Associations amongst Mental Health Indicators and Adolescent Risk Behaviors: The 2003 North Carolina High School Youth Risk Behavior Survey

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Abstract

Tonya Ann Gscheidle: Associations amongst Mental Health Indicators and Adolescent Risk Behaviors: The 2003 North Carolina High School Youth Risk Behavior Survey
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This investigation examined the relationship between self-reported mental health difficulties and risk behaviors in adolescents. The first question asked whether or not gender, race, or disability status predicted adolescent responses to selected mental health indicators from the 2003 North Carolina Youth Risk Behavior Survey (YRBS). The second question examined whether or not the experience of mental health indicators predicted engagement in the selected risk behavior indicators. Finally, the third question examined interactions between the mental health indicators and gender, race, and ethnicity to determine whether those interactions would predict experience of the risk behavior indicators. Participants were 9^{th}, 10^{th}, 11^{th}, and 12^{th} grade high school students (N=2553) from randomly selected high schools in North Carolina. While all of the models analyzed showed that the data itself demonstrated a good fit statistically, none of the models using mental health or risk behavior indicators as an outcome were successful for predicting group membership. Although significant contributions to the outcome variables were found for all models, the variance explained by the predictor variables was very small, ranging from 1% to 13%. Among the most consistent predictors were gender, disability status, and suicidal ideation. These results

support the need for further research on the relationship between mental health and risk behaviors as the basis for defining prevention and intervention programs.

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Chapter 1

Review of the Literature

Mental and behavioral disorders can lead to school failure, alcohol use and abuse, substance abuse, violence, or suicide (NASP, 1998). In order to prevent these negative outcomes, it is vitally important for mental health disorders to be identified as early as possible in order to implement effective interventions. Better services and collaboration for children who have mental health needs will result in more positive outcomes for these children and youth such as greater school completion, decreased contact with the juvenile justice system, increased stability in living arrangements, and improved educational, emotional and behavioral development [U.S. Department of Health and Human Services (USDHHS), 2000; Quinn & Poirier, 2004]. Some school districts around the country are turning to school-based mental health services to try and combat these problems (e.g., Casat, Sobolewski, & Gordon, 1999; Flaherty & Weist, 1999; Adelsheim, Carillo, & Colletta, 2001) since comprehensive school-based programs increase the likelihood that at-risk students will stay in school (United States General Accounting Office, 1993).

One goal stated in Healthy People 2010 (USDHHS, 2000) is to "improve mental health and ensure access to appropriate, quality mental health services" (p. 3), including the objective of increasing the proportion of children and adolescents with mental health disorders who receive treatment. The annual prevalence of mental disorders in children and adolescents is not as well documented as that for adults, however about 20 percent of children are estimated to have mental disorders with at least mild functional impairment

(Report of the Surgeon General, 1999). Federal regulations also define a sub-population of children and adolescents with more severe functional limitations, known as "serious emotional disturbance" (SED) or behaviorally-emotionally disabled (BED).

Children and adolescents with SED number approximately 5 to 9 percent of children ages 9 to 17. Not all mental disorders identified in childhood and adolescence persist into adulthood, even though the prevalence of mental disorders in children and adolescents is about the same as that for adults (i.e., about 20 percent of each age population). While some disorders do continue into adulthood, a substantial fraction of children and adolescents recover or "grow out of" a disorder, whereas, a substantial fraction of adults develops mental disorders in adulthood (Report of the Surgeon General, 1999, p. 46).

Thus, the nature and distribution of mental disorders in young people are somewhat different from those of adults. About five percent of children and adolescents are severely impaired by mental, behavioral and emotional disorders. Of young people aged 9 to 17 years who have a mental health disorder, 27 percent receive treatment in the health sector and an additional 20 percent use mental health services in their schools (USDHHS, 2000). One way to improve mental health and access to services is to identify risk-factors that lead to the development of emotional and behavioral problems in students.

The Youth Risk Behavior Surveillance System (YRBSS) is one mechanism that the Centers for Disease Control (CDC) use to evaluate progress toward the Healthy People 2010 leading health indicators (USDHHS, 2000). Those indicators are listed in Table 1.1.

Table 1.1 Leading Health Indicators of Healthy People 2010

10 Leading Health Indicators of Healthy People 2010
• Physical Activity
• Overweight and Obesity
• Tobacco Use
• Substance Abuse

- Responsible Sexual Behavior
- Mental Health
- Injury and Violence
- Environmental Quality
- Immunization
- Access to Health Care

The Healthy People 2010 objectives provide a comprehensive agenda for improving the health of all persons in the United States during the first decade of the 21st century (Grunbaum, Kann, Kinchen, Ross, Hawkins, Lowry, Harris, McManus, Chyen, & Collins, 2004). State and local agencies and nongovernmental organizations use Youth Risk Behavior Survey (YRBS) data to set health education and health promotion goals, support curricula or program modifications, support legislation that promotes health, and seek funding for new initiatives (Grunbaum et al. 2004). As an example, the CDC uses YRBS data to assess trends in priority health-risk behaviors among high school students (Grunbaum et al., 2004). Each state can also use the data to assess the behavior of their students and then implement programs to prevent engagement in risk behaviors. These risk behaviors include those in the mental health realm, such as experiencing suicidal ideation, stress, loneliness, and depression.

In addition to national efforts to increase awareness for the need for mental health prevention and intervention services, there have also been statewide efforts. North Carolina has an initiative called NC Healthy Schools (www.nchealthyschools.org) that is sponsored both by the Department of Public Instruction and Department of Health and Human Services.

This initiative is focused on promoting healthier student behaviors to support learning in the classroom, using the following eight components:

- Health Education
- Safe Environment
- Mental and Social Health
- Staff Wellness
- Health Services
- Nutrition Services
- Physical Education
- Family Involvement

The mental and social health component of NC Healthy Schools has the overall goal of "promoting provision of adequate resources and service coordination to ensure access by students, families, and staff to mental health services" by addressing the students'

- Acceptance of self
- The ability to express thoughts and feelings in a responsible manner
- Understanding and respect for differences in others
- Positive interpersonal relationships
- The ability to give and receive support
- Awareness of stresses which interfere with healthy development
- Willingness to request assistance when needed
- A supportive school environment that links to community resources.

The goals of the eight components of healthy schools are tracked by several databases maintained by NCDPI, including yearly YRBS data (Center for Health and Care in Schools, 2004).

Given the proportion of time children and youth spend attending school, one promising way to address the mental health needs of children and adolescents is through prevention and identification efforts at the local school system level. The National Association of School Psychologists (NASP, 1998) issued a position statement on mental health services in the schools outlining the need for collaboration between home, school, and community to meet the needs of children and adolescents to assure positive academic and behavioral outcomes. Approximately 70% of behaviorally and emotionally disabled (BED) students are performing below grade level, with the extent of academic deficits increasing with age (Knitzer, Steinberg, & Fleisch, 1990). In addition, only one third of high school students classified as BED are able to pass minimum competency exams (Knitzer et al., 1990).

In a national study examining programs and policies for children with behavioral and emotional disorders, 80% of children identified with behavioral or emotional disorders are educated in public schools (Knitzer et al., 1990). Thirty-five percent spend part of their day in a pull-out resource room, 37% are in self-contained classes, and 10% are served in the regular classroom, while 18% are completely removed from school. Of the 18% removed from school, 12% are being served in day treatment programs and four percent are placed in residential settings. The remaining two percent of students are in juvenile detention centers, inpatient hospitals, or receive home schooling (Knitzer et al., 1990).

Modern school-based mental health services were conceived in the 1950s with the Primary Mental Health Project (PMHP; Cowen, Hightower, Pedro-Carroll, Work, Wyman, and Haffey, 2003). Prior to the development of the PMHP, mental health services for children and adolescents mirrored that of adults, and were characterized by similar problems of cost, access, and focused on repair or "damage control" rather than prevention. Early services also focused on the most severely disabled children, requiring the most time and resources.

Slowly there was a shift from focusing on treatment of dysfunction to focusing on prevention. Schools were recognized as a key force in child development. According to Cowen et al. (2003), the PMHP was based on the following premise:

> Young children, are, relatively speaking, flexible, malleable organisms. Whatever the nature of the difficulties they experience in their early development, those difficulties are less likely, than for older children, to have rooted or fanned out. Thus, the facilitating qualities of having (a) less crystallized problems; (b) fewer set, maladaptive ways of coping with such problems; and (c) the ability to pick up flexibly on new learning and alternatives, each characteristic of the young child, made that age group the logical target for informed prevention programming (p. 13).

Thus, school-based mental health services began to take on a prevention approach and focus on risk indicators of children and adolescents, rather than waiting for a serious disorder to develop before beginning treatment.

A common point of identification and service entry for intervention is through existing community-based child care programs and federally funded programs that target children with disabilities (e.g., Child Find, Head Start; Smith & Fox, 2003). For the most part, access to services is based on a program's eligibility criteria rather than on the needs of children and families. Thus, proactive and systematic identification of high-risk children with specific needs matched to services rarely occurs (Conroy, Hendrickson, & Hester,

2004). Research demonstrates that the majority of severe and chronic problem behaviors demonstrated by school-age children and adolescents originate from behavior patterns established in early childhood (Webster-Stratton, 2000). However, current identification and intervention practices are reactive, once behavior problems are established and more difficult to impact (Conroy, Hendrickson, & Hester, 2004).

Rates of emotional and behavioral problems in 2-year olds range from 12% to 16%, with one third of those toddlers demonstrating a significant delay in emotional competence (Webster-Stratton, 2000). It has been estimated that 7-25% of all preschool age children demonstrate significant behavioral difficulties; 24% of children in Head Start have externalizing behavior problems in the clinical or borderline range and 6.5% have internalizing problems such as withdrawal (Webster-Stratton, 2000). Campbell (1994) determined that many children displaying significant problem behaviors in early childhood were at high risk for school failure and for being identified as having emotional or behavioral disorders in school. In fact, Campbell noted that preschool-age children who demonstrate significant problem behaviors have a 50% chance of demonstrating continued problems such as peer rejection, drug abuse, depression, juvenile delinquency, and school dropout during adolescence.

In addition to addressing the mental health needs of students through service provision, it is also important to identify factors that lead students to self-report mental health difficulties such as if gender and race influence whether or not students self-report mental health needs (Marcotte, Fortin, Potvin, & Papillon, 2002; Sue & Sue, 1999). Whether or not students self-identify as having a disability (documented or perceived) may also increase the

likelihood of indicating they experience loneliness, suicidal ideation, lower self-esteem, and a lower overall quality of life.

Models of Psychopathology and Risk Behaviors for Adolescents

Engel (1983) suggested that illnesses and diseases do not have one major cause but rather are a product of several factors. Specifically, Engel's framework focused on the biological, psychological, and social factors that influence disease and coined this framework the 'biopsychosocial model of disease.' The purpose of the biopsychosocial model is to take a broad view, to assert that simply looking at biological factors alone is not enough. According to Engel's model, biopsychosocial factors are involved in the causes, manifestation, course, and outcome of health and disease, including mental disorders (Report of the Surgeon General, 1999).

> One single factor in isolation—biological, psychological, or social—may weigh heavily or hardly at all, depending on the behavioral trait or mental disorder. That is, the relative importance or role of any one factor in causation often varies. But this does not mean that genetic factors completely preordain or fix the nature of the disorder and that psychological and social factors are unimportant. These social factors modify expression and outcome of disorders. The relative roles of biological, psychological, or social factors also may vary across individuals and across stages of the life span. In some people, for example, depression arises primarily as a result of exposure to stressful life events, whereas in others the foremost cause of depression is genetic predisposition (Report of the Surgeon General, 1999, p. 51).

Thus, it is important not to look at one single factor in isolation of the others. Engel's biopsychosocial model is widely used in the fields of psychology and public health today to explain the effects of psychopathology (or disease) beyond the biological realm and to stress the importance that biology (in the form of the disease or genetics), psychology (in the form of emotional development) and sociology (in the form of secure support networks and family) all influence how the pathology is manifested.

Erikson's Psychosocial Theory. Erikson's theory of child development focuses on the interrelationship between a developing child's internal psychosexual development and his

or her emotional development, emphasizing the interpersonal relationships that arise between the child and parents throughout the child's lifespan (Erikson, 1950).

Erikson conceived of the life course, from birth to old age, as a series of eight epigenetic stages that, proceed in a stepwise fashion, the next dependent upon how well the previous has been mastered: trust versus mistrust; autonomy versus shame and doubt; initiative versus guilt; industry versus inferiority; identity versus role diffusion; intimacy versus isolation; generativity versus stagnation; ego integrity versus despair (Santrock, 2003). Erikson portrayed each stage as a crisis or conflict that needed resolution, either at the time or at a subsequent stage. Each successive stage presents its own challenges but, at the same time, offers the opportunity for correction of unresolved challenges of previous stages. Psychopathology, in the form of a mental disorder, would arise if a stage was ultimately not mastered successfully. The stage that focuses on adolescence (identity vs. identity confusion) centers on the adolescent being able to explore new roles as they head into adulthood. If the adolescent is prohibited from being allowed to explore such roles or is pushed into a role by parents or others, then identity confusion will arise (Santrock, 2003).

School Failure Theory. Post (1981) identified a theory to explain how having a learning disability influences the propensity for delinquency. Post states that delinquent behavior can be a secondary result of disability as disability can lead to school failure which can contribute to poor self-esteem of the student. The low self-esteem can lead a student to participate in activities (usually negative) to raise their sense of self. Those activities can then lead to school suspension or dropout. This student will then befriend others who have also dropped out or been suspended and continue to engage in delinquent and/or risk behaviors (Quinn & Poirier, 2004).

Susceptibility Theory. Keilitz & Dunivant (1987) postulated that delinquency can result from "behaviors that are a direct result of the defining characteristics of the disability. These characteristics (e.g., personality traits, cognitive deficits) lead to a lack of impulse control, suggestibility, and poor perceptions of social cues, which in turn put these children and adolescents at greater risk for delinquent behavior" (p. 125). Thus, students with disabilities can be more susceptible to participating in risk behaviors compared to their non-disabled peers because they are looking for ways to fit in with other students.

Variables Impacting Psychopathology

There are a number of factors that may influence or impact psychopathology. The factors examined in this study include gender, race and ethnicity, and whether or not a student reports a disability. Many times these factors overlap (e.g., a student's race and gender may impact psychopathology) making it difficult to tease out the contribution of individual factors.

Ethnicity. Culture is a critical variable with regard to the individual's manifestation of symptoms, coping styles, social supports, and use of professional services and the provider's delivery of services (Nastasi, Moore, & Varjas, 2004). Mental illness is prevalent across all racial and ethnic groups; prevalence rates among ethnic and minority groups are similar to that of Whites. Exceptions to the above statement include the following two groups: (a) vulnerable, high-need groups (e.g., homeless, institutionalized, incarcerated) who have high prevalence rates and are underrepresented in community surveys and (b) smaller racial or ethnic minority groups (American Indians, Alaskan Natives, Asian Americans, and Pacific Islanders) who are insufficiently studied (USDHHS, 2001). The burden associated with mental illness is greater for minority groups because of disparities related to access and availability of mental health care. Specific cultural factors that also influence the extent to

which minorities seek out mental health care include the stigma of mental illness, mistrust of providers, and miscommunication between patients and providers (Nastasi et al., 2004; Sue & Sue, 1999).

Minorities experience social and economic inequalities (poverty, violence, racism, discrimination) that influence mental health. The most influential of these inequalities is poverty (Nastasi et al., 2004). Poverty is associated with school difficulties (retention, expulsion, dropout), teen pregnancy, low birth weight and infant mortality, lead poisoning, limited educational attainment, poor employment opportunities and unemployment, limited emotional support and cognitive stimulation (Children's Defense Fund, 2002). In 1999, 16% of children lived in poverty. Approximately 25-50% of behaviorally and emotionally disabled students live in poverty (Knitzer et al., 1990). Children living in female headed households had a greater likelihood of being poor compared to those living in two parent households. The risk of poverty was also greater for African American and Hispanic children compared to White children (Federal Interagency Forum on Child and Family Statistics, 2001).

Disability. Cadman, Boyle, Szatmari, and Offord (1987) conducted the Ontario Child Health Study to determine the connection between chronic illness and psychiatric disorders. Specifically, children aged 4-16 were classified into three groups: those with a chronic illness with a disability, those with a chronic illness without disability, and physically healthy. Results of the study indicated that children with chronic illness, regardless if a disability was present, were 2.4 times more likely to be at risk for a psychiatric disorder compared to healthy children. Children with chronic illness accompanied by a learning disability were at the highest risk for developing a secondary psychiatric disorder such as

anxiety and depression. "Children whose normal functional abilities are limited face the greatest challenges in everyday activities, which in turn increases behavioral, social, and school adjustment difficulties" (Mash & Wolfe, 2002, p. 341). Other studies examining the effects of disability status on overall quality of life will be discussed below.

Mental Health Indicators

As with factors impacting psychopathology discussed above, it can be very difficult to isolate different mental health symptoms or indicators. Students can exhibit multiple symptoms or diagnoses, known as comorbidity. Many symptoms are also related to each other (e.g., depression, loneliness, low self-esteem can cluster together). Listed below is research on the mental heath indicators analyzed in the current study.

Depression. A study conducted by Marcotte et al. (2004) using 547 French Canadian adolescents (age 11-18) found that girls reported significantly more depressive symptoms than boys. Girls also reported having a more negative body image, lower self-esteem, and a higher number of stressful life events. The adolescents (both boys and girls) were divided into two groups based on age; the youngest group (age 11-12) had a more positive body image as well as a lower number of stressful events compared to their older counterparts. Adolescents in the study who reported having depressive symptoms (as measured by the Beck Depression Inventory) also reported having a more negative body image, lower self-esteem, and a higher number of negative life events. Girls and boys who had a positive body image reported higher self-esteem. For girls specifically, positive body image correlated with a lower number of stressful life events. Gender was found to be a significant predictor of depression as well as body image, negative stress life events and self-esteem. Overall, the investigators found that body image, self-esteem and negative stressful life events mediated the relationship between gender and depressive symptoms during adolescence.

Suicide. Suicide is the third leading cause of death for adolescents and young adults (15-24) and the fourth leading cause of death for children 5-14 (NIMH, 1999). The suicide rate has increased by 200 to 300% over the 30 year period from the 1960s to 1990s (Malley, Kush, & Bogo, 1994).

According to 2001 YRBS data, 8.8% of high school students (grades 9-12; N= 13,601; 11.2% female; 6.2% male) reported attempting suicide at least one time during the preceding 12 months while 2.6% of respondents (3.1% female; 2.1% male) reported making a suicide attempt during that same period that resulted in injury, overdose, or poisoning that required medical treatment. Overall, 14.8% of students (17.7% female; 11.8% male) reported serious suicidal ideation (made a specific plan); 19% (23.6% female; 14.2% male) seriously considered attempting suicide and 28.3 % (female students 34.5%; male students 21.6%) reported feeling sad or hopeless enough to discontinue some usual activities (CDC, 2002).

Self-esteem. Gender differences surrounding socio-emotional experiences increase during adolescence. Specifically, girls develop lower self-esteem compared to boys. From the ages of 8 to 16, girls dropped 31 percentage points in self-esteem compared to 21 points for boys. Overall, 29 percent of high school girls felt positive about themselves compared to 46 percent of boys (Santrock, 2003). Girls are also more likely to express fear and sadness when communicating, while boys turn their feelings (especially anger) into aggressive actions (Santrock, 2003). In addition, girls tend to ruminate in depressed moods and enter puberty earlier than boys, both increasing the likelihood of depression (Santrock, 2003). The higher likelihood of depression contributes to an increased likelihood of suicidal feelings.

In another study examining the relationship between self-esteem in adolescent boys and girls and participation in risk behaviors, it was found that eighth grade boys reported higher self-esteem than eighth grade girls (Wild, Fisher, Bhana, & Lombard, 2004). When comparing eighth graders to eleventh graders in the study, the authors found that eighth grade girls reported higher self-esteem than eleventh grade girls. Eleventh grade boys also had higher self-esteem on all self-esteem subscales other than school self-esteem when compared to eleventh grade girls. When examining participation in risk behaviors (alcohol use, drug use, sexual behavior, violent behavior, and suicidal ideation), boys in both groups reported engaging in significantly more risk behaviors than girls. Girls, however, were more likely to report suicidal ideation. Overall, the authors found that low global self-worth was significantly associated with an increased likelihood of suicidality in both sexes, of having been bullied and using alcohol in boys, and with risky sexual behavior in girls (Wild et al., 2004).

Stress. Although daily stressors of an individual may include family, school, or community events, it is the individual's perception of these events that determines whether it is considered stressful or not. When individuals experience major life stress, such as chronic violence exposure, it is possible that smaller changes in daily life can contribute to psychological outcomes (Self-Brown, LeBlanc, & Kelly, 2004). Daily stress can mediate or moderate between major life events and psychological outcome. Self-Brown et al. found that violence exposure and daily stress were significantly and positively correlated. At high levels of daily stress, a significant positive relationship between violence exposure and externalizing problems was found. There was also a positive relationship found between high levels of daily stress, violence exposure, and internalizing problems. At lower levels of stress, no significant relationships were found.

Quality of Life. Life satisfaction or quality of life in adolescents is a complicated concept to measure. "In effect, life satisfaction reflects both the extent to which basic needs are met and the extent to which a variety of other goals are attainable, with basic needs fulfillment being more central for individuals in less advantaged circumstances" (Bradley & Corwyn, 2004, p. 385). Some believe that life satisfaction is likely to emerge as meaningful during adolescence as they learn to assess how their basic needs will be met (Cummins & Nistico, 2002). Although in adults a perceived good quality of life is associated with how the adult feels, life satisfaction in adolescents is thought to be more reflective of both how the adolescent feels and their experiences (Bradley & Corwyn, 2004).

In a study of 310 families with at least one child age 10-15, Bradley & Corwyn (2004) examined the correlates of life satisfaction within five ethnic groups. While the authors acknowledge the difficulty in teasing out specific characteristics that can account for a large percentage of the variance in life satisfaction, the authors attempted to look at self-efficacy, family context, marital status, task-orientation, and health status of the families to see which predictors contribute to the adolescent's view of their quality of life in each of the ethnic groups studied. The authors found that all factors combined accounted for less than 30% of the variance in life satisfaction and that no one factor explained much of the variance. Some of their significant findings included that marital status was the most consistent family context predictor for all of the groups studied but Dominican Americans, but neither family conflict nor socioemotional support from family members emerged as significant predictors. There was a significant, positive relationship between health status and life satisfaction, indicating those with better health rated their quality of life as good or better. Income-to-needs (having enough family income to cover basic family needs) was only significant in predicting overall life satisfaction in African Americans and Chinese Americans. The

authors hypothesized that this could be due more to social comparison (how one's income compares to other's in the same neighborhood) than to absolute income alone. Finally, the authors found no relationship between level of academic competence and overall quality of life.

Adding to the complexity of teasing out factors that contribute to quality of life ratings is how having a physical disability may impact how an adolescent perceives their quality of life. While Bradley and Corwyn (2004) found that health status was positively related to overall life satisfaction, Padua, Rendeli, Ausili, Aprile, Caliandro, Tonali, and Salvaggio (2004) found that ratings of quality of life by adolescents with spina bifida are inversely related to severity of disability. Specifically, the authors found that the less severe the disability, the lower the adolescent rated their quality of life because these adolescents spend more time around healthy people and are more aware of their disability and have greater emotional difficulties trying to "fit in" with their non-disabled peers. Those with greater damage to their lower limb muscles and lower physical quality of life were found to rate themselves as having higher self-esteem and an overall greater quality of life. The authors hypothesize that this is because the more severely disabled adolescents spend most of their time around other disabled peers and are not constantly comparing themselves to non-disabled adolescents and therefore are not as acutely aware of the differences their disability poses. Other studies (e.g., Sawyer, Reynolds, Couper, French, Kennedy, Martin, Staugas, Ziaian, & Baghurst, 2004) have also found that while overall quality of life was rated lower by those who had a chronic illness compared to a community sample, self-ratings of quality of life were not directly related to the severity of the illness.

Loneliness. The nature of loneliness in children and adolescents may depend on socio-cultural contexts. In a multi-national study of 2263 young adults ages 9-12 from

Brazil, Canada, Italy, and China authors found that different characteristics predicted loneliness for different cultures (Chen, He, DeOliveira, LoCoco, Zappulla, Kaspar, Schneider, Valdina, Tse, & DeSouza, 2004). Specifically, while sociability was positively associated with loneliness in all four cultures, aggression only indirectly predicted loneliness in Chinese children. Shyness-sensitivity was associated directly with loneliness in Brazilian and Italian children, indirectly in Canadian children, but not at all in Chinese children (Chen et al., 2004). This study illustrates the fact that loneliness and the factors contributing to it may not be universal and that cultural considerations should be taken when assessing loneliness in children.

Studies of loneliness in American adolescents have found links between relational and overt victimization and loneliness. Prinstein, Boergers, & Vernberg (2001) found that adolescents that are overtly and relationally victimized may have more serious risk for poor adjustment than someone who experiences only one form of aggression. Overt victimization is defined as physical actions or threats while relational victimization is spreading rumors or excluding someone from their peer groups (Prinstein et al., 2001). Higher levels of depression, loneliness, and externalizing problems and lower self-esteem were seen in adolescents who experienced both overt and covert relational victimization. Building on the work by Prinstein et al., Storch & Masia-Warner (2004) examined the effects of relational and overt victimization on social anxiety, loneliness, and prosocial behaviors in adolescent girls. Storch & Masia-Warner found that overt and relational victimization was positively associated with the fear of negative evaluation, social avoidance, and loneliness. Prosocial behavior from peers (e.g., positive friendships) helped moderate the effects of loneliness.

Risk Behavior Indicators

Violence. There has been increased concern by educators and mental health practitioners over the impact of school and community violence on children and adolescents. Homicide is the second leading cause of death for adolescents and young adults (ages 15-24 in the United States (Nastasi et al., 2004) and the third leading cause of death among children ages 5 to 14 (Children's Defense Fund, 1999). In a 1999 study of 94 inner-city adolescents, 93% of respondents reported they had been exposed to at least one community violent event (Mazza & Reynolds, 1999).

Adolescents have also been the perpetrators of violent crime. The rate of serious violent crimes committed by juvenile offenders (ages 12-17) in 1999 was 26 per 1000 (Federal Interagency Forum on Child and Family Statistics, 2001). According to the 2001 High School YRBS data, 33% of students participated in one or more physical fights during the past 12 months and 4% required medical treatment for injuries resulting from those fights (CDC, 2002). Violence exposure has both direct and indirect relationships to a range of mental health difficulties, behavioral problems, and academic struggles. Research has shown that exposure to violence has been identified as the strongest predictor of violence among adolescents (Nastasi et al., 2004).

Research has documented the association among peer victimization, perpetration of violence, and mental health problems. Specifically, peer victimization has been associated with anxiety and depression (Bond, Carlin, Thomas, Rubin, & Patton, 2001). Both victimization and bullying have been associated with anxiety, depression, eating disorders, and psychosomatic symptoms (Kaltiala-Heino, Rimpela, Rantanen, & Rimpela, 2000). The study by Kaltiala-Heino et al. also found an association between alcohol abuse and bullying behavior among high school students. Other researchers draw a distinction between the differences in mental health issues that victims vs. bullies experience. For example,

Sourander, Helstela, Helenius, & Piha (2000) found that victims of violence were more likely to experience internalizing problems such as anxiety, depression, and psychosomatic complaints while those who are bullies experience more externalizing disorders such as oppositional defiant and conduct disorders.

Alcohol Use and Abuse. Alcohol is the most commonly used drug by adolescents, followed by tobacco and marijuana (CDC, 2002). The use of alcohol by adolescents increases with age. For example, Johnston, O'Malley, & Bachman (2001) indicated that 50% of twelfth graders reported using alcohol in the past 30 days compared to 22% of eighth graders. Rates of heavy drinking (at least 5 drinks in a row in a short period of time) also increased with age, with 30% of twelfth graders and 14% of eighth graders reporting they engaged in binge drinking (Johnston et al., 2001). Almost one-third (29%) of the students surveyed in the 2001 High School YRBS study reported that they had consumed alcohol before the age of 13 (CDC, 2002). In a study by the Institute for Community Research (Schensul, 2001), 70% of self-identified drug-using urban adolescents reported that it was easy or very easy to get alcohol in or around school. Alcohol use has been linked to participation in other risk behaviors such as drinking and driving. Sells and Blum (1996) concluded from statistics from the U.S. Department of Transportation that adolescents aged 16 to 20 who were involved in fatal automobile accidents were more likely to have been under the influence of alcohol compared with any other age group.

Drug Use. In a study examining practices of self-identified drug-using urban adolescents, 91% indicated it was easy or very easy to get marijuana; 39% heroin; and 54% cocaine in or around school property (Schensul, 2001). Of the 401 youths surveyed, 73% reported lifetime involvement with drugs while 31% reported current involvement in drug-related activities (Schensul, 2001). A cross-sectional study examining the substance use

behavior of 1494 African American students found that risk factors for marijuana use included age, being hit by a parent, affiliation with gangs, and having a tolerant attitude toward drug use by peers (Wright & Fitzpatrick, 2004). Older students and males were more likely to report marijuana use. Academic achievement and parent monitoring were found to be variables that protected students from drug use with better grades and more parental involvement significantly correlated with fewer reports of marijuana use (Wright & Fitzpatrick, 2004).

Sexual Behavior. Approximately 60% of high school students have engaged in sexual intercourse by the time they reach twelfth grade (CDC, 2002). Rates of pregnancy, birth and abortion among U.S. adolescents are considered to be the highest for industrialized nations (Sells & Blum, 1996). NASP (1997) estimated that almost 1000 adolescents become pregnant every day. In 1999, the birth rate among girls aged 15 to 17 was 29 per 1000 and 88% of those births were to unmarried mothers (Federal Interagency Forum on Child and Family Statistics, 2001). Teen pregnancy is a concern because it can interrupt the mother's education and have socioeconomic consequences such as being at a higher risk for poverty and unemployment (Federal Interagency Forum on Child and Family Statistics, 2001).

There is also concern about the risk of adolescents acquiring sexually transmitted diseases from sexual behavior. AIDS has been identified at the sixth leading cause of death among those ages 15-24 in the United States, with 20% of all AIDS cases occurring among young adults ages 20-29. Most acquire the disease during adolescence (Sells & Blum, 1996). Sells & Blum identified the leading causes of AIDS transmission for adolescents (ages 13-24) as sexual contact and intravenous drug use.

Purpose of Study and Research Questions

The above research illustrates how schools can serve as an important resource in identifying students with mental health needs as well as providing services. However, many of those students identified are usually referred for services based on teacher or parent request for formal testing to determine eligibility for special education services (Conroy et al., 2004). This study examined whether intra-individual differences (gender, race, and students with self-reported disabilities) of high school students in North Carolina influence students' self-report of mental health indicators such as suicidal ideation, depression, self-esteem, quality of life, loneliness, and stress on a state-wide measure. This study also examined whether students who reported mental health indicators were more likely to self-report engaging in risk behaviors (violence, alcohol use and abuse, drug use, and sexual behaviors). Finally, interactions between those who reported mental health indicators and their specific subpopulations (gender, race, disability status) were analyzed to see if being a member of a subpopulation strengthened the relationship between experience of mental health indicators and engagement in risk behaviors.

The specific questions that were addressed in the current research study are listed below:

1. Do specific student characteristics (gender, race, disability status) predict student self-report of mental health indicators (suicidal ideation, depression, loneliness, self-esteem, quality of life, stress) on the YRBS?
2. Are students who report experiencing the mental health indicators (suicide, depression, self-esteem, quality of life, loneliness, and stress) more likely to report engaging in risk behaviors (violence, alcohol use and abuse, drug use, sexual behavior)?

3. Does being a member of a sub-population (gender, race, disability status) who also self-reported mental health indicators predict engagement in risk behaviors?

Chapter 2

Research Design & Methodology

The object of this study was to determine which factors, or combination of factors, best predict experience of mental health indicators on the 2003 Youth Risk Behavior Survey (YRBS). These include intra-individual characteristics, including the ethnicity, gender, and self-report of disability status of the students who completed the YRBS. In addition, this study also examined whether students who reported experiencing the mental health indicators on the YRBS also reported engaging in other risk behaviors such as violence, alcohol use, drug use and sexual behaviors. Many of these factors are interrelated and the use of direct logistic regression analyses discussed below was designed to attempt to parse out the predictive ability of each of the variables. Table 2.1 describes the methodology used to answer each research question.

Table 2.1. Research Questions and Methodology

Research Question	Participants	Instrument	Data Analysis
1. Do specific student characteristics (gender, race, disability status) predict self-report of mental health indicators (suicidal ideation, depression, loneliness, self-esteem, quality of life, stress) on the YRBS?	Students who completed 2003 NC HS YRBS	2003 NC High School YRBS	Direct Logistic Regression

2. Are students who report experiencing the mental health indicators (depression, loneliness, self-esteem, stress) more likely to report engaging in risk behaviors (violence, alcohol use and abuse, drug use, sexual behavior)?	Students who completed 2003 NC HS YRBS	2003 NC High School YRBS	Direct Logistic Regression
3. Does being a member of a sub-population who also self-reported mental health indicators predict engagement in risk behaviors?	Students who completed 2003 NC HS YRBS	2003 NC High School YRBS	Heirarchical Logistic Regression

Participants

The participants for the 2003 NC High School YRBS were selected using a two-stage process. The process used for the NC YRBS by the State Department of Public Instruction is the same process used nationally and set forth by the Centers for Disease Control (Grunbaum, et al., 2004; McMillen, 2004). McMillen (2004) has documented the process used to collect the 2003 NC YRBS data. First, all regular public high schools containing students in grades 9, 10, 11, or 12 were included in the sample. Schools were selected systematically with probability proportional to enrollment in grades 9-12 using a random start. Overall, 72 schools were sampled and 51 of those schools participated (73%). Within those sampled schools, all classes in a required subject or all classes meeting during a particular period of the day, depending on the school, were included in the sample. Systematic equal probability sampling with a random start was used to select classes from

each school that participated in the survey. Overall, 2,553 of the 3,108 sampled students (83%) completed useable questionnaires and were representative of all students in grades 9-12; males made up 48.6% of students while females comprised 51.4% of the students who participated. The students surveyed in NC were comparable to the overall national sample (see Table 2.2).

Table 2.2. Sample Size, Response Rates, and Demographics – National and NC YRBS, 2003

	National				North Carolina			
Sample Size	15,214				2,553			
Overall Response Rate	67%				61%			
Student	83%				83%			
School	81%				71%			
Gender	Male		Female		Male		Female	
	48.6%		51.4%		49.5%		50.5%	
Race/Ethnicity	W	AA	H	O	W	AA	H	O
	61.4%	29.4%	16.6%	8.2%	63.8%	29.4%	2.3%	4.5%
Self-Reported Disability	Not Measured				25.9%			

W = White/Caucasian
AA= Black/African American
H = Hispanic
O = Other

Disability Indicators. The YRBS contained three questions asking students whether or not they had a disability. The first question asked the students if they had any physical, mental, emotional or communication-related problems. The second asked students if they

were impaired in any activities resulting from a health problem or impairment. The third asked if the students had any difficulties learning, remembering, or concentrating due to an impairment or health problem. The choice options for these questions included "Yes," "No," or "Not Sure." Each option was converted into a dichotomous variable (yes/no) and then the three questions were collapsed into a single variable. Those students endorsing "Yes" to any of the three disability indicators were included in the subgroup of students with a disability. Those who responded "Not Sure" were coded as not having a disability for the purpose of this study. Note that students who self-reported disability in the above areas may or may not be also identified as having a disability as defined by federal guidelines. This study only focuses on students with self-perceived disabilities rather than those disabilities that are formally diagnosed.

Race. Students were directed to choose one or more of the following responses to describe themselves: "American Indian or Alaska Native;" "Asian," "Black or African American," "Hispanic or Latino," "Native Hawaiian or Other Pacific Islander, and "White." Those choosing more than one response were coded as being "Multi-racial, Hispanic" or "Multi-racial – Non-Hispanic." The responses from this question were recoded to allow for four categories: African American, Hispanic, White, and Other. Students were coded as "other" if they stated they were either American Indian or Alaska Native, Asian, Native Hawaiian or Pacific Islander, or Multi-racial.

Measure

The YRBS is one component of the Youth Risk Behavior Surveillance System developed by the Centers for Disease Control and Prevention in collaboration with representatives from 71 state and local departments of education and health, 19 other federal

agencies, and national education and health organizations (Grunbaum et al., 2004). The Youth Risk Behavior Surveillance System was designed to focus the nation on behaviors among youth related to the leading causes of mortality and morbidity among both youth and adults and to assess how these risk behaviors change over time. The Youth Risk Behavior Surveillance System measures behaviors that fall into six categories:

1. Behaviors that result in unintentional injuries and violence;
2. Tobacco use;
3. Alcohol and other drug use;
4. Sexual behaviors that result in HIV infection, other sexually transmitted diseases, and unintended pregnancies;
5. Dietary behaviors; and
6. Physical activity.

Students completed a self-administered, anonymous, 93-item questionnaire. Previous versions of this instrument have shown moderate (kappa value $\geq$ 41%) to substantial (kappa value $\geq$ 61%) test-retest reliability (Brener, Kann, McManus, Kinchen, Sundberg, & Ross, 2002). Specific questions that are the focus of this study (unintentional injury and violence, alcohol and other drug use, and sexual behaviors that result in HIV infection, other sexually transmitted diseases, and unintended pregnancies) have collectively shown a mean kappa value in the moderate range (Brener et al., 2002). A copy of the specific questions selected from the 2003 NC High School YRBS can be found in Appendix A.

Mental Health Indicators.

The YRBS is designed to have great breadth of questions, but is shallow in that the survey asks questions about many areas of adolescent life without delving deeply into any

one single area. The first part of this study focused on using parts of the NC High School YRBS to answer the research questions; specifically demographic variables (e.g., gender, race) as well as questions asking about mental health experiences (e.g., suicidal ideation). Questions that served as the 'mental health indicators' asked participants to self-report mental health experiences that involve feelings about suicide, depression, self-esteem, quality of life, feeling alone, and stress levels. A total of six questions served as mental health indicator questions on the YRBS. The responses to each question were recoded to be dichotomous and each mental health indicator was analyzed separately. Table 2.3 summarizes how each variable was coded.

Suicidal Ideation. The question on the YRBS that assesses suicidal ideation asks "During the past 12 months, did you ever seriously consider attempting suicide?"

Depression. Students were asked, "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?"

Self-esteem. Students were asked to indicate their response to the statement "I feel good about myself" by choosing one of five response choices ranging from "Strongly disagree" to "Strongly agree."

Quality of Life. Participants were asked to respond to the statement "In general, how would you rate the quality of your life" by choosing one of five response choices ranging from "Poor" to "Excellent."

Loneliness. Students were asked whether or not they agreed with the statement "I feel alone in my life." Five response options ranged from "Strongly disagree" to "Strongly agree."

Stress. The item assessing stress asked students, "How often do you feel stress in your life?" Students chose one of five response options ranging from "Never" to "All of the time."

Risk Behavior Indicators.

Questions that served as 'risk behavior indicators' asked participants to self-report risk behaviors in the areas of violence, drug and alcohol use and abuse, and sexual behaviors. Each group of risk indicators (violence, drug use, alcohol use and abuse, and sexual behaviors) was analyzed separately. The responses to the questions in each group were recoded to be dichotomous (those who engaged in the activity vs. those who did not). Table 2.3 summarizes how each variable was coded.

Violence. A total of five questions were analyzed to examine violence-related behaviors. Specific violent behaviors included carrying a weapon on school property, not attending school due to feelings of being unsafe, being threatened or injured with a weapon on school property, having property deliberately damaged or stolen while at school, and participating in a physical fight on school property. Each question was analyzed individually. Students who reported that they carried a weapon or participated in a physical fight on school property at least one time in the past 30 days (weapon) or 12 months (physical fight) were considered to engage in violent behaviors. Those who responded that they did not attend school for at least one day due to feeling unsafe in the past 30 days, were threatened or injured with a weapon on school property at least once in the past year, or had property damaged or stolen at least one time in the past year were considered to be victims of violent behaviors.

Alcohol Use and Abuse. A total of two questions on the YRBS were used to examine alcohol use and abuse. The first question asked students to self-report how many days they have had at least one drink of alcohol in the past 30 days. The second question asked on how many days did students drink five or more drinks in a row over a couple of hours in the last 30 days. These questions were analyzed separately.

Drug Use. A total of eight questions on the YRBS were used to examine drug use. These questions asked students to self-report how many times, in their lifetime, did they use marijuana, cocaine, ecstasy, hallucinogens (such as LSD or PCP), heroin, methamphetamines, sniffed glue or inhalants, or taken steroid pills or shots. Responses to these questions were combined for the purpose of analysis; students who reported that they used at least one of the drugs listed above at least once in their lifetime were coded as engaging in drug behavior.

Sexual Behavior. A total of two questions on the YRBS were used to examine sexual behaviors. These questions asked whether or not adolescents ever had sexual intercourse and whether or not alcohol or drugs were used before the last time students engaged in sexual intercourse. Each question was analyzed separately.

Table 2.3. Descriptions of Variables Selected from the 2003 NC YRBS.

Variable	Item Format	Variable as used in Analyses
Mental Health Indicators		
Suicidal Ideation	Yes/No	1 = Yes 0 = No
Depression	Yes/No	1 = Yes 0 = No
Self-Esteem	5 options ranging from "Strongly Disagree" to "Strongly Agree"	1 = Agree, Strongly Agree 0 = Strongly Disagree, Disagree, Not Sure
Quality of Life	5 options ranging from	1 = Good, Very Good, or

	"Poor" to "Excellent"	Excellent 0 = Fair, Poor
Loneliness	5 options ranging from "Strongly Disagree" to "Strongly Agree"	1 = Agree, Strongly Agree 0 = Strongly Disagree, Disagree, Not Sure
Stress	5 options ranging from "Never" to "All of the Time"	1 = Most of the Time or All of the Time 0 = Never, Rarely, Sometimes
Risk Behavior Indicators		
Violence		
Carrying a Weapon	5 options ranging from 0 days to 6 or more days	1 = Yes, at least one day 0 = No or 0 days
Physical Fight	8 options ranging from 0 times to 12 or more times	1 = Yes, at least one time 0 = No, not one time
Felt Unsafe	5 options ranging from 0 days to 6 or more days	1 = Yes, at least one day 0 = No or 0 days
Threatened	8 options ranging from 0 times to 12 or more times	1 = Yes, at least one time 0 = No, not one time
Property Stolen/Damaged	8 options ranging from 0 times to 12 or more times	1 = Yes, at least one time 0 = No, not one time
Alcohol		
Use Alcohol in Past 30 Days	7 options ranging from 0 days to all 30 days	1 = Yes, at least one day 0 = No or 0 days
Had 5 or More Drinks In Short Period of Time	7 options ranging from 0 days to 20 or more days	1 = Yes, at least one day 0 = No or 0 days
Drug Use	8 Items with multiple scales	1= Yes, at least one time on any of 8 items 0 = No, 0 times on all of 8 items
Sexual Behavior		
Ever had Sexual Intercourse	Yes/No	1 = Yes 0 = No
Used Drugs or Alcohol Prior to Last Sexual Intercourse	Never Had Sex, Yes, No	1 = Yes 0 = Never Had Sex, No

Procedure

In the Fall of 2003, 72 schools were sampled to participate in the 2003 YRBS High School Survey from among all of the public schools statewide that served grades 9 through 12. Of those, 51 agreed to participate (McMillen, 2004). YRBS administrators were recruited

from education and health agencies at the state and local levels to administer the survey in these 51 schools. Information on standardized survey administration procedures, as well as sets of materials for administering the survey, were disseminated at regional training sessions held by staff from the North Carolina Department of Public Instruction (McMillen, 2004). Administrators then made arrangements with each school to conduct the surveys between February and April 2003. Students completed the self-administered questionnaire during one class period and recorded their responses directly onto a computer-scannable questionnaire booklet or answer sheet (McMillen, 2004). The core national questionnaire contained 87 multiple-choice questions. To meet individual needs, 21 states and 12 cities added or deleted questions, including North Carolina (Grunbaum et al., 2004). Survey procedures were designed to protect the privacy of students by allowing for anonymous and voluntary participation. Before the survey was conducted, parental permission procedures were followed in each school district as per their individual requirements (McMillen, 2004).

Statistical Analyses

The variables taken from the YRBS were used to define group membership; that is, whether or not a student self-reports that they belong in a group defined by mental health difficulties. The independent variables used to predict group membership were gender of the student, ethnicity of the student, and whether or not a student self-identified as having a disability by endorsing one of the three disability indicators on the YRBS. The second research question also focused on group membership; that is whether or not a student who reported experiencing mental health indicators predicted those who also reported participating in risk behaviors. Direct logistic regression analyses using SPSS software were used to predict whether or not the independent variables described above predicted

experience of the mental health indicator questions on the YRBS. Logistic regression analyses were also used to examine whether or not students who reported experiencing the mental health indicators were more likely to experience other risk behaviors. "Logistic regression allows one to predict a discrete outcome such as group membership from a set of variables that may be continuous, discrete, dichotomous, or a mix" (Tabachnick & Fidell, 2001, p.571).

The third research question was analyzed by using hierarchical logistic regression. This method is useful for examining interactions among predictors (e.g., each of the mental health indicators interacting with gender, race, or disability status) to see if they predict the outcome variable (e.g., the risk behaviors).

Chapter 3

Results

Prior to examining the results to the individual research questions, descriptive statistics were run to show response rate by demographics to each indicator. Those results are displayed in Table 3.1.

Question #1: Do specific student characteristics (gender, race, disability status) predict student self-report of mental health indicators (suicidal ideation, depression, loneliness, self-esteem, quality of life, stress) on the YRBS?

All analyses were conducted using SPSS Logistic Regression. Direct logistic regression analyses were performed individually on all mental health indicators as an outcome variable and three predictors: gender, race, and self-report of disability. All data were screened for multicollinearity and for outliers in the solution. No problems with convergence were noted in any of the analyses below and tests of model fit were adequate.

Mental Health Indicators

Suicidal Ideation. Overall, 18.1% of the participants stated that they seriously considered suicide in the past 12 months. Data from 2467 students were available for analysis. A test of the full model with all three predictors against a constant-only model was statistically reliable χ^2 (5, N = 2467) = 153.95, p < .001, indicating that the predictors, as a set, reliably distinguished between students who reported having suicidal ideation within the past 12 months and those who had not. Results of the Hosmer and Lemeshow test, which

Table 3.1. Response Rates for the 2003 NC High School YRBS

Variable	Overall	Male	Female	White	African American	Hispanic	Other
Mental Health Indicators							
Suicidal Ideation	18.1%	14.3%	21.8%	20.1%	13.4%	17.4%	19.1%
Depression	29.3%	20.8%	38.0%	28.8%	30.3%	27.5%	30.4%
Self-Esteem	76.4%	79.1%	73.8%	76.8%	76.9%	75.6%	70.5%
Quality of Life	83.7%	83.6%	83.8%	85.4%	80.8%	84.2%	80.8%
Loneliness	14.9%	12.5%	17.2%	14.8%	14.6%	18.4%	15.0%
Stress	37.8%	28.5%	47.2%	41.9%	30.6%	28.1%	30.1%
Risk Behavior Indicators							
Violence							
Carrying a Weapon	6.3%	8.3%	4.4%	6.1%	6.3%	5.4%	8.3%
Physical Fight	10.7%	14.5%	6.9%	8.2%	15.7%	13.6%	10.2%
Felt Unsafe	5.2%	6.1%	4.3%	3.2%	8.3%	7.8%	11.8%
Threatened	7.2%	8.2%	6.1%	6.7%	7.3%	6.9%	12.7%
Property Stolen/Damaged	26.0%	26.6%	25.2%	25.6%	25.9%	23.5%	30.1%
Alcohol							
Use Alcohol in Past 30 Days	39.4%	41.5%	37.3%	43.6%	30.3%	33.0%	40.0%
Had 5 or More Drinks in Short Period of Time	21.0%	25.1%	16.7%	25.6%	10.3%	19.9%	22.8%
Drug Use	12.6%	13.4%	11.7%	13.7%	9.6%	9.8%	15.0%
Sexual Behavior							
Ever had Sexual Intercourse	52.5%	51.4%	53.7%	44.1%	52.8%	50.2%	53.5%
Used Drugs or Alcohol Prior to Last Sexual Intercourse	18.1%	22.1%	14.5%	20.6%	14.7%	Less than 1%	Less than 1%

measures goodness of fit of the data, was not significant χ^2 (6, N = 2467) = 2.66, p = .75). The nonsignificant chi-square produced from the Hosmer and Lemeshow test indicates that the predicted values are a good fit compared to the observed data (Tabachnick & Fidell, 2001). It is important to note that the Hosmer-Lemeshow test is not intended to measure outcome or model specification, rather it is useful in determining whether the data are appropriate to use in logistic regression analyses. The data is statistically appropriate for analyses when a nonsignificant chi-square result is achieved. The variance in suicidal ideation accounted for is small, with Nagelkerke's $R^2 = 0.10$.

The model successfully predicted 100% of the students who did not report experiencing suicidal ideation, but did not predict any of the students who did report having suicidal thoughts, for an overall success rate of 80.8%. However, this success rate of prediction is not any better than what would be predicted by chance alone. Although the full model was statistically different from the constant-only model, it did not improve overall classification of the students.

Table 3.2 shows regression coefficients, Wald statistics, p-values for the Wald statistics, odds ratios, and 95% confidence intervals for odds ratios for each of the three predictors. According to the Wald criterion, gender (z = 30.87, p < .001), race (z = 4.60, p < .05), and disability status (z = 114.24, p < .001) reliably predicted whether or not a student experienced suicidal feelings. Specifically, females were 1.82 times more likely to report feelings of suicidal ideation compared with males. African American students were 25% less likely to report feelings of suicidal ideation compared to White students. When compared to their non-disabled peers, disabled students were 3.20 times more likely to report feelings of suicidal ideation.

Table 3.2. Logistic Regression Analysis of Suicidal Ideation as a Function of Gender, Race, and Disability Status (N=2467).

Variables	*B*	Wald Test (z-ratio)	p-value of Wald Test	Odds Ratio	95% Confidence Interval for Odds Ratio	
					Lower	Upper
Gender [a]	0.60	30.87	0.00	1.82	1.48	2.25
Race[b]						
African American	-0.29	4.60	0.03	0.75	0.57	0.98
Hispanic	0.16	0.36	0.55	1.17	0.70	1.96
Other	0.19	1.29	0.26	1.20	0.87	1.66
Disability Status[c]	1.16	114.24	0.00	3.20	2.58	3.96
(Constant)	-2.11	419.54	0.00			

[a] Comparison group for gender was male participants.
[b] Comparison group for race was White participants.
[c] Comparison group for disability status was non-disabled students

Depression. Overall, 29.3% of the participants stated they did feel sad or hopeless. Data from 2494 students were available for analysis. A test of the full model with all three predictors against a constant-only model was statistically reliable χ^2 (5, N = 2494) = 207.80, $p < .001$, indicating that the predictors, as a set, reliably distinguished between students who report feeling sad or hopeless and those who did not. Results of the Hosmer and Lemeshow test, which measures goodness of fit of the data, was not significant χ^2 (6, N = 2494) = 1.95, $p = .86$). The nonsignificant chi-square produced from the Hosmer and Lemeshow test indicates the predicted values are a good fit compared to the observed data (Tabachnick & Fidell, 2001). It is important to note that the Hosmer-Lemeshow test is not intended to measure outcome or model specification, rather it is useful in determining whether the data

are appropriate to use in logistic regression analyses. The data is statistically appropriate for analyses when a nonsignificant chi-square result is achieved. The variance that feeling sad or hopeless accounted for is small, with Nagelkerke's $R^2 = 0.11$. The model successfully predicted 92.1% of the students who did not report experiencing sad and hopeless feelings and 26.3% of the students who did report feeling depressed, for an overall success rate of 71.7%.

Table 3.3 shows regression coefficients, Wald statistics, p-values for the Wald statistics, odds ratios, and 95% confidence intervals for odds ratios for each of the three predictors. According to the Wald criterion, gender ($z = 72.23$, $p < .001$) and disability status ($z = 124.03$, $p < .001$) reliably predicted whether or not a student reported feeling sad or hopeless. Females were 2.18 times more likely to report feelings of depression compared to males. Students who self-reported having a disability were 2.96 times more likely to report feeling sad or hopeless compared to their non-disabled peers.

Table 3.3. Logistic Regression Analysis of Depression as a Function of Gender, Race, and Disability Status (N=2494).

Variables	***B***	Wald Test (z-ratio)	p-value of Wald Test	Odds Ratio	95% Confidence Interval for Odds Ratio	
					Lower	Upper
Gender[a]	0.78	72.22	0.00	2.18	1.82	2.61
Race[b]						
African American	-0.92	0.70	0.41	0.91	0.74	1.13
Hispanic	0.44	3.59	0.06	1.55	0.99	2.43
Other	0.20	1.96	0.16	1.22	0.92	1.62
Disability Status[c]	1.09	124.03	0.00	2.96	2.45	3.59
(Constant)	-1.56	325.57	0.00			

[a] Comparison group for gender was male participants.
[b] Comparison group for race was White participants.

[c] Comparison group for disability status was non-disabled students

Self-esteem. Overall, 76.4% of the participants stated that they agreed or strongly agreed with the statement, "I feel good about myself." After deletion of 65 cases with missing values on the variables analyzed, data from 2488 students were available for analysis. A test of the full model with all three predictors against a constant-only model was statistically reliable χ^2 (5, N = 2488) = 216.15, p < .001, indicating that the predictors, as a set, reliably distinguished between students who reported having self-esteem and those who did not. Results of the Hosmer and Lemeshow test, which measures goodness of fit of the data, were not significant χ^2 (6, N = 2488) = 2.85, p = .83). The nonsignificant chi-square produced from the Hosmer and Lemeshow test indicates that predicted values are a good fit compared to the observed data (Tabachnick & Fidell, 2001). It is important to note that the Hosmer-Lemeshow test is not intended to measure outcome or model specification, rather it is useful in determining whether the data are appropriate to use in logistic regression analyses. The data is statistically appropriate for analyses when a nonsignificant chi-square result is achieved. The variance in self-esteem accounted for is small, with Nagelkerke's R^2 = 0.12. The model successfully predicted 93.2% of the students who reported they felt good about themselves and 21.1% of students who stated they had lower self-esteem, for an overall success rate of 72.9%.

Table 3.4 shows regression coefficients, Wald statistics, p-values for the Wald statistics, odds ratios, and 95% confidence intervals for odds ratios for each of the three predictors. According to the Wald criterion, gender (z = 10.56, p = .01), race (z = 18.07, p < .001), and disability status (z = 180.62, p < .001) reliably predicted whether or not a student reported feeling good about themselves. Females were 26% less likely to report feeling good

about themselves compared to males, while African American students were 1.67 times more likely to respond that they did feel good about themselves compared to White students. Students with a self-reported disability were 73% less likely to state that they had high self-esteem.

Table 3.4. Logistic Regression Analysis of Self-Esteem as a Function of Gender, Race, and Disability Status (N=2488).

Variables	***B***	Wald Test (z-ratio)	p-value of Wald Test	Odds Ratio	95% Confidence Interval for Odds Ratio	
					Lower	Upper
Gender[a]	-0.31	10.56	0.001	0.74	0.61	0.89
Race[b]						
African American	0.51	18.07	0.00	1.67	1.31	2.10
Hispanic	-0.18	0.54	0.46	0.84	0.53	1.34
Other	0.14	0.84	0.36	1.15	0.86	1.54
Disability Status[c]	-1.33	180.62	0.00	0.27	0.22	0.32
(Constant)	1.38	267.09	0.00			

[a] Comparison group for gender was male participants.
[b] Comparison group for race was White participants.
[c] Comparison group for disability status was non-disabled students

Quality of Life. Overall, 83.7% of students rated their quality of life as good or better. After deletion of 62 cases with missing values on the variables analyzed, data from 2491 students were available for analysis. A test of the full model with all three predictors against a constant-only model was statistically reliable χ^2 (5, N = 2491) = 127.78, p < .001, indicating that the predictors, as a set, reliably distinguished between students who reported having a good quality of life and those who did not. Results of the Hosmer and Lemeshow test, which measures goodness of fit of the data, were not significant χ^2 (6, N = 2491) = 2.66,

p = .85). The nonsignificant chi-square produced from the Hosmer and Lemeshow test indicates that the predicted values are a good fit compared to the observed data (Tabachnick & Fidell, 2001). It is important to note that the Hosmer-Lemeshow test is not intended to measure outcome or model specification, rather it is useful in determining whether the data are appropriate to use in logistic regression analyses. The data is statistically appropriate for analyses when a nonsignificant chi-square result is achieved. The variance quality of life accounted for is small, with Nagelkerke's $R^2 = 0.08$. The model successfully predicted 100% of the students who reported a good or better quality of life and none of the students who stated they did not have a good quality of life, for an overall success rate of 81.4%. However, this success rate of prediction is not any better than what would be predicted by chance alone. Although the full model was statistically different from the constant-only model, it did not improve overall classification of the students.

Table 3.5 shows regression coefficients, Wald statistics, p-values for the Wald statistics, odds ratios, and 95% confidence intervals for odds ratios for each of the three predictors. According to the Wald criterion, race and disability status reliably predicted whether or not a student reported a good or better quality of life. Compared to White students, African American students were 25% less likely to state they had a good or better quality of life while Hispanic students and students who classified themselves as "other" were 43% and 51% less likely, respectively. Students with self-reported disabilities were 67% less likely to report a good or better quality of life compared to their non-disabled peers.

Table 3.5. Logistic Regression Analysis of Quality of Life as a Function of Gender, Race, and Disability Status (N=2491).

Variables	*B*	Wald Test (z-ratio)	p-value of Wald Test	Odds Ratio	95% Confidence Interval for Odds Ratio	
					Lower	Upper
Gender[a]	-0.16	2.20	0.14	0.85	0.69	1.05
Race[b]						
African American	-0.28	4.92	0.03	0.75	0.59	0.97
Hispanic	-0.56	4.72	0.03	0.57	0.34	0.95
Other	-0.71	20.91	0.00	0.49	0.37	0.67
Disability Status[c]	-1.11	104.13	0.00	0.33	0.27	0.41
(Constant)	4.35	0.41	0.00			

[a] Comparison group for gender was male participants.
[b] Comparison group for race was White participants.
[c] Comparison group for disability status was non-disabled students

Loneliness. Overall, 14.9% of students indicated they agreed or strongly agreed with the statement "I feel alone in my life." After deletion of 54 cases with missing values on the variables analyzed, data from 2499 students were available for analysis. A test of the full model with all three predictors against a constant-only model was statistically reliable χ^2 (5, N = 2499) = 76.05, p < .001, indicating the predictors, as a set, reliably distinguished between students who reported feeling lonely and those who did not. Results of the Hosmer and Lemeshow test, which measures goodness of fit of the data, were not significant χ^2 (6, N = 2499) = 4.99, p = .54). The nonsignificant chi-square produced from the Hosmer and Lemeshow test indicates that predicted values are a good fit compared to the observed data (Tabachnick & Fidell, 2001). It is important to note that the Hosmer-Lemeshow test is not intended to measure outcome or model specification, rather it is useful in determining

whether the data are appropriate to use in logistic regression analyses. The data is statistically appropriate for analyses when a nonsignificant chi-square result is achieved. The variance that feeling lonely accounted for is small, with Nagelkerke's $R^2 = 0.05$. The model successfully predicted 100% of the students who did not report experiencing sad and hopeless feelings and none of the students who did report feeling lonely, for an overall success rate of 83.2%. However, this success rate of prediction is not any better than what would be predicted by chance alone. Although the full model was statistically different from the constant-only model, it did not improve overall classification of the students.

Table 3.6 shows regression coefficients, Wald statistics, p-values for the Wald statistics, odds ratios, and 95% confidence intervals for odds ratios for each of the three predictors. According to the Wald criterion, gender ($z = 9.66$, $p < .01$) and disability status ($z = 65.07$, $p < .001$) reliably predicted feeling lonely. Female students were 1.41 times more likely to report they felt lonely compared to their male cohort, while students with self-reported disabilities were 2.48 times more likely to report loneliness compared to their non-disabled peers.

Stress. Overall, 37.8 % of participants indicated they felt stress most or all of the time. After deletion of 50 cases with missing values on the variables analyzed, data from 2503 students were available for analysis. A test of the full model with all three predictors against a constant-only model was statistically reliable $\chi^2 (5, N = 2503) = 239.14$, $p < .001$, indicating the predictors, as a set, reliably distinguished between students who reported feeling stress and those who have not. Results of the Hosmer and Lemeshow test, which

Table 3.6. Logistic Regression Analysis of Loneliness as a Function of Gender, Race, and Disability Status (N=2499).

Variables	*B*	Wald Test (z-ratio)	p-value of Wald Test	Odds Ratio	95% Confidence Interval for Odds Ratio	
					Lower	Upper
Gender[a]	0.34	9.66	0.02	1.41	1.13	1.74
Race[b]						
African American	0.04	0.08	0.78	1.04	0.80	1.34
Hispanic	0.54	0.59	0.44	0.79	0.43	1.45
Other	1.03	2.20	0.14	1.28	0.92	1.77
Disability Status[c]	0.91	65.07	0.00	2.48	1.99	3.09
(Constant)	-2.10	412.61	0.00			

[a] Comparison group for gender was male participants.
[b] Comparison group for race was White participants.
[c] Comparison group for disability status was non-disabled students

measures goodness of fit of the data, were not significant χ^2 (6, N = 2503) = 0.89, p = .99). The nonsignificant chi-square produced from the Hosmer and Lemeshow test indicates the predicted values are a good fit compared to the observed data (Tabachnick & Fidell, 2001). It is important to note that the Hosmer-Lemeshow test is not intended to measure outcome or model specification, rather it is useful in determining whether the data are appropriate to use in logistic regression analyses. The data is statistically appropriate for analyses when a nonsignificant chi-square result is achieved. The variance that feeling stress accounted for is small, with Nagelkerke's $R^2 = 0.13$. The model successfully predicted 92.2% of the students who did not report experiencing stress and 23.3% of the students who did report feeling stress, for an overall success rate of 66.9%.

Table 3.7 shows regression coefficients, Wald statistics, p-values for the Wald statistics, odds ratios, and 95% confidence intervals for odds ratios for each of the three predictors. According to the Wald criterion, gender, race, and disability status all reliably predicted feeling stress. Females were 2.42 times as likely to report feeling stress compared to males. African American students were 47% less likely to report feeling stress compared to their white peers. Students who self-reported having a disability were 2.57 times more likely to report feeling stress compared to their non-disabled peers.

Table 3.7. Logistic Regression Analysis of Stress as a Function of Gender, Race, and Disability Status (N=2503).

Variables	***B***	Wald Test (z-ratio)	p-value of Wald Test	Odds Ratio	95% Confidence Interval for Odds Ratio	
					Lower	Upper
Gender[a]	0.88	100.02	0.00	2.42	2.03	2.87
Race[b]						
African American	-0.64	34.49	0.00	0.53	0.43	0.65
Hispanic	-0.16	5.92	0.12	0.55	0.34	0.89
Other	-0.53	1.38	0.24	0.85	0.65	1.12
Disability Status[c]	0.94	95.29	0.00	2.57	2.13	3.11
(Constant)	-1.09	190.98	0.00			

[a] Comparison group for gender was male participants.
[b] Comparison group for race was White participants.
[c] Comparison group for disability status was non-disabled students

Question #2: Are students who report experiencing the mental health indicators (suicidal ideation, depression, self-esteem, quality of life, loneliness, stress) more likely to report engaging in other risk behaviors (violence, alcohol use and abuse, drug use, sexual behavior)?

All analyses were conducted using SPSS Logistic Regression. Direct logistic regression analyses were performed individually on all risk behavior indicators as an outcome variable and six predictors: suicidal ideation, depression, self-esteem, quality of life, loneliness, and stress. All data was screened for multicollinearity and for outliers in the solution. No problems with convergence were noted in any of the analyses below and tests of model fit were adequate.

Risk Behavior Indicators

Violence. A total of five questions analyzed examining students' involvement in violent behaviors; two of those questions assessed students' participation in violent behavior while the other three focused on being a victim of the violent acts of others. Students were asked whether or not they were involved in a physical fight on school property during the past 12 months. Overall, 10.7% of the participants stated they were in a physical fight in the past 12 months. Data from 2390 students were available for analysis. A test of the full model with all six predictors against a constant-only model was statistically reliable χ^2 (6, N = 2390) = 30.99, p < .001, indicating the predictors, as a set, reliably distinguished between students who reported being in a physical fight within the past 12 months and those who have not. Results of the Hosmer and Lemeshow test, which measures goodness of fit of the data, were not significant χ^2 (6, N = 2390) = 7.38, p = .29). The variance accounted for is small, with Nagelkerke's $R^2 = 0.02$. The model successfully predicted 100% of the students who did not report participation in a physical fight but did not predict any of the students who did participate, for an overall success rate of 88.3%. However, this success rate of prediction is not any better than what would be predicted by chance alone. Although the full model was

statistically different from the constant-only model, it did not improve overall classification of the students.

According to the Wald criterion, suicidal ideation ($z = 10.68$, $p = .001$) and quality of life ($z = 9.89$, $p < .01$) reliably predicted whether or not a student reported participation in a physical fight. Specifically, students who reported engaging in suicidal ideation were 1.8 times and students who reported having a fair or poor quality of life were 1.7 times more likely to report being in a physical fight than peers in their comparison groups.

Students were also asked whether or not they carried a weapon on school property in the past 12 months. The percentage of students who stated they did carry a weapon was 6.3%. Data from 2400 students were available for analysis. A test of the full model with all six predictors against a constant-only model was statistically reliable χ^2 (6, $N = 2400$) = 36.22, $p < .001$, indicating the predictors, as a set, reliably distinguished between students who reported carrying a weapon on school property within the past 12 months and those who have not. Results of the Hosmer and Lemeshow test, which measures goodness of fit of the data, were not significant χ^2 (5, $N = 2400$) = 5.33, $p = .38$). The variance accounted for is small, with Nagelkerke's $R^2 = 0.04$. The model successfully predicted 100% of the students who did not report carrying a weapon but did not predict any of the students who did participate, for an overall success rate of 93.4%. However, this success rate of prediction is not any better than what would be predicted by chance alone. Although the full model was statistically different from the constant-only model, it did not improve overall classification of the students.

According to the Wald criterion, suicidal ideation ($z = 7.27$, $p < .01$) and depression ($z = 6.46$, $p = .01$) reliably predicted whether or not a student reported carrying a weapon to

school. Specifically, students who experienced feelings of suicidal ideation were 1.8 times and students who reported feeling sad or hopeless were 1.7 times more likely to report bringing a weapon to school than peers in their comparison groups.

The next set of questions asked students about being a victim of violent acts. The first question asked students whether or not they felt unsafe at school or walking to and from school in the past 30 days. Overall, 5.2% of students reported feeling unsafe at least one day. Data from 2419 students were available for analysis. A test of the full model with all six predictors against a constant-only model was statistically reliable χ^2 (6, $\underline{N}$ = 2419) = 67.46, $\underline{p}$ < .001, indicating the predictors, as a set, reliably distinguished between students who reported feeling unsafe at school within the past 12 months and those who did not. Results of the Hosmer and Lemeshow test, which measures goodness of fit of the data, were not significant χ^2 (6, $\underline{N}$ = 2419) = 4.21, $\underline{p}$ = .65). The variance accounted for is small, with Nagelkerke's R^2 = 0.09. The model successfully predicted 100% of the students who did not report feeling unsafe but did not predict any of the students who did feel unsafe, for an overall success rate of 95.5%. However, this success rate of prediction is not any better than what would be predicted by chance alone. Although the full model was statistically different from the constant-only model, it did not improve overall classification of the students.

According to the Wald criterion, depression ($\underline{z}$ = 8.23, $\underline{p}$ < .01) and quality of life ($\underline{z}$ = 15.37, $\underline{p}$ < .001) reliably predicted whether or not a student reported feeling unsafe at school. Students who reported feeling sad or hopeless were two times more likely, while students describing their quality of life as fair or poor were 2.5 times more likely to report feeling unsafe.

Students were also asked how many times they were threatened or injured with a weapon on school property in the past 12 months. A total of 7.2% of the students responded they had felt threatened. Data from 2409 students were available for analysis. A test of the full model with all six predictors against a constant-only model was statistically reliable χ^2 (6, $\underline{N}$ = 2409) = 87.20, $\underline{p}$ < .001, indicating the predictors, as a set, reliably distinguished between students who reported feeling threatened at school within the past 12 months and those who did not. Results of the Hosmer and Lemeshow test, which measures goodness of fit of the data, were not significant χ^2 (5, $\underline{N}$ = 2409) = 6.74, $\underline{p}$ = .24). The variance accounted for is small, with Nagelkerke's R^2 = 0.09. The model successfully predicted 100% of the students who did not report feeling threatened but did not predict any of the students who did feel unsafe, for an overall success rate of 92.2%. However, this success rate of prediction is not any better than what would be predicted by chance alone. Although the full model was statistically different from the constant-only model, it did not improve overall classification of the students.

According to the Wald criterion, suicidal ideation ($\underline{z}$ = 16.68, $\underline{p}$ < .001), depression ($\underline{z}$ = 9.58, $\underline{p}$ < .01) and quality of life ($\underline{z}$ = 8.45, $\underline{p}$ < .01) reliably predicted whether or not a student reported feeling threatened at school. Students who reported experiencing suicidal ideation were 2.2 times more likely, those feeling sad or hopeless were 1.8 times more likely, while students describing their quality of life as fair or poor were 1.7 times more likely to report feeling threatened.

Finally, students were asked how many times in the past 12 months their property was stolen or damaged while at school. Twenty-six percent of students reported their property to be stolen or damaged. Data from 2418 students were available for analysis. A

test of the full model with all six predictors against a constant-only model was statistically reliable χ^2 (6, N = 2418) = 51.03, p < .001, indicating the predictors, as a set, reliably distinguished between students who reported having their property stolen at school within the past 12 months and those who did not. Results of the Hosmer and Lemeshow test, which measures goodness of fit of the data, were not significant χ^2 (5, N = 2418) = 3.98, p = .55). The variance accounted for is small, with Nagelkerke's $R^2 = 0.03$. The model successfully predicted 100% of the students who did not report having their property damaged or stolen, but did not predict any of the students who did have property damaged or stolen, for an overall success rate of 73.7%. However, this success rate of prediction is not any better than what would be predicted by chance alone. Although the full model was statistically different from the constant-only model, it did not improve overall classification of the students.

According to the Wald criterion, depression (z = 11.35, p = .001) and feeling lonely (z = 5.82, p < .05) reliably predicted whether or not a student reported having their property damaged or stolen. Students who reported feeling sad or hopeless were 1.5 times more likely while students experiencing loneliness were 1.4 times more likely to report their property being damaged or stolen while at school.

Alcohol Use and Abuse. Two questions were analyzed assessing alcohol use and abuse of students. The first question asked how many days in the past 30 days did students consume at least one drink of alcohol. Overall, 39.4% of students reported consuming alcohol at least one day. Data from 2322 students were available for analysis. A test of the full model with all six predictors against a constant-only model was statistically reliable χ^2 (6, N = 2322) = 72.21, p < .001, indicating that the predictors, as a set, reliably distinguished between students who reported using drugs in their lifetime and those who did not. Results

of the Hosmer and Lemeshow test, which measures goodness of fit of the data, were not significant χ^2 (5, N = 2322) = 3.21, p = .78). The variance alcohol use accounted for is small, with Nagelkerke's $R^2 = 0.04$. The model successfully predicted 90% of the students who did not report using alcohol and 19.7% of the students who did report drug use, for an overall success rate of 63.2%. However, this success rate of prediction is not any better than what would be predicted by chance alone. Although the full model was statistically different from the constant-only model, it did not improve overall classification of the students.

According to the Wald criterion, suicidal ideation (z = 15.15, p < .001), depression (z = 5.84, p < .05), and stress (z = 6.30, p <.05) reliably predicted whether or not a student reported using alcohol. Students who reported feelings of suicidal ideation were 1.6 times more likely, students who stated they were feeling sad or helpless were 1.3 times more likely, and those who reported feeling stress were 1.3 times more likely to report having used alcohol in the past 30 days.

The second question asked about binge drinking. Specifically, the question asked how many days, in the past 30 days, did students consume 5 or more drinks in a row within a couple of hours. Twenty-one percent of students reported that they engaged in binge drinking. Data from 2378 students were available for analysis. A test of the full model with all six predictors against a constant-only model was statistically reliable χ^2 (6, N = 2378) = 49.62, p < .001, indicating the predictors, as a set, reliably distinguished between students who reported using drugs in their lifetime and those who have not. Results of the Hosmer and Lemeshow test, which measures goodness of fit of the data, were not significant χ^2 (5, N = 2378) = 3.80, p = .58). The variance binge drinking accounted for is small, with Nagelkerke's $R^2 = 0.03$. The model successfully predicted 100% of the students who did not

report binge drinking and none of the students who did report binge drinking, for an overall success rate of 80.1%. However, this success rate of prediction is not any better than what would be predicted by chance alone. Although the full model was statistically different from the constant-only model, it did not improve overall classification of the students.

According to the Wald criterion, suicidal ideation ($z = 12.61$, $p < .001$), stress ($z = 4.13$, $p < .05$), and feeling lonely ($z = 9.83$, $p < .01$) reliably predicted whether or not a student reported binge drinking. Students who reported feelings of suicidal ideation were 1.7 times more likely while students who stated they were feeling stress were 1.3 times more likely to report having abused alcohol in the past 30 days. Students who reported feeling lonely were 39% less likely to report engaging in binge drinking.

Drug Use. All eight questions asking about drug use in the student's lifetime were collapsed into one single variable. Data from 2421 students were available for analysis. A test of the full model with all six predictors against a constant-only model was statistically reliable χ^2 $(6, N = 2421) = 156.14$, $p < .001$, indicating the predictors, as a set, reliably distinguished between students who reported using drugs in their lifetime and those who have not. Results of the Hosmer and Lemeshow test, which measures goodness of fit of the data, were not significant $\chi^2 (5, N = 2421) = 1.36$, $p = .93$). The variance drug use accounted for is small, with Nagelkerke's $R^2 = 0.08$. The model successfully predicted 76% of the students who did not report using drugs and 46.1% of the students who did report drug use, for an overall success rate of 61.3%. However, this success rate of prediction is not any better than what would be predicted by chance alone. Although the full model was statistically different from the constant-only model, it did not improve overall classification of the students.

Table 3.8 shows regression coefficients, Wald statistics, p-values for the Wald statistics, odds ratios, and 95% confidence intervals for odds ratios for each of the six predictors. According to the Wald criterion, suicidal ideation (z = 30.39, p < .001), depression (z = 26.65, p < .001), and quality of life (z = 11.43, p =.001) reliably predicted whether or not a student reported using drugs. Specifically, students who reported feeling of suicidal ideation were 1.99 times more likely to report drug use. Students who stated they were feeling sad or helpless were 1.7 times more likely while those who rated their quality of life as fair or poor were 1.5 times more likely to report having used drugs in their lifetime.

Table 3.8. Logistic Regression Analysis of Drug Use as a Function of Mental Health Indicators (N=2421).

Variables	***B***	Wald Test (z-ratio)	p-value of Wald Test	Odds Ratio	95% Confidence Interval for Odds Ratio	
					Lower	Upper
Suicidal Ideation	0.69	30.39	0.00	1.99	1.56	2.55
Depression	0.54	26.65	0.00	1.71	1.40	2.10
Self-Esteem	0.03	0.10	0.75	1.04	0.84	1.28
Quality of Life	0.41	11.43	0.001	1.50	1.19	1.90
Loneliness	-0.21	2.65	0.10	0.81	0.63	1.04
Stress	0.15	2.17	0.14	1.16	0.95	1.41
(Constant)	-0.532	84.67	0.00			

Sexual Behavior. A total of two questions examining the sexual behaviors of students were analyzed separately. The first question simply asked students whether or not they have engaged in sexual intercourse. Overall, 52.5 % of students replied that they have had sexual intercourse. Data from 2247 students were available for analysis. A test of the full model with all six predictors against a constant-only model was statistically reliable χ^2 (6, N =

2247) = 54.39, $\underline{p} < .001$, indicating the predictors, as a set, reliably distinguished between students who reported having sex in their lifetime and those who did not. Results of the Hosmer and Lemeshow test, which measures goodness of fit of the data, were not significant χ^2 (6, $\underline{N}$ = 2247) = 3.06, $\underline{p}$ = .80). The variance is accounted for is small, with Nagelkerke's R^2 = 0.03. The model successfully predicted 70.5% of the students who did not reportengaging in sexual intercourse and 41.1% of the students who did, for an overall success rate of 56.1%. However, this success rate of prediction is not any better than what would be predicted by chance alone. Although the full model was statistically different from the constant-only model, it did not improve overall classification of the students.

According to the Wald criterion, suicidal ideation ($\underline{z}$ = 7.29, $\underline{p} < .01$), depression ($\underline{z}$ = 16.31, $\underline{p} < .001$), quality of life ($\underline{z}$ = 10.67, $\underline{p}$ = .001) and loneliness ($\underline{z}$ = 11.85, $\underline{p}$ =.001) reliably predicted whether or not a student reported having sex. Specifically, students who reported feelings of suicidal ideation were 1.4 times more likely, students who stated they were feeling sad or helpless were 1.6 times more likely, and those who rated their quality of life as fair or poor were 1.5 times more likely to report having had sexual intercourse. Students who reported feeling lonely were 37% less likely to report engaging in sexual intercourse.

The second question addressed whether or not students drank alcohol or used drugs prior to the last time they engaged in sexual intercourse. Students who reported not engaging in sexual intercourse were eliminated from this analysis, leaving a total of 1102 students available for analysis. A test of the full model with all six predictors against a constant-only model was statistically reliable χ^2 (6, $\underline{N}$ = 1102) = 15.02, $\underline{p} < .05$, indicating that the predictors, as a set, reliably distinguished between students who reported having sex in their

lifetime and those who have not. Results of the Hosmer and Lemeshow test, which measures goodness of fit of the data, were not significant χ^2 (6, N = 1102) = 3.73, p = .71). The variance is accounted for is small, with Nagelkerke's $R^2 = 0.02$. The model successfully predicted 100% of the students who did not report using drugs and alcohol prior to engaging in sexual intercourse and none of the students who did, for an overall success rate of 81.2%. However, this success rate of prediction is not any better than what would be predicted by chance alone. Although the full model was statistically different from the constant-only model, it did not improve overall classification of the students.

According to the Wald criterion, only quality of life reliably predicted whether or not a student reported using alcohol or drugs prior to having sex (z = 6.05, p = .01). Specifically, students who reported having a fair or poor quality of life were 1.6 times more likely to report using drugs or alcohol prior to engaging in sexual intercourse.

Question #3: Does being a member of a sub-population (gender, race, disability status) who also self-reported mental health indicators predict engagement in risk behaviors?

Heirarchical Logistic Regression (HLR) analyses were conducted to answer this question. For each risk behavior indicator question, HLR analyses including separate interactions between each mental health indicator (suicidal ideation, depression, self-esteem, quality of life, loneliness and stress) and gender, race, and disability status were examined. In each analysis, the mental health indicator was entered into the model first, followed by the interaction of the mental health indicator and gender, race, or disability status. The interactions did not significantly change the amount of variance accounted for in the models, which ranged from 1-9%. Significant results are below (alpha was set at 0.05).

Violence. Female students who also reported feelings of suicidal ideation, depression, low self-esteem, lower quality of life, and reported more stress were significantly less likely to say they participated in a physical fight on school property in the previous 12 months. Students with disabilities who also reported depression, having low self-esteem, poor quality of life, feeling lonely, and experiencing higher levels of stress were more likely than their peers to say they participated in a physical fight. African American students who reported having lower self-esteem and were lonely were more likely to report being in a physical fight.

Female students who reported suicidal ideation, depression, self-esteem, a lower quality of life, loneliness, and stress were also significantly less likely to report carrying a weapon on school property. Students with a self-reported disability who also reported feelings of suicidal ideation, lower self-esteem, and reported higher amounts of stress were more likely to report carrying a weapon on school property in the previous 12 months. None of the interactions between race and the mental health indicators were significant on the risk behavior indicator of carrying a weapon on school property.

Adolescent females who reported suicidal ideation, depression, lower self-esteem, and stress were significantly less likely to report feeling unsafe at school. Students with self-reported disabilities who indicated they had experienced each of the six mental health indicators were all more likely to report feeling unsafe at school. African American students who reported feelings of suicidal ideation, depression, fair or poor quality of life, and high level of stress were all significantly more likely to report feeling unsafe at school. Students who identified their race as "other" and reported feeling sad or hopeless, low self-esteem, and experience elevated stress levels also were more likely to report feeling unsafe.

Female students who indicated they had experienced each of the six mental health indicators were less likely to report being threatened on school property in the past 12 months. Students with self-reported disabilities who reported suicidal ideation, lower self-esteem, lower quality of life, and stress were more likely than their non-disabled peers to state that they were threatened. Students who identified their race as "other" and indicated lower levels of self-esteem, lower quality of life, and loneliness were more likely to feel threatened at school. Finally, Hispanic students who reported feeling stress were more likely to feel threatened at school.

The final question analyzed within the cluster of violent risk behaviors was that asking students about having property damaged or stolen while on school property in the past 12 months. Female students who reported having lower self-esteem were 28% less likely to report having property damaged or stolen. Students with self-reported disabilities who reported feelings of suicidal ideation, depression, lower self-esteem, fair or poor quality of life, and stress were significantly more likely to report that they had property damaged or stolen while at school. The only significant interaction involving race was students who described their race as "other" who reported experiencing stress were 1.54 times more likely to say they experienced their property damaged or stolen. Table 3.9 summarizes all of the significant interactions for violent behaviors.

Table 3.9. Significant Interactions between Mental Health Indicators and Gender, Race, and Disability Status as a Function of Violence

Variables	***B***	Wald Test (z-ratio)	p-value of Wald Test	Odds Ratio	95% Confidence Interval for Odds Ratio	
					Lower	Upper
Physical Fight						
Suicidal Ideation	0.74	8.82	0.003	2.10	1.29	3.42
SI x Gender	-0.79	9.77	0.002	0.45	0.28	0.75
Depression	0.41	3.56	0.06	1.51	0.98	2.32
Dep x Gender	-0.72	11.74	0.001	0.49	0.32	2.32
Dep x Disability Status	0.45	4.46	0.04	1.56	1.03	2.37
Self-Esteem	0.19	0.64	0.42	1.20	0.77	1.89
S-E x Gender	-0.75	11.03	0.001	0.47	0.30	0.74
S-E x Disability Status	0.69	9.40	0.002	2.00	1.28	3.11
S-E x Race (AA)	0.60	5.18	0.02	1.83	1.09	3.07
Quality of Life	0.38	2.02	0.16	1.47	0.87	2.49
QoL x Gender	-0.61	5.83	0.02	0.55	0.33	0.89
QoL x Disability Status	1.01	15.54	0.000	2.75	1.66	4.55
Loneliness	-0.35	1.27	0.26	0.70	0.38	1.30
Loneliness x Disability Status	0.64	4.48	0.03	1.89	1.05	3.40
Loneliness x Race (AA)	0.77	5.14	0.02	2.17	1.11	4.23
Stress	0.07	0.13	0.72	1.08	0.72	1.61
Stress x Gender	-0.66	10.54	0.001	0.52	0.35	0.77
Stress x Disability Status	0.48	5.51	0.02	1.61	1.08	2.40
Stress x Race (Oth)	0.70	6.13	0.01	2.02	1.16	3.52
Carrying a Weapon						
Suicidal Ideation	1.25	18.72	0.000	3.47	1.98	6.10
SI x Gender	-1.32	19.83	0.000	0.27	0.15	0.48
SI x Disability Status	0.59	4.00	0.04	1.80	1.01	3.19
Depression	1.28	26.86	0.000	3.60	2.22	5.83
Dep x Gender	-1.25	25.04	0.000	0.29	0.18	0.47
Self-Esteem	0.66	5.49	0.02	1.93	1.11	3.36
S-E x Gender	-1.58	26.79	0.000	0.21	0.11	0.37
S-E x Disability Status	0.97	11.65	0.001	2.65	1.51	4.62

Quality of Life	0.59	3.26	0.07	1.81	0.95	3.44
QoL x Gender	-0.80	6.33	0.01	0.45	0.24	0.84
Loneliness	0.26	0.55	0.46	1.30	0.65	2.60
Loneliness x Gender	-0.92	6.45	0.01	0.40	0.20	0.81
Stress	0.81	11.74	.001	2.25	1.42	3.58
Stress x Gender	-1.28	26.86	0.000	0.28	0.17	0.45
Stress x Disability Status	-0.50	4.21	0.04	1.64	1.02	2.64
Feel Unsafe						
Suicidal Ideation	-0.05	0.02	0.89	0.95	0.42	2.15
SI x Gender	-0.73	4.79	0.03	0.48	0.25	0.93
SI x Disability Status	1.71	19.95	0.000	5.51	2.61	11.66
SI x Race (AA)	1.25	10.39	0.001	3.49	1.63	7.45
Depression	0.25	-.56	0.45	1.29	0.66	2.50
Dep x Gender	-0.62	5.31	0.02	0.54	0.32	0.91
Dep x Disability Status	1.37	22.81	0.000	3.92	2.24	6.88
Dep x Race (AA)	0.78	5.97	0.02	2.18	1.17	4.08
Dep x Race (Oth)	1.07	8.83	0.003	2.90	1.44	5.86
Self-Esteem	0.58	3.48	0.06	1.79	0.97	3.31
S-E x Gender	-0.80	8.15	0.004	0.45	0.26	0.78
S-E x Disability Status	0.80	8.06	0.01	2.23	1.28	3.86
S-E x Race (Oth)	1.41	0.34	17.13	0.000	2.10	8.01
Quality of Life	0.33	0.74	0.39	1.39	0.65	2.97
QoL x Disability Status	1.50	20.39	0.000	4.49	2.34	8.60
QoL x Race (AA)	0.70	3.87	0.04	2.02	1.002	4.05
Loneliness	-0.09	0.04	0.84	0.912	0.41	2.07
Loneliness x Disability Status	1.02	7.69	0.001	2.76	1.35	5.66
Stress	-0.54	2.47	0.12	0.58	0.30	1.14
Stress x Gender	-0.69	5.66	0.02	0.50	0.28	0.89
Stress x Disability Status	1.41	21.36	0.000	4.11	2.26	7.48
Stress x Race (AA)	1.13	11.14	0.001	3.10	1.60	6.03
Stress x Race (Oth)	1.12	8.26	0.004	3.07	1.43	6.61
Feel Threatened						
Suicidal Ideation	1.34	26.69	0.000	3.83	2.30	6.37
SI x Gender	-0.75	8.82	0.003	0.48	0.29	0.78
SI x Disability Status	0.53	4.49	0.03	1.70	1.04	2.78
Depression	1.25	29.21	0.000	3.48	2.21	5.47
Dep x Gender	-0.68	10.26	0.001	0.51	0.34	0.77

Self-Esteem	0.73	9.01	0.003	2.08	1.29	3.36
S-E x Gender	-1.10	19.72	0.000	0.33	0.20	0.54
S-E x Disability Status	0.53	4.77	0.03	1.69	1.06	2.72
S-E x Race (Oth)	1.11	12.90	0.000	3.05	1.66	5.59
Quality of Life	0.92	10.46	0.001	2.51	1.44	4.38
QoL x Gender	-0.78	8.87	0.003	0.46	0.27	0.77
QoL x Disability Status	0.83	9.94	0.002	2.30	1.37	3.87
QoL x Race (Oth)	0.77	5.55	0.02	2.16	1.14	4.08
Loneliness	0.73	6.47	0.01	2.07	1.18	3.63
Loneliness x Gender	-0.58	4.16	0.04	0.56	0.32	0.98
Loneliness x Race (Oth)	1.00	7.44	0.01	2.71	1.32	5.53
Stress	0.56	6.03	0.01	1.74	1.12	2.72
Stress x Gender	-0.75	12.06	0.001	0.47	0.31	0.72
Stress x Disability Status	0.64	8.77	0.003	1.90	1.24	2.90
Stress x Race (H)	1.03	4.32	0.04	2.80	1.06	7.41
Property Damaged						
Suicidal Ideation	0.31	2.37	0.12	1.37	0.92	2.04
SI x Disability Status	0.56	8.21	0.004	1.75	1.19	2.57
Depression	0.36	4.69	0.03	1.44	1.04	2.00
Dep x Disability Status	0.48	9.76	0.002	1.62	1.20	2.19
Self-Esteem	0.39	5.33	0.02	1.47	1.06	2.04
S-E x Gender	-0.33	4.15	0.04	0.72	0.52	0.99
S-E x Disability Status	0.39	5.87	0.02	1.48	1.08	2.04
Quality of Life	0.11	0.26	0.61	1.12	0.73	1.70
QoL x Disability Status	0.78	14.93	0.000	2.19	1.47	3.26
Stress	0.24	2.48	0.12	1.27	0.94	1.71
Stress x Disability Status	0.44	9.07	0.003	1.56	1.17	2.08
Stress x Race (Oth)	0.43	3.93	0.05	1.54	1.01	2.36

Comparison group for gender was male participants.
Comparison group for race was White participants.
Comparison group for disability status was non-disabled students

Alcohol Use and Abuse. There were two questions that looked at drinking behavior in adolescents analyzed in this study. The first asked students how many days, in the past 30 days, did they have a drink of alcohol. Interactions between gender and the mental health indicators on this variable were all found to be nonsignificant. Students with a self-reported disability who also reported having stress in their lives were 1.47 times more likely to report they had used alcohol. African American students who reported feeling sad or hopeless, lower self-esteem, lower quality of life, and stress were significantly less likely to report alcohol use.

The second question asked about binge drinking – how often students drank five or more drinks in a row over a short period of time. Female students who reported having low self-esteem and stress were significantly less likely to report binge drinking. Students with self-reported disabilities who reported feeling lonely were more likely to report that they engaged in binge drinking over the past 30 days. African American students who indicated they experienced all six mental health indicators were significantly less likely to engage in binge drinking behavior. Significant interactions are listed in Table 3.10.

Table 3.10. Significant Interactions between Mental Health Indicators and Gender, Race, and Disability Status as a Function of Alcohol Use and Abuse

Variables	***B***	Wald Test (z-ratio)	p-value of Wald Test	Odds Ratio	95% Confidence Interval for Odds Ratio	
					Lower	Upper
Drink Alcohol						
Depression	0.52	10.48	0.001	1.68	1.23	2.31
Dep x Race (AA)	-0.59	9.57	0.002	0.55	0.38	0.81
Self-Esteem	0.53	10.65	0.001	1.69	1.23	3.23
S-E x Race (AA)	-0.50	5.46	0.02	0.61	0.40	0.92
Quality of Life	0.43	4.51	0.03	1.54	1.03	2.28
QoL x Race (AA)	-0.66	7.31	0.01	0.52	0.32	0.83
Stress	0.55	14.87	0.000	1.74	1.31	2.30

Stress x Disability Status	0.38	7.32	0.01	1.47	1.11	1.94
Stress x Race (AA)	-0.58	9.28	0.002	0.56	0.39	0.81
Binge Drinking						
Suicidal Ideation	0.96	20.86	0.000	2.62	1.73	3.96
SI x Race (AA)	-1.20	11.98	0.001	0.30	0.15	0.59
Depression	0.58	9.99	0.02	1.78	1.25	2.55
Dep x Race (AA)	-1.43	24.39	0.000	0.24	0.14	0.42
Self-Esteem	0.68	14.23	0.000	1.97	1.38	2.80
S-E x Gender	-0.53	8.60	0.003	0.59	0.41	0.84
S-E x Race (AA)	-0.81	8.42	0.004	0.45	0.26	0.77
Quality of Life	0.72	10.61	0.001	2.05	1.33	3.15
QoL x Race (AA)	-0.97	9.98	0.002	0.38	0.21	0.69
Loneliness	-0.04	0.03	0.87	0.96	0.59	1.56
Loneliness x Disability Status	0.59	5.41	0.02	1.80	1.10	2.96
Loneliness x Race (AA)	-0.88	5.70	0.02	0.41	0.20	0.85
Stress	0.11	0.78	0.38	1.12	0.87	1.44
Stress x Gender	-0.77	28.28	0.000	0.46	0.35	0.62
Stress x Race (AA)	-0.93	25.56	0.000	0.40	0.28	0.57

Comparison group for gender was male participants.
Comparison group for race was White participants.
Comparison group for disability status was non-disabled students

Drug Use. There was a significant interaction found between gender and self-esteem with females who said they had a lower self-esteem significantly less likely to report using drugs. There were also significant interactions between disability status and depression, self-esteem, loneliness, and stress. Students with self-reported disabilities who were depressed were 1.42 times, with low self-esteem were 1.41 times, who said they were lonely were 1.78 times, and who said they had stress were 1.88 times more likely to report using drugs.

There was a significant interaction between suicidal ideation and race; specifically, Hispanic students who also reported feelings of suicidal ideation were 74% less likely to report using drugs in their lifetime. Hispanic students who also reported feeling sad or hopeless were also 51% less likely to use drugs. There was also a significant interaction

between self-esteem and race; specifically African American students who reported having lower self-esteem were 1.35 times more likely to report they had used drugs in their lifetime while students who reported their race as "other" were 1.35 times more likely to report drug use. Table 3.11 lists significant interactions.

Table 3.11. Significant Interactions between Mental Health Indicators and Gender, Race, and Disability Status as a Function of Drug Use

Variables	***B***	Wald Test (z-ratio)	p-value of Wald Test	Odds Ratio	95% Confidence Interval for Odds Ratio	
					Lower	Upper
Drug Use						
Suicidal Ideation	1.03	25.08	0.000	2.79	1.87	4.16
SI x Race (H)	-1.35	8.56	0.003	0.26	0.10	0.64
Depression	0.88	30.27	0.000	2.42	1.76	3.31
Dep x Disability Status	0.35	5.32	0.21	1.42	1.05	1.92
Dep x Race (H)	-0.73	4.53	0.03	0.48	0.25	0.94
Self-Esteem	-0.50	20.10	0.000	0.61	0.49	0.76
S-E x Gender	-0.39	10.07	0.000	0.68	0.56	0.82
S-E x Disability Status	0.36	8.16	0.004	1.43	1.12	1.82
S-E x Race (AA)	0.30	7.19	0.01	1.35	1.08	1.68
S-E x Race (Oth)	0.42	7.13	0.01	1.52	1.12	2.06
Loneliness	0.01	0.01	0.94	1.01	0.69	1.49
Loneliness x Disability Status	0.57	7.97	0.01	1.78	1.19	2.64
Stress	0.42	9.00	0.003	1.52	1.16	2.01
Stress x Disability Status	0.63	19.95	0.000	1.88	1.42	2.48

Comparison group for gender was male participants.
Comparison group for race was White participants.
Comparison group for disability status was non-disabled students

Sexual Behaviors. There were two questions analyzed from the YRBS to examine sexual behavior in adolescents who participated in completing the survey. The first question asked whether or not the students had ever had sexual intercourse in their lifetime. There

were no significant interactions found between gender and the mental health indicators on this question. Students with self-reported disabilities who reported experiencing lower self-esteem and poor quality of life were more likely to have engaged in sexual intercourse. African American students who reported feelings of depression, low self-esteem, and poor quality of life were more likely to report engaging in sexual intercourse. Students who described their race as "other" and reported feeling sad or hopeless were also more likely to report having had sexual intercourse in their lifetimes.

The second question asked students whether or not they had used drugs or alcohol before engaging in sexual intercourse the last time. No significant interactions were found between the mental health indicators and gender, race, or disability status on this indicator. See Table 3.12 for a listing of the significant interactions.

Table 3.12. Significant Interactions between Mental Health Indicators and Gender, Race, and Disability Status as a Function of Sexual Behaviors

Variables	***B***	Wald Test (z-ratio)	p-value of Wald Test	Odds Ratio	95% Confidence Interval for Odds Ratio	
					Lower	Upper
Sexual Intercourse						
Depression	0.18	1.16	0.28	1.20	0.86	1.66
Dep x Race (AA)	0.96	21.21	0.000	2.60	1.73	3.91
Dep x Race (Oth)	0.53	4.70	0.03	1.69	1.05	2.72
Self-Esteem	-0.13	0.62	0.43	0.88	0.63	1.22
S-E x Disability Status	0.42	6.45	0.01	1.52	1.10	2.11
S-E x Race (AA)	0.72	9.41	0.002	2.06	1.30	3.26
Quality of Life	0.07	0.10	0.75	1.07	0.71	1.60
QoL x Disability Status	0.47	5.01	0.03	1.60	1.06	2.41
QoL x Race (AA)	0.76	8.45	0.004	2.13	1.28	3.55
Alcohol/Drugs Before Last Sexual Intercourse						
Self-Esteem	0.74	6.98	0.01	2.09	1.21	3.61

S-E x Gender	-0.75	7.75	0.01	0.47	0.28	0.80
Quality of Life	1.34	19.40	0.000	3.80	2.10	6.88
QoL x Gender	-0.62	4.29	0.04	0.54	0.30	0.97
QoL x Race (AA)	-0.70	3.86	0.05	0.49	0.25	0.99

Comparison group for gender was male participants.
Comparison group for race was White participants.
Comparison group for disability status was non-disabled students

Chapter 4

Discussion

Mental Health Indicators

While all of the models analyzed showed that the data demonstrated a good fit statistically, group membership variables were not strong in predicting mental health indicators as outcomes. This may be due to, the low prevalence of the behaviors selected for analysis. Other variables that were not selected could have impacted the outcomes. Although all models had some significant contribution of the predictor variables, the variance explained by the predictor variables were all small, ranging from 5% for loneliness and 13% for stress.

Gender and disability appear to be the strongest predictor variables. Females were found to be more likely to experience suicidal ideation, depression, loneliness, and stress. Adolescent females were also less likely to experience high levels of self-esteem and rate their quality of life as good or better. The results for students with self-reported disabilities were also in the same direction as that for female students. Students who self-reported having a disability reported that they were 3.2 times more likely to report experiencing feelings of suicidal ideation, 2.96 times more likely to indicate feelings of depression, 2.48 times more likely to report feeling lonely, and 2.5 times more likely to note feeling stress all of the time. Students with a disability were 73% less likely to report feeling good or better about themselves and 67% less likely to rate their quality of life as good or better. These

results are consistent with previous research that has found that females are more likely to report depression (e.g., Marcotte et al., 2004), suicidal ideation (CDC, 2002), lower self-esteem (e.g., Wild et al., 2004), loneliness (e.g, Storch & Masia-Warner, 2004), and stress (e.g., Self-Brown et al., 2004). These results are also consistent with disability research that states that students with a disability are more likely to have a comorbid psychiatric disorder (Cadman et al., 1987) and rate their quality of life lower (e.g., Bradley & Conwyn, 2004) than their non-disabled peers.

There were also some significant findings with race as the predictor variable. All racial groups were less likely to rate their quality of life as good or better compared to their white peers. African American students were also less likely to report experiences of suicidal ideation and stress and more likely to report having high self-esteem.

Risk Behavior Indicators

As with the models using mental health indicators as the outcome variable, the models using risk behavior indicators as the outcome variables all showed that the data itself demonstrated a good fit statistically. None of the models using risk behavior indicators as an out were successful for predicting group membership. Although group membership variables did have some significant contribution as predictors, the variance they explained in the outcome variables was very small, ranging from 2% (engaging in a physical fight and using alcohol and drugs before the last time having sexual intercourse) and 9% (feeling unsafe at school and being threatened on school property). When the interactions with mental health indicators were added into the models, the variance remained the same, ranging from 1% to 9%.

There were two different groups of questions looking at violent behaviors – those that asked about participating in violent acts (physical fights, carrying a weapon) and those that asked about being a victim of other's acts of violence (feeling unsafe, being threatened, having property damaged or stolen. Those who reported participating in both violent acts were also significantly more likely to report suicidal ideation. Students who reported they had a lower quality of life and those feeling depressed were also more likely to report participating in a physical fight and carrying a weapon, respectively. Students with self-reported disabilities who reported feelings of depression, lower self-esteem, loneliness, and stress were more likely to say they had been in a physical fight while those who reported suicidal ideation, lower self-esteem, and stress were more likely to report carrying a weapon on school property.

In response to the questions asking about being a victim of violence, those experiencing feelings of depression were more likely to report feeling unsafe, being threatened, and having their property stolen or damaged. Students who perceived their quality of life as being fair or poor were more likely to report feeling unsafe or threatened while adolescents who felt lonely were more likely to have their property stolen or damaged. Significant interactions were found between gender and suicidal ideation, depression, lower self-esteem, stress, loneliness and feeling unsafe, being threatened, and having property stolen or damaged. These findings indicate that females who have mental health difficulties are also more likely to be victims of violent acts. These results are consistent with the research on overt and relational victimization that states that higher levels of depression, loneliness, and lower self-esteem can result from overt and relational victimization (Prinstein et al., 2001; Storch & Masia-Warner, 2004).

Students with self-reported disabilities who also reported experiencing all of the mental health indicators were also more likely to have experienced being a victim of violent behaviors. This may explain why there was also significant interactions, noted above, where students with disabilities were also found to be more likely to be involved in fights and carry a weapon to school. The involvement in physical fighting may or may not be voluntary and it could be that students with disabilities are easy targets to prey upon. Carrying a weapon to school could be for protection since students with disabilities feel unsafe, threatened, and have had property stolen or damaged while at school. The students in this study self-reported their disabilities; they were not formally evaluated using any specific criteria (e.g., IDEA guidelines for special education services).

Neither stress nor self-esteem significantly predicted experience of any of the violent risk behaviors until the interactions were introduced. This finding reinforces the complexity in looking at how stress can influence mental health in different populations. Previous research has found that exposure to violence can lead to daily stress (Self-Brown et al., 2004). Students who feel unsafe, are threatened, or have property stolen or damaged would also be more likely to experience more stress and have lower self-esteem. It could be that the violent acts that students reported being victims of did not occur frequently enough to produce a daily stressor.

Adolescents who reported feelings of suicidal ideation, depression, and stress were significantly more likely to report that they have had at least one drink in the past 30 days. However, African American students who experienced feelings of depression, low self-esteem, poor quality of life, and stress were less likely to report drinking alcohol. Students who experienced feelings of suicidal ideation and stress were also more likely to engage in

binge drinking while those who reported feeling lonely were less likely. African American students who experienced all of the mental health indicators were less likely to report binge drinking. Responses to the question about drug use showed similar results. Students experiencing feelings of suicidal ideation, depression, and reporting a lower quality of life were more likely to report drug use than their peers. However, unlike drinking behavior, African American students here who reported lower self-esteem were significantly more likely to have used drugs in their lifetime. This is also true for Hispanic students who reported depression and lower self-esteem.

The final category of risk behaviors analyzed in this study was sexual behaviors. Students who reported having suicidal ideation, feeling sad or hopeless, and having a fair or poor quality of life were also more likely to report that they had sexual intercourse . Specifically, African American students who reported feeling depressed and a poorer quality of life were more likely to report having had sexual intercourse. Students who categorized their race as "other" and reported feeling sad or hopeless were more likely to have engaged in sexual intercourse. Students who reported feeling lonely were less likely to report engaging in sexual activity. Adolescents with self-reported disabilities who experienced lower self-esteem and poorer quality of life were more likely to report engaging in sexual behavior.

Students who rated their quality of life as fair or poor were also more likely to report using alcohol and drugs prior to their last sexual encounter.

Limitations of Using YRBS Data

The use of YRBS data is subject to multiple limitations. First, these data apply only to youth who attend school on a given day, agree to participate and are therefore not representative of all persons in this age group (Grunbaum et al., 2004). Secondly, although

the YRBS has demonstrated acceptable test-retest reliability, the extent of underreporting or overreporting or experiences and behaviors cannot be directly determined (Grunbaum et al., 2004). As noted above, while the YRBS has a wide focus and asks about many different areas, it is shallow in that it does not delve deep into any one single area. Another limitation in using a measure that has great breadth but is shallow is that there was little opportunity to ask follow-up questions to many of the behaviors analyzed. For example, for students who reported suicidal ideation, no follow-up questions were available to ask the students if they actually attempted suicide or not. These questions are important if these behaviors are to be analyzed further.

However, the benefits of using the YRBS dataset for this study outweigh its limitations. First, the dataset is large and weighted to be representative of high school students in NC allowing for greater generalizabililty of the results of this study. Secondly, while many of the behaviors studied were low-incidence, the breath of the survey allowed for analysis of a variety of mental health and risk behaviors that would not normally be available on a single, normed measure. This information can provide invaluable information for mental health and behavioral programming in the schools.

Resilience to Risk Behaviors

Why do some students who are affected by mental health symptomatology engage in risk behaviors while others do not? Factors that contribute to resiliency based on the Rochester Child Resilience Project (RCRP), which studies urban youth, include: (1) having a warm, caring, nurturing environment throughout childhood but especially throughout the first year of life and (2) those with responsive, nurturing caregivers with whom they form secure attachments with are less vulnerable to the negative effects of major life stress. Continuity of

care also reduces risk. "Quality caregiving promotes sound adaptation and lowers the risk of maladjustment by buffering the child from stressors in the immediate environment, and by promoting a sense of competence and efficacy that acts directly to enhance effective coping with stress" (Cowen et al., 1996, p. 273).

When children enter school and move through adolescence, self-views solidified earlier and further developed over time serve more to enhance adaptation under conditions of life stress. By middle childhood, developmental trajectories for many children are at least well-established and difficult to change. The authors of the RCRP suggest that early intervention and prevention efforts in resiliency have to be long-term rather than superficial. The focus of these efforts has to focus on developing better parenting skills and promoting secure and consistent attachments. Comprehensive family-oriented interventions can increase positive behaviors in children and reduce participation in risk-related delinquent behaviors (Cowen et al., 1996).

While the current study focused on negative and pathological behaviors, the field of psychology is moving toward a shift in focusing on positive aspects of behavior. This movement in positive psychology is being led by Seligman and colleagues (e.g., Seligman & Csikszentmihalyi, 2000) and emphasizes the positive features of such as hope, wisdom, creativity, future mindedness, courage, spirituality, responsibility, and perseverance and how those features can affect health and promote talent and creativity. Focusing on positive aspects of life rather than on pathology may be an important area for research in efforts to promote resilience in children and adolescents.

Mental health service provision in the schools

In addition to the resilience literature, prevention literature (e.g., Webster-Stratton, 2000; Campbell, 1994) has illustrated the importance of recognizing emotional and behavioral problems as early as possible so that interventions can be put into place. Once behavior patterns are established, they are extremely difficult to impact and change. Given the finding from the current study that some students who report certain mental health indicators are more likely to engage in risk behaviors, programs need to be developed in school to address the mental health needs of students in a prevention effort to decrease participation in risk behaviors. There is no data on how many students identified as Behavioral-Emotionally Disturbed (BED) receive mental health services as part of their Individualized Education Program (IEP); however it is known that over 50% of school districts do not provide such services themselves with less than 50% of states having full-time BED specialists on staff in the schools. In states that do offer mental health services, the services vary and are usually short-term or paid for by parents (Knitzer et al., 1990).

School reform needs to include increased mental health service provision due to its effect on positive relationships, healthy self-esteem, and overcoming the barriers of poverty, family dysfunction, teen pregnancy, violence, and substance abuse (NASP, 1998; Flaherty & Weist, 1999; Adelsheim, et al., 2001). Schools constitute a valuable resource as they can provide a range of services from prevention to intervention using school psychologists, and serve as a portal to accessible, affordable mental health services.

Examples of successful attempts at integrating mental health services within the schools have been the New Mexico School Mental Health Initiative (Adelsheim, Carrillo, & Coletta, 2001) and the expanded school mental health (ESMH) programs in Baltimore, MD

(Flaherty & Weist, 1999). The success of both programs has relied on successful interagency collaboration with their respective state health departments. The goal of each program was to identify at-risk youth and provide them and their families with early intervention services so they can succeed in the regular education environment. As a result, over 2000 youth were seen within school mental health clinics (Flaherty & Weist, 1999) and services have been expanded into even the most rural communities (Adelsheim et al., 2001). There are many advantages to providing mental health services in the schools. School psychologists are working in the child's world, have access to teachers and administrators who work directly with the child, can view peer interactions, as well as take into account the school environment, needs, and goals of the individual child (Tharinger & Stafford, 1995). The school psychologist is also in a better position to influence the coordination of services within the schools as well as have the opportunity for long-term follow-up (Tharinger & Stafford, 1995).

A crucial factor contributing to whether or not students receive services are teacher beliefs and perceptions relating to their students' mental health status. As services become more widespread and comprehensive in the schools, teachers will most likely have a greater role as a referral source. The increasing number of children identified as having socio-emotional difficulties has led to an increasing demand on general education teachers (e.g., classroom management, effective instruction; Roeser & Midgley, 1997). While research exploring this aspect of school-based mental health has been sparse, there has been at least one study examining the relationship between teacher beliefs and the mental health status of students in their classrooms. Specifically, Roeser and Midgley examined teachers' beliefs concerning students' mental health, the correlates of teacher beliefs (e.g., self-efficacy,

instructional practices, professional experiences, and student characteristics) about students' mental health, and teachers' perceptions of their students' mental health needs. Overall, while 99% of elementary school teachers felt that mental health concerns were part of their role as a teacher, 68% of teachers felt "somewhat" to "very much" burdened by the mental health needs of their students, with teachers in schools outside of urban areas reporting slightly less feelings of burden. Looking at the subset of teachers who reported that they felt burdened by the mental health needs of students, the authors found that students in those classrooms self-reported significantly higher levels of depressive symptoms, and lower levels of positive school affect compared to students in classes where the teachers reportedly felt less burdened. A national study found that the identification of students with emotional needs had "as much to do with local tolerances for difficult behavior, an attitude toward special education and resources as it does with a student's needs" (Knitzer, Steinberg, & Fleisch, 1990, p. xii).

Recommendations stemming from the above study suggest that teachers should be trained to help students find appropriate services and be provided with a list of services and resources available within the school and larger community settings to assist with this process (Roeser & Midgley, 1997). Knitzer (1991) reported that in addition to lack of services, there is an "absence of support systems for teachers of identified students, especially those who teach in self-contained classrooms, and who often feel (and are) isolated and beleaguered" (p. 105).

Adelsheim et al. (2001) state that the main goals of the New Mexico school-based mental health initiative were an "early identification of high-risk youth, supportive intervention for the child and family, and a plan to get the child back on track and successful

in the classroom" (p. 155). School health personnel, including psychologists, helped train teachers to identify children's mental health issues in the classroom and link them to appropriate intervention. The school psychologist was also instrumental in linking school-based mental health needs to community resources.

Given the research above regarding teacher burden and student mental health needs and the success of school psychologists training teachers and providing links to community based resources outlined by Adelsheim et al. (2001), it appears that the school psychologists are needed to assist teachers in dealing with the problems faced in their classrooms stemming from the mental health needs of their students. School psychologists may need to expand their consultation services to provide greater support to teachers as well as work with other school personnel to be sure that teachers are aware of the resources provided to them as well as their students in need.

In order to address the mental health needs of children and adolescents in NC, a longitudinal, population-based study dubbed the Great Smoky Mountain Study began in 1992, surveying 1,073 children aged 9 through 16 and their parents from 11 counties in Western NC. The goals of the study were to estimate the number of children with emotional and behavioral disorders, the persistence of emotional and behavioral disorders in children and adolescents over time, the need for and use of services for behavioral-emotionally disabled (BED), the influence of income level and insurance on service use, who are most at risk for BED, and what children are most at risk for unfavorable outcomes (e.g., school dropout, teen pregnancy, etc.) (Angold, Burns, Costello, & Behar, 1998). Results of the study found that 70% of the participating students had no diagnosable behavioral or emotional disorder; however 25 of the remaining 30% had moderately severe disorders. The

remaining 5% were BED with marked functional impairments at home and school (Angold et al., 1998). Table 4.1 details the characteristics of the children in this study who were characterized as BED.

Table 4.1. Characteristics of Children and Adolescents in the Great Smoky Mountain Study diagnosed as BED

Characteristics of Children with BED in NC

- 70% had a disruptive behavior disorder
- 27% had an anxiety disorder
- 20% have a depressive disorder
- 16% have a substance use disorder
- 13 % have attention deficit hyperactivity disorder (ADHD)
- 4 % have tic disorders
- 2% have an eating disorder (anorexia or bulimia)
- 1% were enconpretic
- 41% had more than one of these disorders

Although parents of these students utilized services from various sectors (e.g., private, community, etc.) more than 75% of children receiving services were seen by school counselors and school psychologists in the education sector and for many, this was their only source of mental health care (Angold et al., 1998). However, only 44% of youths with BED received any professional mental health care during a two-year period. Children receiving Medicaid benefits were better served due to the low level of services provided to the privately insured and uninsured children (Angold et al., 1998).

Winston-Salem/Forsyth County Schools (WSFCS), serving approximately 45,000 students in an urban area of NC, was able to set up a comprehensive school-based health center program. Initially, services were intended for those students enrolled in an alternative high school, Independence High, designed for students who were unable to attend regular high school due to truancy, injury, pregnancy or repeated behavior problems. Students attending Independence High also had difficulty accessing medical and other services due to cost, transportation, conflicts with work, and stigma. Thus, appointment failure rates were as high as 47% at community health centers and emergency room use became the primary source of services (Trivette & Thompson-Drew, 2003).

Currently, WSFCS has four comprehensive school-based health centers: two in high schools, one in a middle school, and one in an elementary school. Medical and mental health services are provided at these clinics that are staffed by social workers, nurses, and part time residents and psychiatrists. These centers serve all students as long as parents provided financial and insurance information for enrollment, which proved difficult. As such, WSFCS developed "Wellness Centers" that provide mental health services via a school clinical social worker but students did not need parental consent to access those services (Trivette & Thompson-Drew, 2003). The paper did not report any statistics about who utilizes the services, which would be useful for others wishing to design similar programs in NC.

The state of North Carolina does provide quality standards for school-based health clinics in NC (www.healthinschools.org). These standards address access to services, what services are provided, staffing, and relationships between the school and community.

Future Research

With the need for population based data to address national initiatives such as Healthy People 2010, this study can serve as a useful resource for goal setting in the development of Healthy People 2020. Currently national data on comprehensive mental health and risk behaviors is limited and future research should focus on gathering population-based data for tracking incidence and prevalence as well as developing policy to drive prevention and intervention programs for children and adolescents.

There is also a need to study mental health and risk behaviors in a developmental framework. The current study did not analyze the behaviors by age or grade level since many of the behaviors were of low prevalence and did not lend themselves to that level of analysis. Additional studies examining national, rather than just state results of the YRBS may want to examine the developmental nature of these behaviors so that prevention and intervention programs can be targeted to the appropriate grade level.

Finally, researchers may want to extend the scope of the current study to examine the types of environments students are exposed to who report mental health and risk behavior problems. That kind of analysis could not be done in this study in that follow-up questions were lacking and the anonymity of questionnaires precluded follow-up interviews with students. However, as research on resilience and prevention has identified factors such as parental monitoring and academic success of students to be associated with reduced risk of engaging in risk behaviors, it would be informative for future surveys to include aspects of the home and school environment. Such information would provide the basis for examination of factors at greater depth that may impact mental health characteristics and predict participation in the risk behaviors described in this study.

APPENDIX A: Specific Subset of Questions on the YRBS to be used as Mental Health, Risk Behavior and Disability Indicators

Questions Serving as Mental Health Indicators

During the past 12 months, did you ever **seriously** consider attempting suicide?

A. Yes
B. No

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?

A. Yes
B. No

How often do you feel stress in your life?

A. Never
B. Rarely
C. Sometimes
D. Most of the time
E. All of the time

In general, how would you rate the quality of your life?

A. Poor
B. Fair
C. Good
D. Very good
E. Excellent

I feel alone in my life.

A. Strongly disagree
B. Disagree
C. Not sure
D. Agree
E. Strongly agree

I feel good about myself.

A. Strongly disagree
B. Disagree
C. Not sure
D. Agree
E. Strongly agree

Questions Serving as Risk Behavior Indicators

Violence

During the past 30 days, on how many days did you carry a weapon such as a gun, knife, or club **on school property**?

A. 0 days
B. 1 day
C. 2 or 3 days
D. 4 or 5 days
E. 6 or more days

During the past 30 days, on how many days did you **not** go to school because you felt you would be unsafe at school or on your way to or from school?

A. 0 days
B. 1 day
C. 2 or 3 days
D. 4 or 5 days
E. 6 or more days

During the past 12 months, how many times has someone threatened or injured you with a weapon such as a gun, knife, or club **on school property**?

A. 0 times
B. 1 time
C. 2 or 3 times
D. 4 or 5 times
E. 6 or 7 times
F. 8 or 9 times
G. 10 or 11 times
H. 12 or more times

During the past 12 months, how many times has someone stolen or deliberately damaged your property such as your car, clothing, or books **on school property**?

A. 0 times
B. 1 time
C. 2 or 3 times
D. 4 or 5 times
E. 6 or 7 times
F. 8 or 9 times
G. 10 or 11 times
H. 12 or more times

During the past 12 months, how many times were you in a physical fight **on school property**?

A. 0 times
B. 1 time
C. 2 or 3 times
D. 4 or 5 times
E. 6 or 7 times
F. 8 or 9 times
G. 10 or 11 times
H. 12 or more times

Alcohol Use and Abuse

During the past 30 days, on how many days did you have at least one drink of alcohol?

A. 0 days
B. 1 or 2 days
C. 3 to 5 days
D. 6 to 9 days
E. 10 to 19 days
F. 20 to 29 days
G. All 30 days

During the past 30 days, on how many days did you have 5 or more drinks of alcohol in a row, that is, within a couple of hours?

A. 0 days
B. 1 or 2 days
C. 3 to 5 days
D. 6 to 9 days
E. 10 to 19 days
F. 20 to 29 days
G. All 30 days

Drug Use

During your life, how many times have you used marijuana?

A. 0 times
B. 1 or 2 times
C. 3 to 9 times
D. 10 to 19 times
E. 20 to 39 times
F. 40 to 99 times
G. 100 or more times

During your life, how many times have you used **any** form of cocaine, including power, crack, or freebase?

A. 0 times
B. 1 or 2 times
C. 3 to 9 times
D. 10 to 19 times
E. 20 to 39 times
F. 40 or more times

During your life, how many times have you used ecstasy (also called MDMA)?

A. 0 times
B. 1 or 2 times
C. 3 to 9 times
D. 10 to 19 times
E. 20 to 39 times
F. 40 or more times

During your life, how many times have you used LSD (acid), PCP (angel dust), mushrooms, or other hallucinogens?

A. 0 times
B. 1 or 2 times
C. 3 to 9 times
D. 10 to 19 times
E. 20 to 39 times
F. 40 or more times

During your life, how many times have you used **heroin** (also called smack, junk, or China White)?

A. 0 times
B. 1 or 2 times
C. 3 to 9 times
D. 10 to 19 times
E. 20 to 39 times
F. 40 or more times

During your life, how many times have you used **methamphetamines** (also called speed, crystal, crank, or ice)?

A. 0 times
B. 1 or 2 times
C. 3 to 9 times
D. 10 to 19 times
E. 20 to 39 times
F. 40 or more times

During your life, how many times have you sniffed glue, breathed the contents of alcohol spray cans, or inhaled any paints or sprays to get high?

A. 0 times
B. 1 or 2 times
C. 3 to 9 times
D. 10 to 19 times
E. 20 to 39 times
F. 40 or more times

During your life, how many times have you taken **steroid pills or shots** without a doctor's prescription?

A. 0 times
B. 1 or 2 times
C. 3 to 9 times
D. 10 to 19 times
E. 20 to 39 times
F. 40 or more times

Sexual Behavior

Have you ever had sexual intercourse?

A. Yes
B. No

Did you drink alcohol or use drugs before you had sexual intercourse the **last time**?

A. I have never had sexual intercourse
B. Yes
C. No

Questions Serving as Disability Indicators

A disability can be physical, mental, emotional, or communication-related. Do you consider yourself to have a disability?

A. Yes
B. No
C. Not sure

Are you limited in any way in any activities because of any impairment or health problem?

A. Yes
B. No
C. Not sure

Because of any impairment or health problem, do you have any trouble learning, remembering, or concentrating?

A. Yes
B. No
C. Not sure

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