grades 6 to 9.

Current Study

Careful and rigorous investigations of variables that influence suicidal ideation and behaviors are needed to inform effective prevention and intervention efforts with youth. Thus, the goals of the study are to 1) identify self-reported behavioral, family, and school-climate variables *concurrently* associated with suicidal thoughts and behaviors among ninth graders; 2) examine the *concurrent* relation between teacher-rated depression score and self-reported suicidality; 3) investigate the cumulative impact of *concurrent* variables (identified in the first step) on suicidal ideation and behaviors; and 4) investigate whether student *trajectory* from sixth to ninth grade varies as a function of identified risk factors among ninth graders who a) did not endorse suicidal ideation or behaviors, b) reported suicidal ideation but not behaviors, and c) reported both suicidal ideation and behaviors.

Using data from *Healthy Teens*, this study examined the influence of the following variables on suicidality: physical aggression, drug use, delinquency, living arrangement (not living with both parents), low parental monitoring and involvement, poor student-student relationships, poor student-teacher relationships, peer victimization, student withdrawal, and student social skills. These variables were selected for investigation as they appear, based upon previous research, most relevant to suicidal ideation and behaviors:

The ecological model of development (Bronfenbrenner, 1977) guided the following hypotheses. First, variables from different domains measured in ninth grade will account for variance in self-reported ideation and behavior, beyond that explained by self-reported sadness.

Second, students who report suicidal ideation or behaviors will have worse scores on concurrent measures that typically reflect risk (e.g., drug use, delinquency, peer victimization, physical aggression, low life satisfaction, poor school social relationships, and low parental involvement). Third, as the number of concurrent correlates that a student reports increases, the likelihood of endorsing suicidal ideation or behaviors will increase. Fourth, students will vary considerably with respect to risk factors endorsed and trajectory across sixth through ninth grades. Thus it is hypothesized that a random sample of students contains more than one underlying or latent distribution.

CHAPTER 2

LITERATURE REVIEW

This chapter contains the following sections: definitions, significance, innovation, predictors, and theories. The first section defines key terms related to suicidality. The importance of understanding suicidality in adolescence is outlined in the significance section and the innovation section contains details about the novel research design implemented in this study. Additionally, variables associated with adolescent suicidality, such as depression and deviancy, as well as remaining empirical questions, are discussed in the predictors section. Finally, in the theories section, specific theories related to suicidality and general theories of individual behavior are reviewed, particularly those that guided hypothesis-development.

Definitions

Silverman and colleagues (2007a) meticulously delineated a revised nomenclature for suicide. While the nomenclature includes a broad range of self-injurious behaviors, the subcategory most relevant to this discussion is "suicide-related thoughts and behaviors" (p. 265), which comprises three specific categories, "suicide-related ideations," "suicide-related communications," and "suicide-related behaviors" (p. 265-266). Although Silverman et al. (2007a; 2007b) specified subcategories of suicide-related behaviors, such as "no suicidal intent" or "some degree of suicidal intent," in the current study, I use the terms, "suicidality" and "suicide-related behavior" to refer to any thoughts, plans, or behaviors that include the intent to die by self-inflicted means. Additionally, I group these terms into "suicidal ideation" and

"suicidal behavior." The former includes thoughts and plans related to suicide whereas the latter refers to suicidal attempts and medical treatment for suicide-related injuries.

To advance the field of suicide prevention, identifying risk and protective factors that are sensitive and specific to suicidal behavior is critical (Van Orden, Witte, Gordon, Bender, & Joiner, 2008). *Sensitivity* refers to the likelihood that a measure correctly identifies the presence of a disorder when it is actually present. For example, a suicide screener with high sensitivity should identify the majority of the students who are at risk for suicidal behavior; a screener with low sensitivity might fail to identify students who are at risk (i.e., false negative) while also identifying some students who are at risk (i.e., true positive). Conversely, *specificity* relates to the measure's accuracy in suggesting the absence of a disorder when the disorder is actually absent (Cicchetti, 1994). A suicide screener with high specificity should accurately predict students who are not at-risk of suicidal behavior, whereas one with low specificity would yield numerous false positives. As Prinstein (2008) points out, the equifinality of suicide behavior presents challenges for effective and efficient screening.

Significance

According to data collected from the Centers for Disease Control and Prevention's (CDC) Youth Risk Behavior Survey (YRBS), suicide is the third leading cause of death for children ages 12 to 19 (Centers for Disease Control and Prevention, 2010c). Approximately 6% of high school students who were surveyed in 2009 indicated making at least one suicide attempt in the preceding year and 14% of high students reported having had suicidal ideation at some point within the previous 12 months (Centers for Disease Control and Prevention, 2010a).

Rates of suicide and suicide-related behaviors vary by race and gender. Typically, girls are more likely to report suicidal thoughts and behaviors whereas boys are more likely to

complete suicide. For example, among high school students in the United States, approximately 36% of girls compared to 22% of boys reported feeling sad or hopeless in the two weeks prior to the survey, 19% of girls and 13% of boys reported suicidal thoughts, and 15% of girls and 11% of boys reported suicidal plans (Centers for Disease Control and Prevention, 2012b) on the 2011 YRBS. Additionally, data from the 2011 YRBS revealed that students who identified as American Indian/Alaskan Native had the highest rates of self-reported sadness (36%), and suicidal thoughts (22%), plans (18%), and attempts (15%) compared to White, Black, Asian, and Hispanic youth. Asian and Hispanic youth reported the next-highest rates of sadness (28%, 32%), suicidal thoughts (19%, 17%), plans (14%, 14%), and attempts (11%, 10%), respectively, relative to White and Black students (Centers for Disease Control and Prevention, 2012a).

Suicidality is not a problem confined to the United States. In a cross-sectional study of Turkish high school students, prevalence of suicidal ideation ranged from approximately 6% in boys to 14% among girls. Rates were even higher when asked about suicidal thoughts across their lifetime (15% of boys and 29% of girls) (Eskin et al., 2007). Approximately 5% of boys and 11% of girls in a New Zealand study secondary schools students reported having attempted suicide in the previous 12 months (Fleming, Merry, Robinson, Denny, & Watson, 2007). In a study of Korean adolescents, 12% of all students surveyed endorsed having attempted suicide (Kim & Kim, 2008).

Unfortunately, suicide-related behaviors continue to occur at disturbing rates. Public and private entities have recognized the need to research and reduce suicidality. Following the tragic shootings at Columbine, the Department of Health and Human Services issued a National Strategy for Suicidal Prevention (NSSP) in 2001 and identified awareness, intervention, and

methodology as three primary objectives of the prevention effort (Subtance Abuse and Mental Health Services Administration, 2009).

Efforts to understand and prevent suicide-related thoughts and behaviors have increased with improved awareness. In addition to journals that are dedicated entirely to the study of suicide and suicide prevention, (e.g., *Suicide and Life-Threatening Behavior, Crisis: The Journal of Crisis Intervention and Suicide Prevention*), other journals have dedicated special sections or series to suicide prevention research (D. N. Miller & Eckert, 2009; Prinstein, 2008).

Innovation

The goal of the current study is to investigate proximal and distal predictors of suicidal ideation and behaviors reported by ninth graders. Given its unique research design, this study makes several contributions to the extant literature. First, inclusion of variables at multiple levels of the ecological model enriches the current knowledge through theory-driven research. This study will unveil which levels of the ecological model are more closely associated with suicidal ideation and behaviors, and whether the sum of risk factors is a better predictor than individual factors. Second, the use of longitudinal data provides the opportunity to examine whether students who did not report suicidal ideation or behaviors, students who reported only suicidal ideation, and students who reported suicidal behaviors in ninth grade differ in their trajectories of risk factors from Grades 6 to 9. Identification of malleable risk variables will support the development of specific, research-based prevention and intervention efforts to reduce suicidal thoughts and behaviors in adolescence.

Predictors

In the following paragraphs, I discuss three areas associated with suicidality: psychopathology of the child and family, problem behaviors, and protective factors. Risk factors

for suicide do not appear to occur in isolation, but form a constellation of factors. Thus, separating them in discrete categories is not always possible. For example, among youth, history of psychopathology, hopelessness, and family conflict have been identified as possible risk factors for suicide-related behavior (Evans, Hawton, & Rodham, 2004).

Defined as a variable associated with another variable, a "correlate" does not supply information about the temporal or directional nature of the relation. "Risk factors" refer to characteristics of the individual or the environment that increase the probability that a negative outcome will occur. In contrast, "protective factors" refer to factors that increase the likelihood that a positive outcome will ensue when risk factors are present. A "causal risk factor" is a variable that, when changed, affects the outcome of another variable. Finally, "mediators" impact the existence of a relation between two different variables, whereas "moderators" are variables that or influence the nature of the relation between two variables (Kazdin, Kraemer, Kessler, Kupfer, & Offord, 1997).

Psychopathology. Child psychopathology and family history of psychopathology have been implicated as risk factors for suicidality (Conner & Goldston, 2007; Dori & Overholser, 1999; Eskin et al., 2007; Gould et al., 2003; D. N. Miller & Eckert, 2009; Sourander et al., 2009). For example, in a longitudinal study of Finnish youth, boys whose scores fell above the clinical cutoff point on a parent or teacher scale measuring conduct, hyperactivity, and emotional problems were significantly more likely than boys with scores below the clinical cutoff to engage in serious suicidal behavior when assessed 16 years later (Sourander et al., 2009).

Depression is one of the most common diagnoses associated with suicidal risk (Conner & Goldston, 2007; Fairweather-Schmidt et al., 2009; Fergusson, Beautrais, & Horwood, 2003).

Some researchers have hypothesized that the increase in antidepressant use to treat adolescent depression is associated with a decline in rates of suicide from 1993 to 2003 (Gould et al., 2003).

Given the association between depression and suicidality, investigators have studied differences between depressed individuals who attempt suicide and those who do not. For example, in a clinical sample of depressed adolescents, lower scores on measures of hopelessness and depression distinguished non-attempters from suicide attempters (Dori & Overholser, 1999). In a study of adults with major depression, Malone et al. (2000) found significantly higher levels of subjective depression, hopelessness, and suicidal ideation among suicide attempters compared to non-attempters. In contrast, non-attempters reported a greater number of reasons to live. The presence of two or more mental health disorders also serves as a risk factor for suicide-related behavior (Sourander et al., 2009). Additionally, because firearms are used in approximately 50% of completed suicides, access to lethal means is considered a risk factor suicidal behavior (Gould et al., 2003).

In a longitudinal study with youth aged 9 to 16 years, the presence of any depressive disorder, compared to other psychiatric disorders, resulted in the highest risk of suicidality as indicated by odds ratios. Moreover, when adjusting for the presence of other disorders or covariates, depression continued to have the highest odds associated with suicidality. Youth with depression and either anxiety or disruptive behavior disorders were also at an increased risk of reporting suicidality relative to those without comorbid disorders (Foley et al., 2006).

From their review of research of suicide in male youth, Conner and Goldston's (2007) concluded that depression was associated with suicide risk. A recent study also found support for the association among depression symptoms and risk for suicide attempt (Thompson, Kuruwita, & Foster, 2009). In a review of intervention studies, Mann et al. (2005) found some support for

the use of depression screeners to identify and intervene with adults who are potentially at-risk of developing suicidality.

Although depression and sadness are not equivalent concepts, sadness is often one symptom of depression. Specifically, one depression-related symptom is the presence of sad or depressed feelings for two or more weeks that results in behavior change. Consequently, the Youth Risk Behavior Survey has used questions related to sadness to account for the presence of depression (Centers for Disease Control and Prevention, 2004).

Problem Behaviors. At the behavioral level, substance abuse, physical aggression, and victimization have been identified as factors associated with suicidal ideation and behavior. Studies regarding the role of substance abuse and suicidality have yielded equivocal results (Aseltine et al., 2009). In a sample of adolescents, ages 11 to 19, heavy episodes of drinking increased suicidality risk for all adolescents, but the risk was greater for teenagers who were 13 years of age or younger. In one longitudinal study, substance abuse was related to suicidality only in the presence of psychopathology (Foley et al., 2006). In a different longitudinal study, neither early alcohol nor early cigarette use increased risk for subsequent report of suicidal ideations or suicide attempts (Wilcox & Anthony, 2004b). In contrast, independent of race and gender, Borowsky, Ireland, and Resnick (2001) found that alcohol and marijuana use were risk factors for attempted suicide.

Variables associated with suicidality have also differed across study, gender, age, and ethnicity (Borowsky et al., 2001; Brunstein Klomek, Marrocco, Kleinman, Schonfeld, & Gould, 2007; Eskin et al., 2007; Fergus & Zimmerman, 2005; Foley et al., 2006; Goldbeck, Schmitz, Besier, Herschbach, & Henrich, 2007; King & Merchant, 2008; Lee, Choi, Kim, Park, & Shin, 2009; Roland, 2002; Wilcox & Anthony, 2004a). Using data from students in Grades 7 through

12 who participated in the National Longitudinal Study of Adolescent Health, Borowsky et al. (2001) examined risk and protective factors of suicide behavior. For Black, Hispanic, and White females, history of mental health problems requiring treatment, somatic symptoms, suicide behavior of a friend, and illicit drug use predicted suicidality. For boys, independent of race, same-sex attraction and weapon-carrying were related to suicide risk.

Violence victimization and perpetration have been associated with suicidal behavior (Borowsky et al., 2001); however, results differ across studies and by gender (Brunstein Klomek et al., 2007; Rigby & Slee, 1999; Swahn, Bossarte, & Sullivent, 2008). From a developmental perspective, rates of serious physical aggression and suicide increase from ages 11 to 21 years (Conner & Goldston, 2007). Eskin et al.(2007) found that gender was a strong predictor of suicidal ideation and attempts. For boys, low self-esteem and depression predicted suicidal ideation; low self-esteem, low grades, and parental divorce predicted suicide attempts. For girls, depression, lack of assertiveness, and older age predicted suicidal ideation; depression was the only predictor of suicide attempts. In a longitudinal study, inhalant and cannabis use were related to increased risk for suicide attempts for girls, but not boys (Wilcox & Anthony, 2004b).

Protective Factors. Previous research suggests that family involvement, living with both biological parents, perceived social connectedness, and good social skills may serve as protector factors against negative outcomes. Although depression has been identified as a risk factor for suicidality, few studies have investigated the relation between life satisfaction and suicidality during adolescence (Proctor, Linley, & Maltby, 2009). As expected, the few studies that have examined life satisfaction and suicidality during adolescence provide initial support for the inverse relation between life satisfaction and suicidality (Kim & Kim, 2008; Thatcher, Reininger, & Drane, 2002; Valois, Zullig, Huebner, & Drane, 2004).

Unlike the limited number of studies that exist with life satisfaction and suicide, previous research supports a positive relation between life satisfaction and positive family relationships (Ma & Huebner, 2008; Trzcinski & Holst, 2008). Additionally, family support and connectedness have been identified as a protective factor against suicidal ideation and behavior for both boys and girls, independent of race (Borowsky et al., 2001; Sharaf, Thompson, & Walsh, 2009). Interestingly, the contribution of family functioning to overall life satisfaction in adolescence may decrease as age increases (Leung, McBride-Chang, & Lai, 2004; Suldo & Huebner, 2004).

Considerably less research exists pertaining to other protective factors for suicide. Although family cohesion and religious/moral reasoning appear to protect against suicidality, additional research is needed (Evans et al., 2004)**.** Fergus and Zimmerman (2005) outline a resilience approach to studying adolescent development and emphasize the important role that parents play in promoting positive outcomes. Resilience refers to the processes involved in promoting positive, healthy outcomes despite the presence of risk factors. Although not the only type of protective factor identified, Fergus and Zimmerman emphasize the range of risk factors affected by family-related variables: "Across most risk factors for adolescent substance abuse, violent behavior, and sexual behavior, parental factors seem to be particularly vital in helping youth be resilient" (p.410). Since the 1960s, in which approximately 85% of children lived with two parents, the percentage of children living with two parents has consistently declined. Specifically, data from the 2009 United States census indicate that nearly 60% of children under the age of 18 live with two biological parents (Kreider & Ellis, 2011).

Theories

Theory development, testing, and application are greatly needed to advance knowledge regarding the development of suicidality (Prinstein, 2008; Van Orden et al., 2010). This study is guided by two theoretical frameworks: Joiner's interpersonal theory of suicide guides selection of variables related to social support and Bronfrenbrenner's ecological model serves to organize the multiple levels of risk and protective factors.

Joiner's (2005) interpersonal theory of suicide, a theory primarily tested with clinical samples of adults, stipulates that individuals acquire the capacity for committing suicide over time through a relatively linear progression. According to the theory, feeling hopeless about co-occurring feelings of thwarted belongingness and perceived burdensomeness can cause "active" suicidal ideation (i.e., thoughts about committing suicide). Additionally, the presence of either thwarted belongingness or perceived burdensomeness can cause "passive" suicidal ideation (i.e., thoughts about death). Although the interpersonal theory of suicide contains additional constructs and hypotheses, only the aspects of the theory most relevant to the present study are discussed.

Thwarted belongingness consists of two components of interpersonal functioning, loneliness and absence of reciprocal care. Loneliness is viewed as an "affectively laden cognition that one has too few social connections" (p. 582). Some proposed indicators of loneliness that have also been associated with increased risk of suicide attempts are self-reported loneliness, living alone, few social supports, and non-intact families whereas marriage, number of children, and number of friends have been associated with decreased risk. The absence of reciprocal care is conceptualized as the lack of relationships that are perceived supportive, positive and reciprocal in nature. Social withdrawal, domestic violence, and family conflict are among the

proposed indicators of the absence of reciprocal care that have also been correlated with increased risk for suicide attempts (Van Orden et al., 2010).

Another model that has been applied across a range of fields, including child development, is Bronfenbrenner's Ecological Model (1979). According to the Ecological Model, human development occurs within the context of dynamic proximal and distal environmental influences. Bronfenbrenner conceptualized the ecological environment as being nested within multiple, interacting spheres (Bronfenbrenner, 1977, p. 514). The microsystem is defined as the interactions between a person and his or her immediate environment. A mesosystem refers to the interactions among settings in which a person develops (e.g., interactions among friends, family, school). In contrast, the exosystem includes structures that influence child development but do not directly include the child (e.g., mass media). Finally, the macrosystem consists of overall cultural patterns that are manifested in the micro-, meso-, and exo-systems.

Results from Rutter's (1979) seminal study of cumulative risk and child development revealed significant increases in negative outcomes for children with two risk factors compared to those with one or fewer risk factors. Moreover, risk of poor adjustment continued to increase with the increase in number of risk factors (i.e., increased risk for children with three compared to two risk factors). In a recent study of youth externalizing and internalizing problems, Trentacosta and colleagues (2008) found that risk factor index score predicted nurturing and involved parenting, which subsequently predicted externalizing and internalizing issues.

Despite the existing literature involving risk factors for suicidality, several researchers have voiced the need for additional research involving protective factors (Evans et al., 2004). According to Fergus and Zimmerman, "A rich understanding of resilience processes… necessitates including cumulative risks, assets, and resources studied over time" (Fergus &

Zimmerman, 2005, p. 407). Longitudinal research is needed to understand early indicators of and buffers against suicidality (King & Merchant, 2008; Sharaf et al., 2009). The current study expands on this research to evaluate whether these same constructs measured in middle school predict ninth grade suicidality.

CHAPTER 3

METHOD

This chapter describes the methodology of the current study. Specifically, the design, setting, and participant section describes sample recruitment and composition. The procedures section outlines the process of parent and student consent as well as data collection. Finally, the measures section contains descriptions and statistical properties of the instruments used to gather data.

Design, Setting, and Participants

Data were gathered annually from a cohort of students who consented to participate in the *Healthy Teens Longitudinal Study*. In sixth grade (2002-2003 academic year), 939 students were randomly selected and invited to participate in the study; of them, 79% (n=745) agreed to participate. In ninth grade, 84% (n=624) of these students reconsented to continue in the study. Students who did not respond to ninth grade suicide questions (n=49) and one student whose response pattern appeared illogical were excluded from the analyses. Thus, the final sample consisted of 574 students (48% girls; 48% White, 36% Black, 11% Latino). In ninth grade, the average age was 14.8 years (*SD*=.57) and approximately 52% of students lived with both biological parents (Table 3.1).

Table 3.1 Sample demographics

Demographic Characteristics	N	%
Gender		
% Boys	299	52
Race		
White	276	48
Black	208	36
Latino	65	11
Asian	7	1.2
Multiracial/Other	18	3.1
Family Structure		
% living with both parents Grade 6	332	59
% living with both parents Grade 9	295	52

The majority of students attended one of eight high schools located in one of six school districts in Northeast Georgia. School populations reflected a range of racial, socioeconomic, and geographic (e.g., urban, rural) characteristics. The proportion of Caucasian students at each school ranged from 20% to 88%, and the proportion of students eligible for free or reduced-price lunches ranged from 20% to 67% across participating schools (Governor's Office of Student Achievement, 2007-2008). Community-risk indices for counties were these schools were located indicated rates of poverty and crime higher than the national average. Compared to national estimates of the percentage of children living in poverty (15.7%), approximately 26.1% of the children in the participating counties lived at or below the poverty level. The rate of juvenile arrest for violent crimes in these communities was nearly double the national average: 74.1 arrests per 100,000 youth compared to 42.7 arrests per 100,000 youth in the United States (Henry & Farrell, 2004).

Procedures

The Healthy Teens project staff obtained signed parental permission in Grades 6 and 9, and student assent at every assessment. Trained research assistants supervised all data collection. In middle school, student completed the surveys in laptops where they could see and hear the questions. In high school, students completed the surveys online using school computers. Research assistants surveyed students who dropped out of school at their home. A teacher who knew the student well was asked to complete a behavioral rating scale. Thus, each year a different teacher rated the student. Teachers and high school students received a small monetary incentive to complete the questionnaires. The university's Institutional Review Board approved all procedures.

Measures

The internal consistency of the problem behaviors and life satisfaction scales, measured by Cronbach's alpha, is reported using data from this study. The first alpha score is for sixth grade and the second is for ninth grade.

Suicide. Four questions from the YRBS requested information about serious suicidal thoughts, plans, attempts, and medical treatment received for injuries related to attempted suicide (Centers for Disease Control and Prevention, 2004). Students answered these questions in ninth grade only, not in middle school. The time frame for all questions was the year prior to the survey. For the question on suicide attempts, respondents indicated the number of times they attempted suicide; these responses were dichotomized into *never* (0) and *1 or more times* (1). Response categories for all other questions were *no* (0) and *yes* (1). Using these questions, two new variables were created: *suicidal ideation* and *suicidal behavior*. Suicidal ideation was defined as having suicidal thoughts and/or plans. Suicidal behavior was defined as whether or

not students reported having attempted suicide with or without having received medical treatment for suicide-related injuries.

Feeling Sad. One dichotomous question from the YRBS assessed self-reported feelings of sadness: "During the past 12 months, did you ever feel so sad or hopeless almost every day for two weeks or more in a row that you stopped doing some usual activities?" (Centers for Disease Control and Prevention, 2004). Response categories were *no* (0) and *yes* (1).

Problem Behaviors. The Problem Behavior Frequency Scale (Farrell, Kung, White, & Valois, 2000) measures self-reported physical aggression (7 items, α=.83, .85), delinquency (8 items, α=.73, .87), drug use (6 items, α=.77, .91), and victimization (12 items, α=.90, .90). Students indicate the frequency of these problem behaviors, using the following response categories: never (1), *1 to 2 times* (2), *3 to 5 times* (3), *6 to 9 times* (4), *10 to 19 times* (5), and *20 times or more* (6). The time frame for all questions was the 30 days preceding survey administration.

The Physical Aggression scale is composed of four items representing physical behaviors that could hurt others (e.g., "Hit or slapped another kid.") and three items representing violent threats (e.g., "Threatened to physically harm another kid."). The Drug Use scale includes four questions about the frequency of alcohol use, one question about cigarette smoking, and one question about marijuana use. The Delinquency scale contains questions about being on suspension, cheating on a test, skipping school, committing petty theft, doing graffiti or spray painting, and damaging property. The Victimization scale includes questions on overt victimization (e.g., "Had been pushed or shoved by another kid.").

Problem behavior subscales were moderately to highly correlated (r = .39 to .74). Thus, to avoid collinearity problems, a new composite variable, Problem Behaviors, was calculated as

the average of self-reported physical aggression, overt victimization, drug use, and delinquency scales, with higher scores indicating more problem behaviors. The internal consistency of this composite scale, measured by Cronbach's alpha, was adequate for the new composite (4 variables, α=.74, .83).

Table 3.2 Correlations among variables reflecting problem behaviors

	Physical Aggression	Drug Use	Delinquency
Physical Aggression			
Drug Use	.57**		
Delinquency	.67**	.74**	
Overt Victimization	.63**	.39**	.49**

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

Parental Involvement. The Monitoring and Involvement subscale of the Parenting Practices (12 items, α=.87, α=.90) measure assess children's perception of their caregivers' involvement in and knowledge of daily routines and activities. Examples of questions are: "How often does a parent talk with you about what you had actually done during the day?" and "In the past 30 days, how often did you and a parent do things together at home?"

School Social Relationships. Two scales from the Classroom Climate measure assess students' perception of social relationships in the classroom: Student-Student Relationship (7 items, α=.71, α=.77) and Student-Teacher Relationship (4 items, α=.77, α=.77). Several questions were based upon Vessels' School Climate Survey (Vessels, 1998, pp.232-236). Responses range from *strongly disagree* (1) to *strongly agree* (4) on a 4-point scale. Scales are obtained by calculating the mean value of the items. On both scales, higher values indicate more positive relationships. Examples of items for the Student-Student Relationship scale are "Students make friends easily," and "Students get along well together most of the time." Examples of items on the Student-Teacher Relationship scale are "Teachers treat students with

respect" and "Teachers treat students fairly." Student-Teacher and Student-Student Relationship variables were highly correlated (r = .55), therefore, the two variables were averaged to create a new variable, School Social Relationships (α=.80, α=.83).

Life Satisfaction. The Life Satisfaction Scale (Huebner, 1994; Huebner, Laughlin, Ash, & Gilman, 1998) measures life satisfaction with family, friends, school, self, home, and life (6 items; α=.84, .85). Each question begins with "I would describe my satisfaction with…"; response options range from *terrible* (1) to *delighted* (7) on a 7-point scale. The average score of the six items was used to assess overall life satisfaction, with higher scores indicating higher satisfaction.

BASC. Three subscales of the teacher ratings from the Behavior Assessment System for Children (BASC) measure Depression (9 items, α=.75, α=.60), Withdrawal (7 items, α=.74, α=.72), and Social Skills (11 items, α=.92, α=.91). The adolescent version of the BASC is a nationally-normed teacher rating measure of student behavior. The BASC Manual defines Depression as "Feelings of unhappiness, sadness, and stress that may result in an inability to carry out everyday activities (neurovegetative symptoms) or may bring on thoughts of suicide," Withdrawal, "The tendency to evade others to avoid social contact," and Social Skills, "The skills necessary for interacting successfully with peers and adults in home, school, and community settings" (Reynolds & Kamphaus, 1992, p. 48). Response categories range from *Never* (0) to *Almost Always* (4) on a 4-point scale. Although these subscales could be considered indices of individual behavior, they were included to obtain independent indicators of withdrawal from social interaction and poor social skills that would likely impede positive peer relationships. All scaled scores can be converted to a T-score, with a mean of 50 and standard deviation of 10.

Living Arrangements. Students indicated whether the following adults lived in their house: mother, father, step mother, step father, foster mother, foster father, grandmother, grandfather, aunt, uncle, other relatives or friends. Because not living with both biological parents is often a risk factor for negative outcomes (Fergus & Zimmerman, 2005; Sourander et al., 2009), this variable was dichotomized into (1) living with both biological parents or (0) other living arrangements.

CHAPTER 4

RESULTS

This chapter is first organized according to when independent variables were assessed (e.g., middle school, Grade 9) and then by statistical analysis. All outcome variables were collected in Grade 9. The concurrent variable section consists of univariate and multivariate analyses whereas the longitudinal data section describes latent growth mixture model specification and selection. The univariate analysis section includes the results of each one way analysis of variance conducted on continuous variables and each chi square test of discrete variables. The multivariate analysis section contains results when multiple variables are included in one analysis. This section includes two analyses: the risk factor index and the multiple logistic regression. Separate analyses were conducted for two outcome variables, suicidal ideation and suicidal behaviors. The final section, latent growth mixture models, describes model specification and selection of two longitudinal models of problem behaviors and life satisfaction.

Concurrent Variables

Univariate Analyses

One-way analyses of variance (ANOVAs) and chi-square tests were used to address the study's first goal of identifying self-reported behavioral, family, and school-climate variables associated with suicidal thoughts and behaviors. Consistent with nationally collected data using the YRBS, more girls (16.0%) than boys (9.0%) reported suicidal ideation in Grade 9, ($\chi 2$ (1) = 6.39, p = .011). Although not statistically significant, more girls (10.2%) than boys (6.0%) reported suicidal behavior. Within gender group, mean construct scores were compared between

reporters and non-reporters of suicidal ideation. Consistent with the first hypothesis, the results revealed several self-reported differences between reporters and non-reporters of suicidality (Tables 4.1a and 4.1b). Neither suicidal ideation nor suicidal behaviors differed significantly as a function of race. Thus, univariate analyses focused on examining differences in correlates of suicide-related behavior by gender.

Table 4.1a Comparison of scores on hypothesized risk variables in Grade 9 and reports of suicidal ideation by gender (n=574)

		Girls				Boys			
		No (n=231) M (SD)	Yes (n=44) M (SD)	F(df=1)	P	No (n=272) M (SD)	Yes (n=27) M (SD)	F(df=1)	p
Student Self-Report									
Problem Behaviors		1.28 (0.42)	1.66 (0.72)	23.51	<.001	1.44 (0.60)	1.75 (0.75)	6.30	.010
Physical Aggression		1.37 (0.63)	1.71 (0.72)	10.63	<.001	1.58 (0.76)	1.70 (0.63)	0.62	.430
Drug Use		1.25 (0.67)	1.81 (1.24)	18.74	<.001	1.35 (0.77)	1.83 (1.15)	8.83	<.001
Delinquency		1.14 (0.31)	1.47 (0.70)	26.25	<.001	1.29 (0.59)	1.65 (0.80)	8.80	<.001
Overt Victimization		1.35 (0.56)	1.64 (0.86)	7.72	.010	1.54 (0.72)	1.82 (0.92)	3.43	.070
Parental Involvement		3.99 (0.93)	3.40 (0.96)	14.60	<.001	3.77 (1.00)	3.19 (0.94)	8.26	<.001
School Social Relationships		2.69 (0.41)	2.43 (0.53)	13.00	<.001	2.77 (0.49)	2.54 (0.39)	5.62	.020
Student-student Relationship		2.59 (0.46)	2.40 (0.57)	5.63	.020	2.71 (0.50)	2.46 (0.38)	6.33	.010
Student-teacher relationship		2.78 (0.49)	2.45 (0.60)	15.21	<.001	2.83 (0.61)	2.62 (0.51)	3.10	.080
Life Satisfaction		5.62 (0.94)	4.43 (1.26)	52.13	<.001	5.74 (0.98)	4.64 (1.40)	28.19	<.001
Teacher Ratings									
Depression		44.11 (3.49)	45.94 (6.08)	6.69	.010	43.85 (3.24)	44.25 (4.06)	0.31	.580
Withdrawal		43.91 (5.66)	44.75 (8.11)	0.59	.440	44.74 (6.29)	45.12 (5.78)	0.08	.780
Social Skills		51.10 (10.49)	48.01 (10.30)	2.81	.100	45.42 (8.88)	44.67 (8.69)	0.15	.700
		%	%	χ^2 (df=1)	P	%	%	χ^2 (df=1)	P
Feeling Sad	No	95.1	4.9	37.88	<.001	95.9	4.1	40.44	<.001
	Yes	67.3	32.7			68.5	31.5		
Lives with both parents	No	79.1	20.9	4.83	.030	88.4	11.6	2.00	.160
	Yes	88.9	11.1			93.1	6.9		

Table 4.1b Comparison of scores on hypothesized risk variables in Grade 9 and reports of suicidal behavior by gender (n=574)

		Girls				Boys			
		No (n=247) M (SD)	Yes (n=28) M (SD)	F (df=1)	p	No (n=281) M (SD)	Yes (n=18) M (SD)	F (df=1)	p
Student Self-Report									
Problem Behaviors		1.28 (0.45)	1.83 (0.64)	34.07	.001	1.45 (0.62)	1.78 (0.57)	4.83	.030
Physical Aggression		1.35 (0.59)	2.03 (0.85)	29.39	.001	1.58 (0.75)	1.79 (0.60)	1.24	.270
Drug Use		1.26 (0.69)	2.06 (1.33)	26.76	.001	1.37 (0.83)	1.77 (0.66)	4.08	.040
Delinquency		1.16 (0.40)	1.48 (0.46)	15.72	.001	1.30 (0.61)	1.69 (0.64)	6.87	.010
Overt Victimization		1.36 (0.60)	1.75 (0.71)	10.16	.001	1.55 (0.74)	1.88 (0.84)	3.26	.070
Parental Involvement		3.95 (0.93)	3.38 (1.03)	9.27	.001	3.75 (0.99)	3.16 (1.03)	6.01	.020
School Social Relationships		2.66 (0.44)	2.53 (0.47)	2.07	.150	2.76 (0.48)	2.64 (0.54)	0.98	.320
Student-Student Relationship		2.56 (0.48)	2.52 (0.53)	0.24	.630	2.70 (0.49)	2.52 (0.55)	2.29	.130
Student-Teacher Relationship		2.75 (0.52)	2.54 (0.56)	3.95	.050	2.82 (0.60)	2.76 (0.60)	0.14	.710
Life Satisfaction		5.52 (1.02)	4.70 (1.32)	15.24	.001	5.73 (0.99)	4.24 (1.31)	36.64	.001
Teacher Ratings									
Depression		44.04 (3.29)	47.55 (7.46)	18.16	.001	43.82 (3.33)	45.02 (2.81)	1.74	.190
Withdrawal		43.82 (5.80)	45.95 (8.04)	2.67	.100	44.81 (6.32)	44.24 (4.70)	0.11	.740
Social Skills		51.19 (10.34)	45.65 (10.80)	6.37	.010	45.43 (8.86)	43.91 (8.83)	0.39	.530
		%	%	χ^2 (df=1)	p	%	%	χ^2 (df=1)	p
Feeling Sad	No	95.7	4.3	15.77	.001	95.1	4.9	3.02	.080
	Yes	80.9	19.1			88.9	11.1		
Lives with both parents	No	89.2	10.8	.10	.750	91.3	8.7	3.19	.070
	Yes	90.4	9.6			96.3	3.8		

Suicidal Ideation. Compared to girls who did not report suicidal ideation, girls who reported suicidal ideation had significantly worse scores on all self-reported scales: Problem Behaviors, Parental Involvement, School Social Relationships, and Life Satisfaction. Similarly, boys who reported suicidal ideation had significantly higher scores on the Problem Behaviors scale and significantly lower Parental Involvement, School Social Relationships, and Life Satisfaction scores than boys who did not report suicidal ideation. However, no significant differences were observed among boys for Physical Aggression, Overt Victimization, and Student-Teacher Relationships scales. Girls and boys who endorsed suicidal ideation were significantly more likely to report sadness than those who did not report suicidal ideation. Additionally, students who lived with both biological parents were less likely to report suicidal ideation than those not living with both parents, but this difference was only significant for girls (Table 4.1a).

Suicidal Behaviors. Girls and boys who indicated suicidal behavior had significantly higher scores on Problem Behaviors and significantly lower scores on Parental Involvement and Life Satisfaction scales than students who did not report suicidal behavior. Of the Problem Behaviors scales, only Drug Use and Delinquency were significantly higher for boys who endorsed suicidal behavior. Of the School Social Relationship scales, only Student-Teacher Relationship scores were significantly lower for reporters of suicidal behavior. For girls only, those who reported sadness were significantly more likely to report suicidal behavior than non-reporters. Not living with both parents was not associated with suicidal attempts (Table 4.1b).

Teacher Ratings. Gender interactions emerged for teacher-rated depression scores. Compared to girls who did not report suicidal *ideation*, teachers rated girls who endorsed suicidal ideation significantly higher in Depression. Teacher-rated Depression and Social Skills

scores were also significantly worse for girls who reported suicidal *behavior* than those without suicidal behavior. In contrast, no significant differences were found on teacher rating scales between boys who reported suicidal ideation or behaviors and those who did not (Tables 4.1a and 4.1b).

Multivariate Analyses

Risk factor index (RFI). To investigate the cumulative effect of experiencing multiple risk factors (the third goal of this study), a four-construct risk factor index was created. Consistent with previous research, continuous variables were dichotomized into absence (0) or presence (1) of risk, using a sample-based 30th percentile cutoff score, to create the RFI (Forehand, Biggar, & Kotchick, 1998; Jessor, Van Den Bos, Vanderryn, Costa, & Turbin, 1995). Similarly, dichotomous variables were coded so that (0) reflected no risk and (1) indicated risk. The RFI was constructed based on variables that had the strongest theoretical and statistical associations with suicidal ideation and behaviors: Problem Behaviors (30th percentile cut-off score= 1.43), Life Satisfaction (30th percentile cut-off score= 5.16), School Social Relationships (30th percentile cut-off score= 2.47), and Parental Involvement (30th percentile cut-off score= 3.34). Scores reflected the total number of risk factors present and ranged from 0 (no risk) to 4 (high risk on all variables). Table 4.2 presents the prevalence of suicidal ideation and behaviors by number of risk factors.

Table 4.2 Percent of ninth graders who endorsed suicidal ideation and attempts by number of risk factors (n=568)

Number of Risk Factors	Students with risk factors n	Suicidal Ideation (n=70) % Yes	Suicidal Attempts (n=46) % Yes
0	231	*3.9****	*1.8***
1	136	7.4	5.9
2	115	18.3	11.3
3	60	**31.7*****	**21.7*****
4	27	**40.7*****	**29.6*****

***Significantly different than expected at .001 level
**Significantly different than expected at .01 level
Italics indicates significantly *less* than expected
Bold face indicates significantly **more** than expected

Logistic regression models. Separate logistic regression models were conducted for suicidal ideation and suicidal behavior. To examine the impact of hypothesized risk variables on suicidality, beyond sadness, Feeling Sad was excluded from the RFI but included as a predictor in the logistic regression analyses. Three constructs—gender, Feeling Sad, and RFI score—were included as predictors in both models. For both models, the Hosmer-Lemeshow goodness-of-fit test statistics suggested that models demonstrated acceptable fit.

When the RFI score, Feeling Sad, and gender were entered simultaneously as categorical predictors of *suicidal ideation*, Feeling Sad and RFI score were directly associated with suicidal ideation. As expected, students who reported sadness were at increased odds of reporting suicidal ideation (OR=6.59, CI=0.42 to 1.43). Additionally, students with more risk factors were at increased odds of reporting suicidal ideation (2 risk factors: OR= 3.19, CI=1.35 to 7.54, 3 risk factors: OR=7.59, CI=3.03 to 18.96, 4 risk factors: OR=9.41, CI=3.12 to 28.49) (Table 4.3). In contrast, gender was no longer significantly related to suicidal ideation when included in the same model with RFI score and Feeling Sad.

When RFI score, sadness, and gender were entered simultaneously as categorical predictors of *suicidal behaviors*, similar results were observed: Feeling Sad and RFI score were directly associated with suicidal behavior. Students who reported sadness were at increased odds of reporting suicidal behaviors (OR=2.08, CI=1.03 to 4.18). Additionally, students with two or more risk factors were at increased odds of reporting suicidal behaviors (2 risk factors: OR= 5.67, CI=1.76 to 18.31, 3 risk factors: OR=12.94, CI=3.92 to 42.67, 4 risk factors: OR=19.29, CI=5.00 to 74.34) (Table 4.3). As in the logistic regression model of suicidal ideation, gender did not explain a significant amount of variance in the model of suicidal behaviors when RFI score and Feeling Sad were included.

Table 4.3 Logistic Regression of Suicidal Ideation & Behaviors

	B (SE)	Wald (p)	Exp(B)	95% C.I. (L, U)
Suicidal Ideation				
Gender	-0.26 (0.31)	0.67 (0.41)	0.78	(0.42, 1.43)
Sadness	1.89 (0.32)	34.17 (<.001)	6.59	(3.50, 12.40)
Overall RFI		28.55 (<.001)		
1 Risk Factor	0.46 (0.49)	0.90 (0.34)	1.59	(0.61, 4.14)
2 Risk Factors	1.16 (0.44)	6.95 (0.01)	3.19	(1.35, 7.54)
3 Risk Factors	2.03 (0.47)	18.79 (<.001)	7.59	(3.03, 18.96)
4 Risk Factors	2.24 (0.57)	15.72 (<.001)	9.41	(3.11, 28.49)
Constant	-3.68 (0.42)	77.43 (<.001)	0.03	
Suicidal Behavior				
Gender	-0.50 (0.35)	2.00 (.160)	0.61	(0.30, 1.21)
Sadness	0.73 (0.36)	4.22 (.040)	2.08	(1.03, 4.18)
Overall RFI		26.12 (<.001)		
1 Risk Factor	1.18 (0.63)	3.57 (.060)	3.26	(0.96, 11.12)
2 Risk Factors	1.74 (0.60)	8.42 (<.001)	5.67	(1.76, 18.31)
3 Risk Factors	2.56 (0.61)	17.67 (<.001)	12.94	(3.92, 42.67)
4 Risk Factors	2.96 (0.69)	18.48 (<.001)	19.29	(5.00, 74.34)
Constant	-3.97 (0.54)	53.80 (<.001)	0.02	
Hosmer & Lemeshow	χ^2 (df=7)	P		
Suicidal Ideation	8.12	.322		
Suicidal Behavior	3.43	.754		

Longitudinal and concurrent variables

Structural equation modeling was used to address the study's fourth goal of investigating whether students followed different trajectories from sixth to ninth grade as a function of self-reported risk factors. Specifically, latent growth mixture modeling, a type of structural equation modeling, was used to examine early indicators of subsequent report of suicidal ideation or behaviors. Latent variables are conceptualized as unobservable constructs that are measured by multiple observable variables or indicators. Given the amount of measurement error that can be included in latent variable approaches, latent variable modeling has become increasingly popular with the development of advanced statistical software programs (Kline, 2005). Research questions can be tested by comparing the fit of a hypothesized model of variable relationships to the observed pattern of covariances among variables. As summarized by Nylund, Asparouhov, and Muthén (2007) "…mixture models aim to uncover unobserved heterogeneity in a population and to find substantively meaningful groups of people that are similar in their responses to measured variables or growth trajectories" (p.536).

Findings from the univariate and multivariate analyses conducted were used to select outcome variables to include in the latent growth mixture models. Four variables that were consistently associated with suicidal ideation and behaviors in the univariate analyses were selected to create a four-construct risk factor index (RFI): Problem Behaviors, Life Satisfaction, Parental Involvement, and School Social Relationships. For the purpose of examining the cumulative impact of experiencing multiple risk factors, these variables were dichotomized into absence or presence of risk for the RFI. To investigate variables that accounted for unique variance in suicidal ideation and cognition, however, the original continuous variables, Problem Behaviors, Life Satisfaction, Parental Involvement, and School Social Relations, along with

gender and sadness, were entered into multiple logistic regression models. Results indicated that sadness, Problems Behaviors, and Life Satisfaction were significant predictors in separate models of suicidal ideation and behavior (see Table 4.4). Gender was not a significant predictor of either suicidal ideation or behaviors when included with sadness and risk factor index score in multiple logistic regression models. Consequently, Life Satisfaction and Problem Behaviors trajectories were examined as they appeared to be the most consistent predictors, beyond sadness, of suicidality in ninth grade.

Table 4.4 Logistic Regression of Suicidal Ideation & Behaviors

	B (SE)	Wald (p)	Exp(B)	95% C.I. (L, U)
Suicidal Ideation				
Gender	-0.25 (0.32)	0.61 (0.43)	0.78	(0.42, 1.46)
Sadness	1.72 (0.34)	26.26 (<.001)	5.58	(2.89, 10.78)
Life Satisfaction	-0.57 (0.15)	14.28 (<.001)	0.57	(0.42, 0.76)
Problem Behaviors	0.62 (0.23)	7.46 (0.006)	1.87	(1.19, 2.92)
Parental Involvement	-0.06 (0.17)	0.11 (0.74)	0.95	(0.68, 1.31)
School Social Relationships	-0.08 (0.34)	0.05 (0.82)	0.92	(0.47, 1.81)
Constant	-0.27 (1.20)	0.05 (0.82)	0.76	
Suicidal Behavior				
Gender	-0.66 (0.37)	3.07 (0.08)	0.59	(0.25, 1.08)
Sadness	0.59 (0.39)	2.37 (0.12)	1.81	(0.85, 3.86)
Life Satisfaction	-0.72 (0.17)	17.2 (<.001)	0.49	(0.34, 0.68)
Problem Behaviors	1.04 (0.24)	18.9 (<.001)	2.84	(1.77, 4.54)
Parental Involvement	0.005 (0.20)	0.001 (0.98)	1.01	(0.68, 1.49)
School Social Relationships	0.62 (0.40)	2.43 (0.12)	1.86	(0.85, 4.04)
Constant	-1.96 (1.39)	2.00 (0.16)	0.14	
Hosmer & Lemeshow	χ^2 (df=8)	P		
Suicidal Ideation	11.17	0.19		
Suicidal Behavior	6.44	0.60		

Several different growth mixture models of Life Satisfaction and Problem Behaviors were tested. Included as a distal outcome variable, ninth-grade suicidality was defined as an

ordinal variable with three mutually exclusive categories: absence of suicidal ideation or behaviors (0), presence of suicidal ideation only but not behavior (1), and presence of suicidal behaviors (with or without suicidal ideation) (2).

Consistent with recommendations by Muthén and colleagues (Muthén, 2004; Nylund et al., 2007), in step one, the main outcome variables, Life Satisfaction and Problem Behaviors trajectories were examined in *separate* growth mixture models. Examining each main outcome variable independently facilitates overall interpretation and understanding. For example, acceptable fit of a combined model could result from one outcome variable fitting extremely well to the observed data and potentially masking poor fit of the other variable. Alternatively, poor fit could reflect extremely poor fit of one variable while obscuring good fit of the other. For both constructs, a model with three latent classes fit the observed data significantly better than a two-class model (which fit the data significantly better than a one-class model). In other words, the results supported three distinct trajectories of scores.

Next, gender was added to the model as a time-invariant covariate that predicted scores in sixth grade and changes in scores across Grades 6 through 9. In the third step, race was added as a time-invariant covariate of scores in sixth grade and changes in scores across Grades 6 through 9. To test the hypothesis that the trajectories of both Life Satisfaction and Problem Behaviors scores were related to suicidality, the final three-class model included Life Satisfaction and Problem Behaviors as outcome variables, gender and race as time-invariant covariates, and suicidality as a distal outcome variable (Figure 4.1).

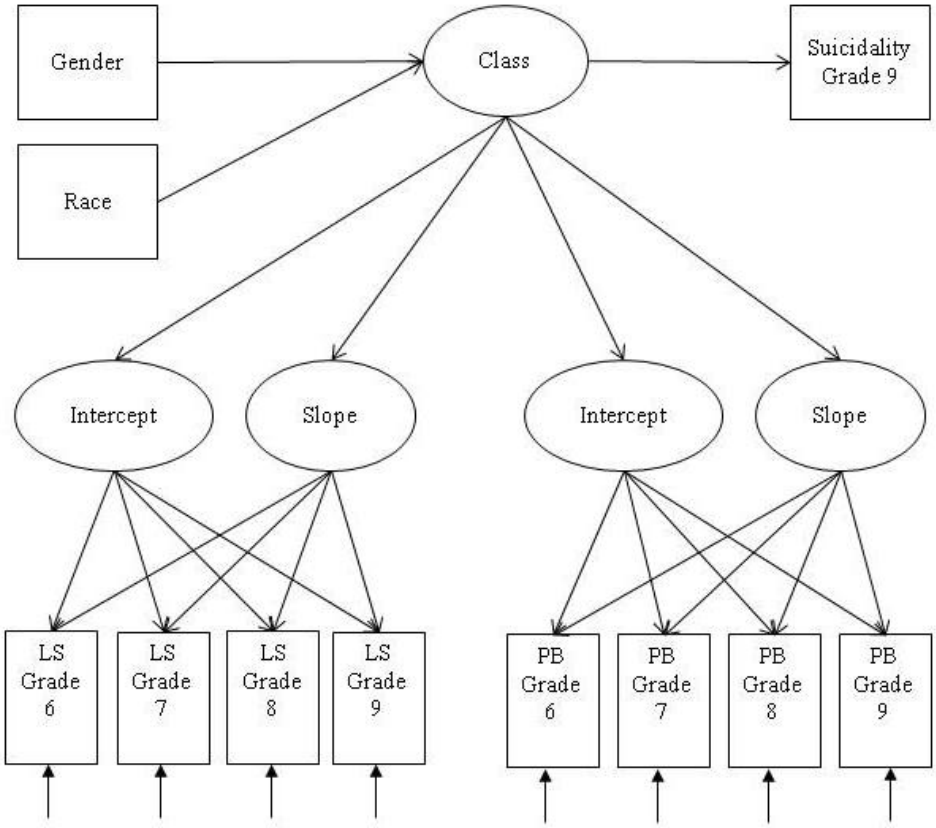

Figure 4.1. Analysis 1: Final latent growth mixture model of life satisfaction (LS) and problem behaviors (PB) across Grades 6 through 9 with race and gender included as time-invariant covariates and suicidality as a distal outcome variable.

Although the first set of analyses has many advantages, the relation between changes in Life Satisfaction and Problem Behaviors and suicidality response could not be tested directly. Additionally, model fit was examined only when the distal outcome variable was included. Therefore, the second set of analyses differed in the following ways. First, suicidality was not included in the model until *after* latent class membership had been assigned. Consequently, model fit was examined prior to the inclusion of suicidality as a distal outcome variable. Second, suicidality was regressed directly on Life Satisfaction intercept, Life Satisfaction slope, and gender instead of being regressed on latent class. Third, Life Satisfaction and Problem Behaviors trajectories were investigated in the *same* growth mixture model (GMM) (Figure 4.2).

A model with three latent classes fit the observed data significantly better than a two-class model, indicating the presence of three distinct latent trajectories (Table 4.4). To understand the composition of the latent classes better, a multiple group analysis was conducted in which students were assigned to "observable" groups using posterior probabilities of latent class membership. Next, gender and race were included as covariates of Problem Behaviors and Life Satisfaction intercept and change scores (CFI = .924, TLI=.889, RMSEA = .056, SRMR = .076). In the final step, the following relations were specified in a multiple-group growth analysis of Life Satisfaction and Problem Behaviors: 1) gender and race were included as covariates of Problem Behaviors and Life Satisfaction intercept and change scores, 2) gender and race were included as covariates of suicidality, 3) suicidality was regressed on Life Satisfaction intercept and change scores, and 4) suicidality was correlated with self-reported sadness scores (CFI = .914, TLI=.881, RMSEA = .050, WRMR = 1.434).

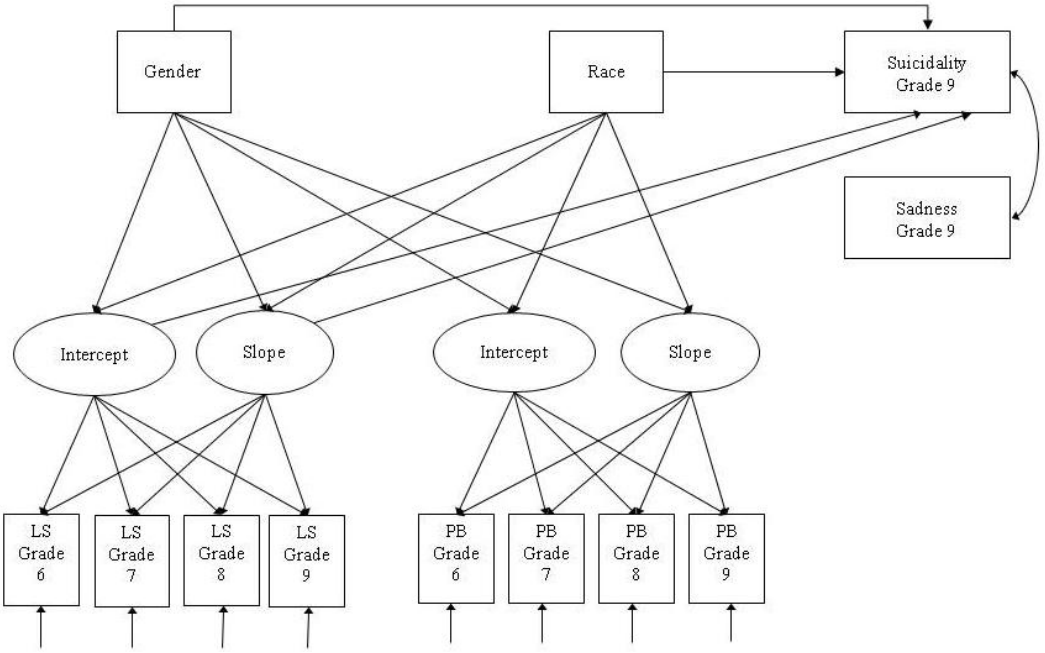

Figure 4.2. Analysis 2: Final growth mixture model of Life Satisfaction (LS) and Problem Behaviors (PB) across Grades 6 through 9 with known classes (categorical latent variables omitted)

Table 4.4 Fit Statistics for All Latent Growth Models

Model Description	Classes (n)	Free Parameters (n)	Entropy	BIC	Adjusted BIC	Log-likelihood	LMR LRT
Analysis 1							
Problem Behavior	2	22	.874	1983.7	1913.4	-921.8	1734.3, p<.001
Problem Behavior	3	33	.850	1578.8	1474.1	-684.6	467.6, p<.001
Problem Behavior with gender as covariate	3	41	.854	1603.0	1472.8	-671.3	466.8, p<.001
Problem Behavior with gender & race as covariates	3	47	.855	1630.4	1481.2	-665.9	467.9, p<.001
Life Satisfaction	2	22	.754	6138.3	6068.4	-2999.3	666.2, p<.001
Life Satisfaction	3	33	.761	6085.9	5981.1	-2938.1	120.6, p<.001
Life Satisfaction with gender as covariate	3	41	.769	6100.6	5970.3	-2920.0	138.1, p=.001
Life Satisfaction with gender & race as covariates	3	47	.767	6129.1	5979.9	-2915.3	140.3, p=.002
Problem Behavior & Life Satisfaction, gender & race as covariates	3	66	.865	7337.7	7128.2	-3459.2	578.4, p=.002
Analysis 2							
Problem Behavior & Life Satisfaction	2	39	.884	7205.1	7081.3	-3478.7	2010.0, p<.001
Problem Behavior & Life Satisfaction	3	56	.862	6747.3	6569.6	-3195.8	238.1, p=.010

The main difference between the two sets of analyses was the order in which variables and variable relationships were added. Although different types of information were obtained, both sets of analyses supported three, nearly identical, trajectory groups. For 97% of the sample, group assignment remained the same across both sets of analyses. Moreover, none of the students' assigned groups changed from one extreme to the other (e.g., from *low* to *high* risk or vice versa). Thus, the groups described below are informed by both sets of analyses. Table 4.5 summarizes the characteristics of the three groups and Figures 4.3 depicts the predicted and observed trajectories of Problem Behaviors and Life Satisfaction for the three groups.

The group labeled *low* risk had the lowest Problem Behaviors scores (M = 1.12, SD =.01) and highest Life Satisfaction scores (M = 6.26, SD =.06) across Grades 6 through 9 (n=191; 40% boys, 63% Caucasian, 23% African American). Although average Life Satisfaction scores decreased across grades for the *low* risk group, Problem Behaviors scores remained relatively low (and stable). In the *low* risk group, the probability of reporting suicidal ideation was .02 and suicidal behavior, .01. The second set of analyses revealed that change in Life Satisfaction differed significantly by gender and race in the *low* risk group. Specifically, the slopes of boys' and non-Caucasian students' Life Satisfaction scores from grades 6 through 9 were significantly more positive than girls' and Caucasian students' scores, respectively. In other words, boys and non-Caucasian students reported larger increases in life satisfaction in the low risk group than did girls or Caucasian students. A negative life satisfaction slope (i.e., decreased life satisfaction over time) was significantly related to higher ninth grade suicidality. Additionally, the positive correlation between sadness and suicidality was statistically significant in the *low* risk group only (r = .19, p = .026). Sixth-grade Life Satisfaction and Problem Behaviors scores and changes in Life Satisfaction and Problem Behaviors scores varied significantly within this group.

In the group labeled *medium* risk (n = 277; 55% boys, 44% Caucasian, 40% African American), Problem Behaviors (*M* = 1.42, *SD* =.03) and Life Satisfaction (*M* = 5.41, *SD* = .13) scores were worse than the *low* risk group, but better than the *high* risk group. Across grades, Life Satisfaction scores decreased slightly while Problem Behaviors scores increased slightly. When race was held constant, boys were significantly more likely than girls to be in this group compared to the *low* risk group (OR=1.76). When gender was held constant, Caucasian students were more likely than non-Caucasian students to be in the medium risk than low risk class (OR=1.57). The probability of reporting suicidal ideation was .09 and suicidal behavior, .10. The second set of analyses indicated significant gender differences for the *medium* risk group in amount of (1) initial Problem Behaviors, (2) change in Problem Behaviors, and (3) change in Life Satisfaction. Specifically, boys had higher sixth grade Problem Behaviors scores, smaller changes in Problem Behaviors and larger increases in Life Satisfaction than girls. Lower Life Satisfaction scores in Grade 6 were significantly related to suicidality in Grade 9. Additionally, the positive correlation between sadness and suicidality approached significance in the *medium* risk group (r = .17, p = .054).

In the group labeled *high* risk (n = 106; 67% boys, 32% Caucasian, 51% African American), students' Life Satisfaction (*M* = 4.58, *SD* = .21) and Problem Behaviors (*M* = 2.13, *SD* =.10) scores were worse than the *low* or *medium* risk group's scores. The odds ratio of being in the *high* risk compared to the *low* risk group for boys compared to girls was 3.03 when race was held constant (i.e., relative to girls, boys were more likely to be in the *high* risk than *low* risk class). When gender was held constant, the odds ratio of being in the *high* risk class compared to *low* risk class for Caucasian versus non-Caucasian students was 1.97. In the *high* risk group, the probability of reporting suicidal ideation was .10 and suicidal behavior, .16. Results from the

second set of analyses revealed that initial amount and change in Life Satisfaction and Problem Behaviors did not differ significantly by gender or race for students in the *high* risk group. Suicidality did not vary as a function Life Satisfaction, likely due to the small amount of differences in Life Satisfaction change within this group. Higher sixth-grade Problem Behaviors scores were associated with *lower* ninth-grade suicidality; however, increases in Problem Behaviors were associated with higher suicidality in ninth grade.

Table 4.5 Descriptive Information for each Latent Trajectory Class

Risk Group	Low (n=199)	Medium (n=270)	High (n=105)
Means (SD)			
6th Grade			
Problem Behavior	1.12 (0.12)	1.43 (0.31)	2.11 (0.73)
Life Satisfaction	6.22 (0.58)	5.34 (1.29)	4.78 (1.57)
Parental Involvement	4.24 (0.79)	3.64 (0.95)	3.26 (1.08)
School Social Relationships	3.00 (0.38)	2.80 (0.42)	2.56 (0.47)
9th Grade			
Problem Behavior	1.09 (0.10)	1.37 (0.31)	2.09 (0.91)
Life Satisfaction	6.01 (0.71)	5.38 (1.10)	5.07 (1.28)
Parental Involvement	4.20 (0.81)	3.67 (0.97)	3.36 (1.05)
School Social Relationships	2.91 (0.40)	2.64 (0.41)	2.46 (0.55)
Risk group (% yes)			
9th Grade Sadness	19.6*	33.1	34.3
Suicidal Ideation	5.0**	14.4	21.0*
Suicidal Behavior	2.0**	9.3	16.2**
Demographic (%)			
Boys	40.7*	55.2	65.7
Caucasian	61.3**	44.1	33.3*
African American	25.1**	38.5	51.4**
Other	13.6	17.4	15.2

*Mean problem behavior and life satisfaction scores significantly differ by group.
***Significantly different than expected at .001 level
**Significantly different than expected at .01 level
*Significantly different than expected at .05 level

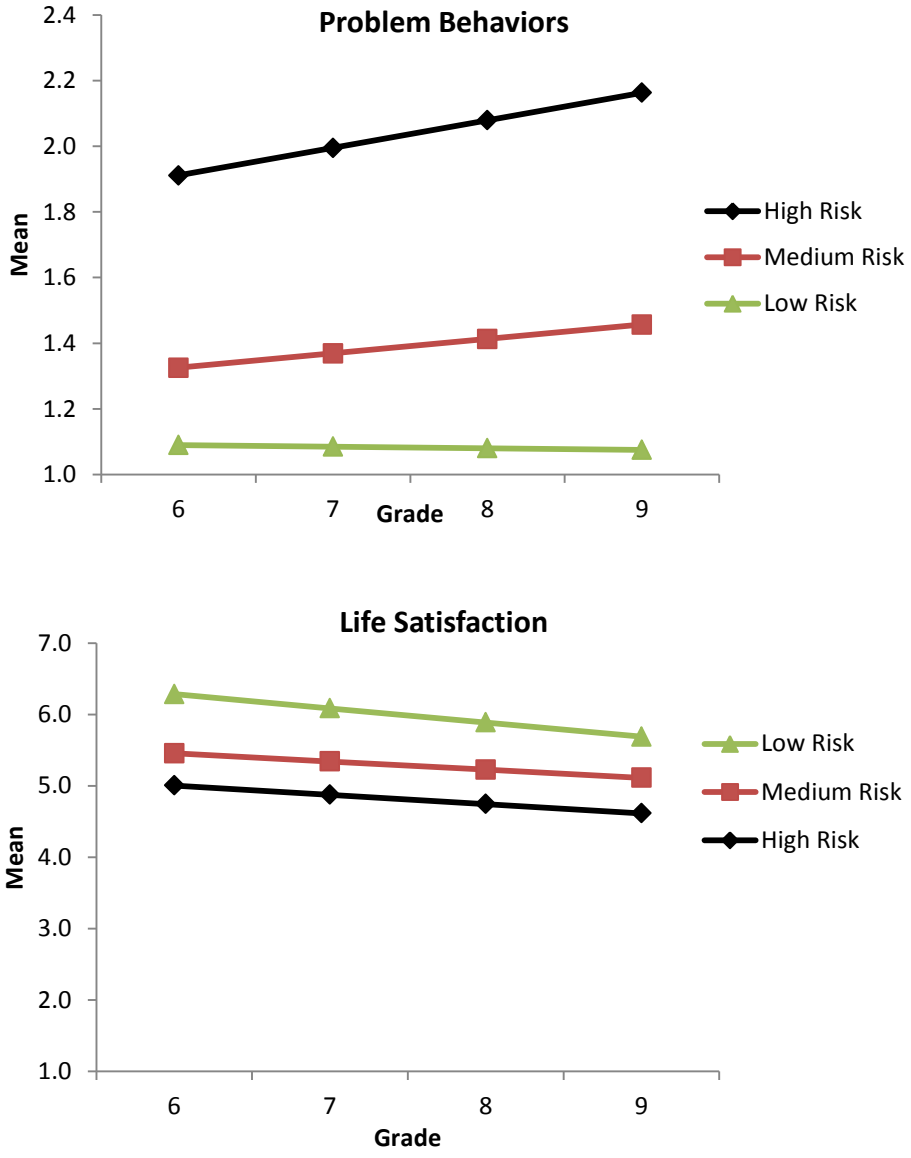

Figure 4.3 Predicted Problem Behaviors and Life Satisfaction Scores by Latent Trajectory Class

CHAPTER 5

CONCLUSION

Randomly selected ninth grade students in the Healthy Teens study completed surveys regarding life satisfaction, problem behaviors (e.g., drug use, physical aggression, drug use, delinquency, and overt victimization), parental involvement, relationships at school, feeling sad, suicidal ideation, and suicidal behaviors. Additionally, scores from teacher rating scales related to student withdrawal, depression, and social skills were included in the current study. Several hypothesized variables at different levels of the Ecological Model predicted suicidality in ninth grade.

Results of this study were consistent with national statistics and previous findings indicating that girls were significantly more likely to report suicidal ideation than boys (Centers for Disease Control and Prevention, 2012b). In contrast to the national data gathered from the Youth Risk Behavior Survey in 2011, self-reported suicidality did not differ significantly as a function of race (Centers for Disease Control and Prevention, 2012a). Moreover, this study advances understanding of adolescent suicidal ideation and behaviors in several areas. First, suicidal ideation is associated with high problem behaviors (LaFromboise, Medoff, Lee, & Harris, 2007; Yoder et al., 2006), low parental involvement (Kaminski et al., 2010; King & Merchant, 2008), lower life satisfaction(Valois et al., 2004), and worse relationships at school (Bearman & Moody, 2004; Brunstein Klomek et al., 2007; Eskin et al., 2007; King & Merchant, 2008; Rigby & Slee, 1999; Skapinakis et al., 2011). Results suggest that students who experience perceived difficulties in their immediate environment or microsystem, such as low parental

involvement or poor relationships at school, are at increased risk for reporting suicidal ideation. Additionally, students who reported suicidal ideation report significantly lower life satisfaction and higher levels of drug use, delinquency, and overt victimization than students without suicidal ideation. Deviant student behavior may reflect students' general dissatisfaction with their immediate environment. Compared to satisfaction with school relationships, life satisfaction exhibited a stronger association with suicidal ideation. Within Bronfenbrenner's Ecological Model (1977), life satisfaction broadly encompasses several spheres whereas relationships at school is more narrowly contained in a specific microsystem and the mesosystems in which school relationships interact with other contexts. Similarly, suicidal behavior was associated with higher problem behaviors(Aseltine et al., 2009; Borowsky et al., 2001; Nickerson & Slater, 2009; Tang et al., 2009; Wilcox & Anthony, 2004b), lower life satisfaction(Kim & Kim, 2008; Valois et al., 2004), and lower parental involvement (Borowsky et al., 2001; Kaminski et al., 2010; King & Merchant, 2008; Summerville, Kaslow, Abbate, & Cronan, 1994; Timmons, Selby, Lewinsohn, & Joiner, 2011) scores.

Second, teacher ratings were not robust predictors of suicidal ideation or behaviors. For *boys*, none of the teacher rating scores was significantly worse for reporters of suicidal ideation or behaviors. Although teacher-rated depression was associated with suicidal ideation and behaviors for *girls*, withdrawal score did not differ significantly between girls who reported ideation or behaviors and those who did not. These results suggest that asking students directly about life satisfaction, parental involvement, and problem behaviors would be preferable to relying on teacher assessment of behaviors that may be difficult for high school teachers to detect. By high school, students have a variety of teachers and exhibit various behaviors across settings. Consistent with an ecological model of human development, understanding distress in

one microsystem or fraction of a student's development may not provide as much information as indicators of well-being across multiple contexts.

Third, not living with both biological parents was only associated with suicidal ideation of girls. Nontraditional living arrangements may be increasingly common and account for a lack of effect of family structure (Kreider & Ellis, 2011). However, given findings from this study that underscore the importance of parent involvement, lack of parent involvement is likely a better indicator of risk than family structure.

Fourth, consistent with previous cumulative risk research (e.g., Rutter), risk factor index score was a strong predictor of suicidal ideation and behaviors (T. R. Miller & Taylor, 2005). Although examining the impact of individual variables on suicidality is important, a multivariate, child-centered approach has more ecological validity. In addition to feeling sad, risk factor index score explained a significant amount of variance in student report of suicidal ideation and behavior. Additionally, gender was no longer a significant predictor of ideation or behavior after accounting for risk factor index score. These results emphasize the necessity of investigating not only the type of risk factor present in an adolescent's life, but also, the number of risk factors that a student experiences.

Fifth, suicidality was associated with trajectories of high problem behaviors and low life satisfaction, suggesting that students who are at risk of reporting suicidal ideation or behavior could be identified as early as sixth grade (Borowsky et al., 2001; Sourander, Helstelä, Haavisto, & Bergroth, 2001; Wilcox & Anthony, 2004b). In the high risk group, for example, students' problem behaviors scores increased from sixth to seventh grade and remained higher than their peers across all grades. In contrast, problem behaviors scores of students in the low risk group were consistently low across Grades 6 through 9. Regarding life satisfaction, students who were

least likely to report suicidal ideation or behavior had the highest life satisfaction scores across Grades 6 through 9. Although life satisfaction decreased slightly across grades within this low risk group of students, their life satisfaction scores remained higher than students who were in the high risk group for endorsing suicidality. Students who were in the medium or high risk groups reported similarly low life satisfaction scores in ninth grade. Unlike the students in the medium risk group who reported consistent levels of life satisfaction across grades, however, students' life satisfaction in the high risk group decreased from 6th to 7th grade before increasing in 8th and 9th grades.

This study has some limitations. First, suicidal ideation and behaviors were reported by students but not verified by independent sources. However, given the private nature of these cognitions, the majority of studies do use self-reports (Brener, Billy, & Grady, 2003). Second, students were asked to report about thoughts, plans, behaviors, and treatment for behaviors that occurred in the previous 12 months. Although consistent with methodology implemented in previous national surveys (e.g., YRBS), data with a 12-month time frame may be less precise than a shorter time frame. Third, the sample was obtained from the southeastern region of the United States. Although the sample is a good representation of the local area, the study should be replicated in other parts of the country. Finally, other predictors—such as family history of suicidality and mental health illness—were not included in the current study.

Implications for Practice

This study has several important implications. This study demonstrated that different risk factors were associated with suicidal ideations and suicidal behaviors in ninth grade when hypothesized risk variables were analyzed individually. This study also identified specific variables, beyond sadness, that predicted unique variance in the likelihood of reporting suicidal

ideations or behaviors. For example, when sadness, risk factor index score, and gender were included in a multiple logistic regression model of suicidal ideations, feeling sad and having **two** or more risk factors significantly increased the probability of reporting suicidal ideations. Moreover, gender was *not* a significant predictor of suicidal ideations in the multivariate analysis. Similarly, when sadness, risk factor index score, and gender were included in a multiple logistic regression model of suicidal behavior, sadness and having **two** or more risk factors significantly increased the likelihood of reporting suicidal behaviors. Gender was *not* a significant predictor of suicidal behavior in the multivariate analysis.

Results from the latent growth mixture models suggest that risk factors for suicidality can be identified prior to Grade 9. Three trajectories of students were identified based upon life satisfaction and problem behaviors scores reported in Grades 6 through 9. Students in the "high risk" group consistently reported higher problem behavior and lower life satisfaction scores across all grades relative to peers. Finally, based upon the latent growth mixture models, adolescent development from sixth to ninth grades was associated with increases in negative feelings. Independent of risk group, students' self-reported life satisfaction declined from sixth to ninth grade. In contrast, a pattern of heightened problem behaviors indicated risk.

Implications for Research

Although race was included in the longitudinal analyses as a time-invariant covariate, it was not the focus of the current study. According to national cross-sectional data, suicidal ideation and behavior vary by race (Centers for Disease Control and Prevention, 2012a). Previous research with Among American Indian youth suggests that depression and substance abuse significantly predicted suicidal ideation (LaFromboise et al., 2007). Low parental involvement has been associated with depression among African American youth (Simons et al.,

2002). In the present study, although self-reported suicidality did not differ by race, specific relations between race and risk variables differed by risk group. Within the low risk group, for example, non-white students' life satisfaction increased over time. Additional research is needed to identify different risk factors and trajectories within and between races.

Consistent with previous research, in the current study, physical aggression and overt victimization were highly related (Espelage & Swearer, 2003; Graham, Bellmore, & Mize, 2006; Herrero, Estevez, & Musitu, 2006; Putallaz et al., 2007; Sullivan, Farrell, & Kliewer, 2006). In addition to the strong correlation between physical aggression and overt victimization, overt victimization was moderately correlated with drug use and delinquency. Consequently, the composite variable, Problem Behaviors, reflected behavior perpetrated and experienced by individuals.

Although few studies have investigated suicidality and the continuum of bullying behaviors in adolescence, findings have been mixed. In one study with Greek youth, victimization, but not bullying or bullying/victimization behaviors, predicted suicidal ideation In a different study, however, victimization and bullying were both associated with suicidality (Brunstein Klomek et al., 2007; Skapinakis et al., 2011). To examine differences between perpetrating aggression and experiencing aggression and suicidality, aggression and victimization variables would need to be investigated separately. Although bullying, victimization, and bullying-victimization behaviors have been associated with numerous negative outcomes, further investigation of the relation between behaviors along the bullying continuum and suicidality risk are needed.

REFERENCES

Aseltine, R. H., Schilling, E. A., James, A., Glanovsky, J. L., & Jacobs, D. (2009). Age variability in the association between heavy episodic drinking and adolescent suicide attempts: Findings from a large-scale, school-based screening program. *Journal of the American Academy of Child & Adolescent Psychiatry, 48*(3), 262-270.

Bearman, P. S., & Moody, J. (2004). Suicide and friendships among American adolescents. *American Journal of Public Health, 94*(1), 89-95. doi: 10.2105/ajph.94.1.89

Borowsky, I. W., Ireland, M., & Resnick, M. D. (2001). Adolescent suicide attempts: Risks and protectors. *Pediatrics, 107*(3), 485-493. doi: 10.1542/peds.107.3.485

Brener, N., D., Billy, J. O. G., & Grady, W. R. (2003). Assessment of factors affecting the validity of self-reported health-risk behavior among adolescents: Evidence from the scientific literature. *Journal of Adolescent Health, 33*(6), 436-457. doi: 10.1016/s1054-139x(03)00052-1

Bronfenbrenner, U. (1977). Toward an experimental ecology of human development. *American Psychologist, 32*(7), 513-531. doi: 10.1037/0003-066x.32.7.513

Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Cambridge, MA: Harvard University Press.

Brunstein Klomek, A., Marrocco, F., Kleinman, M., Schonfeld, I. S., & Gould, M. S. (2007). Bullying, depression, and suicidality in adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry, 46*(1), 40-49. doi: 10.1097/01.chi.0000242237.84925.18

Centers for Disease Control and Prevention. (2004). Methodology of the Youth Risk Behavior Surveillance System. *Morbidity and Mortality Weekly Report, 53*(RR-12), 1-14.

Centers for Disease Control and Prevention. (2010a). Suicide: Facts at a glance Retrieved September, 2010, from http://www.cdc.gov/violenceprevention/pdf/Suicide_DataSheet-a.pdf

Centers for Disease Control and Prevention. (2010b). Web-based Injury Statistics Query and Reporting System (WISQARS) Retrieved Septembter 28, 2010

Centers for Disease Control and Prevention. (2010c). Youth Risk Behavior Surveillance — United States, 2009. *MMWR, 59*(SS-5), 8-10, 59-62.

Centers for Disease Control and Prevention. (2012a). 1991-2011 High School Youth Risk Behavior Survey Data Retrieved July 13, 2012, from http://apps.nccd.cdc.gov/youthonline/App/Default.aspx

Centers for Disease Control and Prevention. (2012b). Youth Risk Behavior Survellience - United States, 2011. *MMWR, 61*(4), 68-74.

Cicchetti, D. V. (1994). Guidelines, criteria, and rules of thumb for evaluating normed and standardized assessment instruments in psychology. *Psychological Assessment, 6*(4), 284-290. doi: 10.1037/1040-3590.6.4.284

Conner, K. R., & Goldston, D. B. (2007). Rates of suicide among males increase steadily from age 11 to 21: Developmental framework and outline for prevention. *Aggression and Violent Behavior, 12*(2), 193-207. doi: 10.1016/j.avb.2006.07.002

Dieserud, G., Røysamb, E., Ekeberg, O., & Kraft, P. (2001). Toward an integrative model of suicide attempt: a cognitive psychological approach. *Suicide and Life-Threatening Behavior, 31*(2), 153-168.

Dori, G. A., & Overholser, J. C. (1999). Depression, hopelessness, and self-esteem: Accounting for suicidality in adolescent psychiatric inpatients. *Suicide and Life-Threatening Behavior, 29*(4), 309-318. doi: 10.1111/j.1943-278X.1999.tb00526.x

Eskin, M., Ertekin, K., Dereboy, C., & Demirkiran, F. (2007). Risk factors for and protective factors against adolescent suicidal behavior in Turkey. *Crisis: The Journal of Crisis Intervention and Suicide Prevention;Crisis: The Journal of Crisis Intervention and Suicide Prevention, 28*(3), 131-139. doi: 10.1027/0227-5910.28.3.131

Espelage, D. L., & Swearer, S. M. (2003). Research on school bullying and victimization: What have we learned and where do we go from here? *School Psychology Review, 32*(3), 365-383.

Evans, E., Hawton, K., & Rodham, K. (2004). Factors associated with suicidal phenomena in adolescents: A systematic review of population-based studies. *Clinical Psychology Review, 24*(8), 957-979. doi: 10.1016/j.cpr.2004.04.005

Fairweather-Schmidt, A. K., Anstey, K. J., & Mackinnon, A. J. (2009). Is suicidality distinguishable from depression? Evidence from a community-based sample. *Australian & New Zealand Journal of Psychiatry, 43*(3), 208-215. doi: doi:10.1080/00048670802653331

Farrell, A. D., Kung, E. M., White, K. S., & Valois, R. F. (2000). The structure of self-reported aggression, drug use, and delinquent behaviors during early adolescence. *Journal of Clinical Child Psychology, 29*(2), 282-292. doi: 10.1207/S15374424jccp2902_13

Fergus, S., & Zimmerman, M. A. (2005). Adolescent Resilience: A framework for understanding healthy development in the face of risk. *Annual Review of Public Health, 26*(1), 399-419. doi: doi:10.1146/annurev.publhealth.26.021304.144357

Fergusson, D. M., Beautrais, A., & Horwood, L. J. (2003). Vulnerability and resiliency to suicidal behaviours in young people. *Psychological Medicine, 33*(1), 61-73.

Fleming, T. M., Merry, S. N., Robinson, E. M., Denny, S. J., & Watson, P. D. (2007). Self-reported suicide attempts and associated risk and protective factors among secondary school students in New Zealand. *Australian & New Zealand Journal of Psychiatry, 41*(3), 213-221. doi: 10.1080/00048670601050481

Foley, D. L., Goldston, D. B., Costello, E. J., & Angold, A. (2006). Proximal psychiatric risk factors for suicidality in youth: The Great Smoky Mountains Study. *Arch Gen Psychiatry, 63*(9), 1017-1024. doi: 10.1001/archpsyc.63.9.1017

Forehand, R., Biggar, H., & Kotchick, B. A. (1998). Cumulative risk across family stressors: Short- and long-term effects for adolescents. *Journal of Abnormal Child Psychology, 26*, 119-128.

Goldbeck, L., Schmitz, T. G., Besier, T., Herschbach, P., & Henrich, G. (2007). Life satisfaction decreases during adolescence. *Quality of Life Research, 16*(6), 969-979.

Gould, M. S., Greenberg, T., Velting, D. M., & Shaffer, D. (2003). Youth suicide risk and preventive interventions: A review of the past 10 years. *Journal of the American Academy of Child & Adolescent Psychiatry, 42*(4), 386-405.

Governor's Office of Student Achievement. (2007-2008). Report Card, 2011, from http://gaosa.org/Index.aspx

Graham, S., Bellmore, A. D., & Mize, J. (2006). Peer victimization, aggression, and their co-occurrence in middle school: Pathways to adjustment problems. *Journal of Abnormal Child Psychology, 34*(3), 363-378.

Henry, D. B., & Farrell, A. D. (2004). The study designed by a committee: Design of the Multisite Violence Prevention Project. *American Journal of Preventive Medicine, 26*(1), 12-19.

Herrero, J., Estevez, E., & Musitu, G. (2006). The relationships of adolescent school-related deviant behaviour and victimization with psychological distress: Testing a general model of the mediational role of parents and teachers across groups of gender and age. *Journal of Adolescence, 29*, 671-690.

Huebner, E. S. (1994). Preliminary development and validation of a multidimensional life satisfaction scale for children. *Psychological Assessment, 6*, 149-158.

Huebner, E. S., Laughlin, J. E., Ash, C., & Gilman, R. (1998). Further validation of the multidimensional students' life satisfaction scale. *Journal of Psychoeducational Assessment, 16*, 118-134.

Jessor, R., Van Den Bos, J., Vanderryn, J., Costa, F. M., & Turbin, M. S. (1995). Protective factors in adolescent problem behavior: Moderator effects and developmental change. *Developmental Psychology, 31*(6), 923-933. doi: 10.1037/0012-1649.31.6.923

Joiner, T. E. (2005). *Why people die by suicide*. Cambridge, MA: Harvard University Press.

Joiner, T. E., Johnson, F., & Soderstrom, K. (2002). Association between serotonin transporter gene polymorphism and family history of attempted and completed suicide. *Suicide and Life-Threatening Behavior, 32*(3), 329-332. doi: 10.1521/suli.32.3.329.22167

Kaminski, J., Puddy, R., Hall, D., Cashman, S., Crosby, A., & Ortega, L. (2010). The relative influence of different domains of social sonnectedness on self-directed violence in adolescence. *Journal of Youth and Adolescence, 39*(5), 460-473. doi: 10.1007/s10964-009-9472-2

Kazdin, A. E., Kraemer, H. C., Kessler, R. C., Kupfer, D. J., & Offord, D. R. (1997). Contributions of risk-factor research to developmental psychopathology. *Clinical Psychology Review, 17*(4), 375-406.

Kim, H. S., & Kim, H. S. (2008). Risk factors for suicide attempts among Korean adolescents. *Child Psychiatry and Human Development, 39*(3), 221-235. doi: 10.1007/s10578-007-0083-4

King, C. A., Kerr, D. C. R., Passarelli, M. N., Foster, C. E., & Merchant, C. R. (2010). One-year follow-up of suicidal adolescents: Parental history of mental health problems and time to post-hospitalization attempt. *Journal of Youth & Adolescence, 39*(3), 219-232. doi: 10.1007/s10964-009-9480-2

King, C. A., & Merchant, C. R. (2008). Social and interpersonal factors relating to adolescent suicidality: A review of the literature. *Archives of Suicide Research, 12*(3), 181-196. doi: 10.1080/13811110802101203

Kline, R. B. (2005). *Principles and practice of structural equation modeling* (Second ed.). New York: The Guilford Press.

Kreider, R. M., & Ellis, R. (2011). Living arrangements of children: 2009. *Current Population Reports* (pp. 70-126). Washington, DC: U.S. Census Bureau.

LaFromboise, T. D., Medoff, L., Lee, C. C., & Harris, A. (2007). Psychosocial and cultural correlates of suicidal ideation among American Indian early aolescents on a Northern Plains reservation. *Research in Human Development, 4*(1/2), 119-143. doi: 10.1080/15427600701481020

Lee, J., Choi, H., Kim, M. J., Park, C. G., & Shin, D.-s. (2009). Anger as a predictor of suicidal ideation in middle-school students in Korea: gender difference in threshold point. *Adolescence, 44*(174), 433-446.

Leung, C. Y.-W., McBride-Chang, C., & Lai, B. P.-Y. (2004). Relations among maternal parenting style, academic competence, and life satisfaction in Chinese early adolescents. *The Journal of Early Adolescence, 24*(2), 113-143. doi: 10.1177/0272431603262678

Ma, C. Q., & Huebner, E. S. (2008). Attachment relationships and adolescents' life satisfaction: Some relationships matter more to girls than boys. *Psychology in the Schools, 45*(2), 177-190.

Malone, K., Oquendo, M., A. , Haas, G., Ellis, S., P. , & et al. (2000). Protective factors against suicidal acts in major depression: Reasons for living. *The American Journal of Psychiatry, 157*(7), 1084.

Mann, J. J., Apter, A., Bertolote, J., Beautrais, A., Currier, D., Haas, A., . . . Hendin, H. (2005). Suicide prevention strategies: A systematic review. *Journal of the American Medical Association, 294*(16), 2064-2075. doi: 10.1001/jama.294.16.2064

Miller, D. N., & Eckert, T. L. (2009). Youth Suicidal Behavior: An Introduction and Overview. *School Psychology Review, 38*(2), 153-167.

Miller, D. N., Mazza, J. J., & Eckert, T. L. (2009). Suicide prevention programs in the schools: A review and public health perspective. *School Psychology Review, 38*(2), 168-188.

Miller, T. R., & Taylor, D. M. (2005). Adolescent suicidality: Who will ideate, who will act? *Suicide and Life-Threatening Behavior, 35*(4), 425-435.

Multisite Violence Prevention Project. (2004). The Multisite Violence Prevention Project: Background overview. *American Journal of Preventive Medicine, 26*(1), 3-11.

Muthén, B. (2004). Latent variable analysis: Growth mixture modelling and related techniques for longitudinal data. . In D. Kaplan (Ed.), *Handbook of quantitative methodology for the social sciences* (pp. 345–368). Newbury Park, CA: Sage Publications.

Nickerson, A. B., & Slater, E. D. (2009). School and community violence and victimization as predictors of adolescent suicidal behavior. *School Psychology Review, 38*(2), 218-232.

Nylund, K. L., Asparouhov, T., & Muthén, B. O. (2007). Deciding on the number of classes in latent class analysis and growth mixture modeling: A Monte Carlo simulation study. *Structural Equation Modeling, 14*(4), 535-569.

Prinstein, M. J. (2008). Introduction to the special section on suicide and nonsuicidal self-injury: A review of unique challenges and important directions for self-injury science. *Journal of Consulting and Clinical Psychology, 76*(1), 1-8. doi: 10.1037/0022-006x.76.1.1

Proctor, C. L., Linley, P. A., & Maltby, J. (2009). Youth life satisfaction: A review of the literature. *Journal of Happiness Studies, 10*(5), 583-630. doi: 10.1007/s10902-008-9110-9

Putallaz, M., Grimes, C. L., Foster, K. J., Kupersmidt, J. B., Coie, J. D., & Dearing, K. (2007). Overt and relational aggression and victimization: Multiple perspectives within the school setting. *Journal of School Psychology, 45*(5), 523-547.

Reynolds, C. R., & Kamphaus, R. W. (1992). BASC (Behavioral Assessment System for Children) manual *BASC (Behavioral Assessment System for Children) manual B2 - BASC (Behavioral Assessment System for Children) manual* (pp. 48). Circle Pines, MN: American Guidance Service.

Rigby, K., & Slee, P. (1999). Suicidal Ideation among adolescent school children, involvement in bully—victim problems, and perceived social support. *Suicide and Life-Threatening Behavior, 29*(2), 119-130. doi: 10.1111/j.1943-278X.1999.tb01050.x

Roland, E. (2002). Bullying, depressive symptoms and suicidal thoughts. *Educational Research, 44*(1), 55-67. doi: 10.1080/00131880110107351

Rosenberg, H. J., Jankowski, M. K., Sengupta, A., Wolfe, R. S., Wolford, G. L., & Rosenberg, S. D. (2005). Single and multiple suicide attempts and associated health risk factors in New Hampshire adolescents. *Suicide and Life-Threatening Behavior, 35*(5), 547-557.

Rutter, M. (1979). Protective factors in children's responses to stress and disadvantage. In M. W. Kent & J. E. Rolf (Eds.), *Primary prevention of psychopathology* (Vol. 3, pp. 49-74). Hanover, NH: University Press of New England.

Sharaf, A. Y., Thompson, E. A., & Walsh, E. (2009). Protective effects of self-esteem and family support on suicide risk behaviors among at-risk adolescents. *Journal of Child and Adolescent Psychiatric Nursing, 22*(3), 160-168. doi: 10.1111/j.1744-6171.2009.00194.x

Silverman, M. M., Berman, A. L., Sanddal, N. D., O'Carroll, P. W., & Joiner, T. E. (2007a). Rebuilding the Tower of Babel: A revised nomenclature for the study of suicide and suicidal behaviors. Part I: Background, rationale, and methodology. *Suicide and Life-Threatening Behavior, 37*(3), 248-263.

Silverman, M. M., Berman, A. L., Sanddal, N. D., O'Carroll, P. W., & Joiner, T. E. (2007b). Rebuilding the Tower of Babel: A revised nomenclature for the study of suicide and suicidal behaviors: Part II: Suicide-related ideations, communications and behaviors. *Suicide and Life-Threatening Behavior, 37*(3), 264-277. doi: 10.1521/suli.2007.37.3.264

Simons, R. L., Murry, V., McLoyd, V., Lin, K.-H., Cutrona, C., & Conger, R. D. (2002). Discrimination, crime, ethnic identity, and parenting as correlates of depressive symptoms among African American children: A multilevel analysis. *Development and Psychopathology, 14*(02), 371-393. doi: doi:10.1017/S0954579402002109

Skapinakis, P., Bellos, S., Gkatsa, T., Magklara, K., Lewis, G., Araya, R., . . . Mavreas, V. (2011). The association between bullying and early stages of suicidal ideation in late adolescents in Greece. *BMC Psychiatry, 11*(1), 22-30. doi: 10.1186/1471-244x-11-22

Sourander, A., Brunstein Klomek, A., Niemelä, S., Haavisto, A., Gyllenberg, D., Helenius, H., . . . Gould, M. S. (2009). Childhood predictors of completed and severe suicide attempts: findings from the Finnish 1981 Birth Cohort Study. *Archives of General Psychiatry, 66*(4), 398-406.

Sourander, A., Helstelä, L., Haavisto, A., & Bergroth, L. (2001). Suicidal thoughts and attempts among adolescents: a longitudinal 8-year follow-up study. *Journal of Affective Disorders, 63*(1-3), 59-66.

Subtance Abuse and Mental Health Services Administration. (2009). National Strategy for Suicide Prevention- Compendium of Federal Activities Retrieved September, 2010, from http://www.samhsa.gov/mentalhealth/NSSPCompendium_v2_March09.pdf

Suldo, S. M., & Huebner, E. S. (2004). The role of life satisfaction in the relationship between authoritative parenting dimensions and adolescent problem behavior. *Social Indicators Research, 66*(1), 165-195. doi: 10.1023/B:SOCI.0000007498.62080.1e

Sullivan, T. N., Farrell, A. D., & Kliewer, W. (2006). Peer victimization in early adolescence: Association between physical and relational victimization and drug use, aggression, and

delinquent behaviors among urban middle school students. *Development and Psychopathology, 18*(1), 119-137.

Summerville, M. B., Kaslow, N. J., Abbate, M. F., & Cronan, S. (1994). Psychopathology, family functioning, and cognitive style in urban adolescents with suicide attempts. *Journal of Abnormal Child Psychology, 22*(2), 221-235.

Swahn, M. H., Bossarte, R. M., & Sullivent, E. E. (2008). Age of alcohol use initiation, suicidal behavior, and peer and dating violence victimization and perpetration among high-risk, seventh-grade adolescents. *Pediatrics, 121*(2), 297-305. doi: 10.1542/peds.2006-2348

Tang, T.-C., Ko, C.-H., Yen, J.-Y., Lin, H.-C., Liu, S.-C., Huang, C.-F., & Yen, C.-F. (2009). Suicide and its association with individual, family, peer, and school factors in an adolescent population in southern Taiwan. *Suicide and Life-Threatening Behavior, 39*(1), 91-102. doi: 10.1521/suli.2009.39.1.91

Thatcher, W. G., Reininger, B. M., & Drane, J. W. (2002). Using path analysis to examine adolescent suicide attempts, life satisfaction, and health risk behavior. *The Journal of School Health, 72*(2), 71-77.

Thompson, M., Kuruwita, C., & Foster, M. (2009). Transitions in suicide risk in a nationally representative sample of adolescents. *Journal of Adolescent Health, 44*, 458-463. doi: 10.1016/j.jadohealth.2008.10.138

Timmons, K. A., Selby, E. A., Lewinsohn, P. M., & Joiner, T. E. (2011). Parental displacement and adolescent suicidality: Exploring the role of failed belonging. *Journal of Clinical Child & Adolescent Psychology, 40*(6), 807-817. doi: 10.1080/15374416.2011.614584

Trentacosta, C. J., Hyde, L. W., Shaw, D. S., Dishion, T. J., Gardner, F., & Wilson, M. (2008). The relations among cumulative risk, parenting, and behavior problems during early

childhood. *Journal of Child Psychology and Psychiatry and Allied Disciplines, 49*(11), 1211-1219.

Trzcinski, E., & Holst, E. (2008). Subjective well-being among young people in transition to adulthood. *Social Indicators Research, 87*(1), 83-109. doi: 10.1007/s11205-007-9160-0

Valois, R. F., Zullig, K. J., Huebner, E. S., & Drane, J. W. (2004). Life satisfaction and suicide among high school adolescents. *Social Indicators Research, 66*(1-2), 81-105.

Van Orden, K. A., Witte, T. K., Cukrowicz, K. C., Braithwaite, S. R., Selby, E. A., & Joiner, T. E., Jr. (2010). The interpersonal theory of suicide. *Psychological Review, 117*(2), 575-600. doi: 10.1037/a0018697

Van Orden, K. A., Witte, T. K., Gordon, K. H., Bender, T. W., & Joiner, T. E., Jr. (2008). Suicidal desire and the capability for suicide: Tests of the interpersonal-psychological theory of suicidal behavior among adults. *Journal of Consulting and Clinical Psychology, 76*(1), 72-83. doi: 10.1037/0022-006x.76.1.72

Wilcox, H. C., & Anthony, J. C. (2004a). Child and adolescent clinical features as forerunners of adult-onset major depressive disorder: retrospective evidence from an epidemiological sample. *Journal of Affective Disorders, 82*(1), 9-20.

Wilcox, H. C., & Anthony, J. C. (2004b). The development of suicide ideation and attempts: an epidemiologic study of first graders followed into young adulthood. *Drug and Alcohol Dependence, 76, Supplement,* S53-S67. doi: 10.1016/j.drugalcdep.2004.08.007

Yoder, K. A., Whitbeck, L. B., Hoyt, D. R., & LaFromboise, T. (2006). Suicidal ideation among American Indian youths. *Archives of Suicide Research, 10*(2), 177-190. doi: 10.1080/13811110600558240