

Development of the Adolescent Exploratory and Risk Behavior Rating Scale

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Abstract

Adolescence is a time when risk behaviors begin to increase through experimentation with health risk behaviors such as substance use and reckless driving and exploratory risk behaviors such as asking someone on a date and standing up to peers. It is likely that some risk-taking is necessary in the course of social and academic development throughout childhood and adolescence. A shift in the adolescent risk behavior research from a focus on health related behaviors to physical and psychological well-being with a link to educational attainment has gained strength, but the goals of this movement are incomplete. Research is needed to better understand the positive outcomes of health risk and exploratory risk behaviors, and a measure that includes both exploratory risk behavior and health risk behavior is needed. The Adolescent Exploratory and Risk Behavior Rating Scale (AERRS) was developed to address this need.

The AERRS was developed using both classical test theory and item response theory methods. The participants were 682 high school students in the Midwest. The results suggest that the developed measure has adequate reliability. The initial examination of validity resulted in a factor structure in which health risk behaviors and exploratory risk behaviors fall into separate factors with some gender differences noted. The item response theory results suggest that risk behavior is a spectrum of behaviors with exploratory behaviors falling on one end and health risk behavior on the opposite end of the spectrum. It was concluded that the AERRS is a reliable measure that has the potential to become a key assessment that has many potential uses in both academic research and applied settings, such as schools.

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Chapter 1: Introduction and Literature Review

Adolescence is a time when risk-taking increases through experimentation with behaviors such as asking someone on a date, substance use, standing up to peers, unprotected sex, reckless driving, and peer aggression. These behaviors have a potential for both favorable and adverse consequences. However, the focus of researchers and practitioners is often on the adverse consequences. Homicides, suicides, and unintentional injuries account for 51% of deaths for those 11–14 years of age and 76% of deaths for those 15–19 years of age (National Center for Health Statistics, 2007). The Centers for Disease Control and Prevention (CDC, 2006a) reported that nationally, 26% of students report drinking more than five drinks in a row at least once in the last thirty days, 36% reported involvement in a physical fight at least once in the last 12 months, and 47% reported at least one instance of sexual intercourse. These behaviors are frequently accepted within adolescent peer groups, but teachers, parents and other adults often discourage such behaviors because they are often associated with adverse effects.

Other risk behaviors can result in constructive outcomes, but teachers, parents and other adults often overlook them. It is likely that some risk-taking is necessary over the course of social and academic development, and these risks might include the choice to engage in challenging academic tasks, unfamiliar extracurricular activities, and making new friends. It is necessary to define risk behavior in a way that includes both types of behavior in order to provide a more complete conception and, in turn, to develop interventions that increase positive risks and decrease negative risks. This approach was suggested almost two decades ago (Jessor, 1992), but has yet to be realized in practice.

Risk behaviors can be classified as either negative or positive based on outcome. The dominant focus within the research literature is on negative outcomes of risk behavior (e.g. Aloise-Young & Chavez, 2002; Brooks, Harris, Thrall, & Woods, 2002), but not all risk is negative. Indeed, some amount of risk is necessary and appropriate for optimal development. For example, the choice to be challenged by academic material (i.e., academic risk taking) facilitates learning (Clifford, 1991). Health risk behaviors are the focus of much within the adolescent risk literature, but there are few lines of research that concentrate on the positive outcomes of risk behavior in adolescents. A clear definition is needed to better inform the assessment and intervention programs of educational and mental health providers who are in position to influence adolescent behavior.

Definitions of Risk Behavior

Researchers have introduced various definitions of risk behavior across the years, and the proposed definitions establish variable levels of emphasis on the actual or potential consequences associated with risk behavior. Irwin's (1993) definition includes behaviors for which there are unknown consequences and the potential for those consequences to have a negative health outcome. Yates (1992) defined risk as multi-dimensional and proposed a definition that includes the consideration of potential loss, probability of loss, and significance of the potential loss. These definitions address the potential for adverse outcomes, but fail to address potentially constructive outcomes. The behaviors often referred to by these definitions include drug abuse, risky sexual activity and other reckless behaviors (e.g., fighting, gang activity, and reckless driving). Research is clear that these behaviors are related to negative health and educational outcomes.

Substance use is related to increased school dropout rates (Aloise-Young & Chavez, 2002; Ellickson, Khanh, Bell, & McGuigan, 1998), lower academic attainment (e.g., Jeynes, 2002) and poor school attendance (Engberg & Morral, 2006; Maes & Lievens, 2003). In addition, the use of alcohol, marijuana and injected drugs is related to a choice of like deviant peers that remains constant throughout adolescence (Dishon & Owens, 2002).

These above definitions emphasize only the negative consequences of risk and exclude risk behaviors that are likely to result in positive outcomes, such as standing up to peers, attempting a physical challenge, or participation in athletics. Participation in athletics and contradiction of peer attitudes or requests are not typically studied as risk behavior; however, those behaviors put the individual at risk for injury, disappointment and social rejection. There is consistent evidence that participation in athletics and other extracurricular activities is related to positive outcomes, which include enhanced academic achievement (Broh, 2002; Cooper, Valentine, Nye, & Lindsay, 1999), reduced substance use (e.g., Eccles & Barber, 1999), and decreased dropout rates (e.g., Mahoney & Cairns, 1997). Students who defend against peer pressure are less likely to participate in delinquent behaviors (Wright, Nichols, Graber, Brooks, Gunn, & Botvin, 2004). In addition, students who report a high level of peer conformity also report lower academic achievement and a greater number of skipped classes (Santor, Messervey, & Kusumakar, 2000).

An extended definition of risk includes the weight of both the negative and positive outcomes associated with a particular behavior (Byrnes, Miller, & Schaffer, 1999; Moore & Gullone, 1996). If an individual feels the positive outcome overrides the

negative, he/she is more likely to take the risk. From the adolescent's perspective, use of illegal drugs can result in negative outcomes such as incarceration and health problems or in a pleasing outcome of feeling high. Participation in extreme sports is also a risk many adolescents choose to take, and may result in positive outcomes such as development of new skills and sense of accomplishment or in negative outcomes such as injury or disappointment. The sole focus no longer lies on negative outcomes, but allows one to discriminate between maladaptive behaviors with potential negative outcomes and adaptive behaviors with potential for psychological and physical growth. This definition opens the door to a more positive view of risk behavior and creates the potential to understand participation in risk behavior as a strength rather than a limitation.

Some risk behaviors are distinct from typical health risk behavior in terms of the likely consequences (Byrnes et al., 1999). Irwin and Vaughn (1988) termed behaviors that result in positive consequences "exploratory behaviors," but this differentiation is not yet commonplace in the research literature. It is not a simple task to label behaviors as either risky or not risky because behaviors labeled as negative can sometimes relate to constructive outcomes (Schulenberg, 2006) and behaviors that are generally considered positive can be quite risky. A recent qualitative study demonstrated that adolescents understand the risks associated with many socially acceptable activities and decisions. For example, adolescents identified going to college and getting married as risky (Abbott-Chapman, Denholm, & Wyld, 2008). Therefore, risk behavior is more completely defined when it is based on psychological outcomes rather than the use of traditionally accepted descriptions. Table 1 provides examples of risk and exploratory

behaviors and demonstrates how each can result in both positive and negative consequences.

Table 1

Consequences of Risk and Exploratory Behaviors

	<u>Health Risk Behavior</u>			<u>Exploratory Behavior</u>		
	<u>Substance Use</u>	<u>Skipping School</u>	<u>Stealing</u>	<u>Make Friends</u>	<u>Try New Sport</u>	<u>Stand up to Peers</u>
<u>Positive consequences</u>						
Internal stimulus	X		X	X	X	X
Social acceptance	X	X	X	X		X
Lower anxiety	X ^a			X	X	
Lower dropout rate					X ^b	
Fewer delinquent behaviors						X ^c
Higher academic attainment					X ^d	
<u>Negative consequences</u>						
Death	X					
Injury	X				X	
Poor school attendance	X ^e					
Social rejection	X	X	X	X	X	X
Lower academic achievement	X ^f	X				
Punishment	X	X	X			
Higher school dropout	X ^g	X				

Note. Examples of risk and exploratory risk behaviors and potential consequences of the behavior with references where noted.

^a Shedler & Block, 1990. ^bMahoney & Cairns, 1997. ^cWright et al., 2004. ^dBroh, 2002.

^eEngberg & Morral, 2006. ^fJeynes, 2002. ^gAloise-Young & Chavez, 2002.

For the purpose of this project, risk behavior is defined broadly as those behaviors that have the potential to result in both positive and negative outcomes. However, very different types of behavior fall under such a definition (e.g., speaking out in class and substance use). In order to distinguish between these different types of risk behavior, subtypes are also defined. Exploratory risk behavior is defined as behavior for which

there is an increased likelihood of positive health and educational outcomes. Health risk behavior, the group of typically studied behavior, is then defined as behaviors for which there is an increased certainty of negative health and educational outcomes (see Table 2 for a summary of risk behavior definitions).

Table 2

Summary of Risk Behavior Definitions

	<u>Irwin, 1993</u>	<u>Yates, 1992</u>	<u>Moore & Gullone, 1996</u>	<u>Byrnes et al., 1999</u>	<u>Jessor, 1992</u>	<u>Proposed Definition</u>
Unknown Consequences	X					
Negative Consequences	X	X				
Positive Consequences			X	X	X	X
Significance of Negative Consequences		X		X		X
Probability of Negative Consequences		X	X	X	X	X
Probability of Positive Consequences			X	X	X	X
Distinguished from Exploratory Behavior						X

Adolescent Risk Behavior Theory

Theories of adolescent risk behavior are abundant in the literature, and arise from various schools of thought within the field of psychology. Cognitive psychology explains risk behavior with a focus on cognitive developmental stages and decision-making processes (Benthin, Slovic, & Severson, 1993; Boyer, 2006). Biological psychologists hypothesized that risk behavior is the result of biological processes such as naturally occurring hormonal surges (Udry, 1988), timing of pubertal maturation (Irwin & Millstein, 1986), and inherited personality traits (Zuckerman, Bone, Neary, Mangelsdoff, & Brustman, 1972).

Neither cognitive nor biological paradigms fully explain adolescent risk behavior. Social environments, such as family structure and parent-child interactions, also influence

adolescent participation in risk behavior (Baumrind, 1991; Cooper, Shaver, Collins, 1998). As young people pull away from their parents and spend increased time with friends, peer influence greatly increases and asserts a powerful effect on the initiation of risk behavior (Chassin, Presson, Sherman, Montello, & McGrew, 1986). In a recent experimental study, participants interacted with a computerized risk-taking game. The participants were randomly assigned to play either alone or with a group of two same aged peers who were encouraged to call out advice. Adolescents took more risks, engaged in more high risk decisions and viewed risk more positively when accompanied by peers. Adult participants did not show the same effect when accompanied by peers, which suggests that adolescence is a time when peer influence makes a significant impact on decision-making in risky situations (Gardner & Steinberg, 2005).

The developmental model provides a distinct perspective wherein risk behavior is considered on a more macroscopic, rather than microscopic, level. Consider an infant who is learning to walk. The infant risks falling when she first stands alone without the aid of a parent or piece of furniture. She also risks a fall when the first steps are made, but those steps are made nonetheless. Developmentally it is appropriate and necessary for the infant to risk the falls in order to advance her gross motor skills. Adolescents also take developmentally appropriate risks, but have a larger world in which to take risks and a wider range of motor, cognitive and social abilities with which to analyze and choose risk behavior. Adolescence is characterized as a stage in life when self-awareness and personal identity come into conflict with authority, and the adolescent who best negotiates the conflict transforms into a confident young adult for whom family and career goals are more easily achieved (Erickson, 1968). Risk behavior paired with a

supportive familial network is associated with increased self-confidence, greater stress tolerance, and higher levels of self-initiation (Baumrind, 1987)

In order to consolidate the various models and to create a comprehensive model of risk behavior, biopsychosocial models were developed. After fifteen years of research on risk behavior, Jessor (1992) adopted a biopsychosocial model of adolescent risk behavior and included the positive outcomes that potentially result from the participation in risk behavior. He redefined risk behavior as functional behaviors that resulted from an interaction of genetics, social environment, perceived environment, personality traits, and behavior experiences. The model presented risk behavior as necessary for adolescents to attain developmental goals. Participation in risk behavior is a mark of maturity and symbolizes the transition from childhood to adult status. It also serves as a method for gaining acceptance from peer groups, establishing autonomy, and challenging social conventions (Jessor, 1992; Mitchell, Crawshaw, Bunton, & Green, 2001). The most recent perspectives on adolescent risk behavior are consistent with the notion that the increase of risk behavior in adolescence is a function of typical development (Steinberg, 2007).

This comprehensive model of risk behavior provides the foundation to better understand risk behavior in adolescence, and encourages researchers, clinicians, and policy makers to transform their view of risk behavior from a wholly negative set of behaviors to a spectrum of behaviors that include traditionally studied health risk behavior and newly conceptualized exploratory risk behaviors. There is a movement by several researchers for a shift in focus away from a disease model to strengths and virtues within psychological experience. This more positive viewpoint focuses attention on the

importance of understanding risk behaviors as a normal and potentially positive aspect of adolescent development.

Positive Psychology

At the beginning of the new century, Seligman and Csikszentmihalyi (2000) edited an issue of *American Psychologist* that was meant to bring about a shift in attention from diseases and deficits to positive qualities and strengths of human experience. In this seminal paper, Seligman and Csikszentmihalyi explained that the fundamental concepts of positive psychology stemmed from prevention science. It is necessary to understand qualities that buffer some individuals against disease in order to prevent disease from occurrence in others, and they challenged psychological researchers to focus on investigations of human strengths in order to “understand and learn how to foster these virtues in young people” (Seligman & Csikszentmihalyi, 2000, p. 7).

This paper created a context for pioneering work that found that positive outcomes resulted from participation in risk behaviors. In a study of over 2000 high school students, Chassin, Pearson, and Sherman (1989) found that substance-using adolescents were more likely to be creative, assertive, and independent compared to their peers who did not use substances. Adolescents were asked to provide a self-report of conventional deviance, which was defined as creativity, adventurousness, curiosity, ability to speak up, unconventionality, and independence. Students were also asked to report tobacco use. Higher scores on the self-report measure of constructive deviance was predictive of tobacco use, and the researchers concluded that participation in substance use does not relate only to negative outcomes, but also relates to indicators of positive unconventionality, such as creativity and independence.

Cross-sectional data from a longitudinal study also revealed that a certain amount of risk taking is psychologically adaptive (Shedler & Block, 1990). Substance use was reported to researchers during a structured interview, and psychologists observed adolescents during several social experiments and provided independent (and blind of the drug use interview) personality and behavior ratings. Adolescents who reported experimentation with drugs (but were not frequent users) were characterized as exhibiting better social skills and were less anxious than those adolescents who refrained from drug experimentation. Adolescents who refrained from the use of marijuana and other substances were described as tense, unexpressive, and socially isolated, and adolescents who frequently used substances were described as troubled, socially withdrawn, unhappy, and rebellious. Although the data suggest that experimentation with risk behaviors (i.e., low level of risk behavior rather than regular participation) may have a positive impact on the psychological health of the adolescent, it would be unethical to promote such behavior with the knowledge that these behaviors often lead to other high-risk activities or participation in the activity beyond what is considered exploratory or experimental (e.g., daily substance use). Instead, promotion of risk-related activities might encourage exploratory risk behaviors as a replacement of health risk behaviors with the knowledge that risk taking is natural to the adolescent lifestyle and promotes psychological growth.

The results of these studies suggest that taking risks in adolescence may lead to a level of psychological health that cannot be gained through abstinence from risk. This hypothesis makes intuitive sense if we view risk from a developmental standpoint. Think back to the one-year old learning to walk. In order to learn a new skill, risk must be taken. Consider also an adult in the prime of her entrepreneurial career. The most fruitful

result may follow a series of business risks: most significantly, the risk to invest a significant amount of money in a new business. Successful children and adults take risks each day for the purpose of growth and development. Adolescents too must take risks in order to achieve optimum growth and development.

As in all risk behavior, adolescents must choose an activity after weighing potential benefits and detriment. As there are negative and positive outcomes for all behavioral choices, the literature supports a view of risk taking on a spectrum that includes behaviors that create various types and levels of risk (Mpofu, Caldwell, Smith, Flisher, Mathews, & Wegner et al., 2006). For example, frequent substance use (a typically studied health risk behavior) creates the risk of injury or death to self or others, but regular participation in challenging academic tasks increases the risk of errors and failure. Alternatively, each behavior carries with it a set of potential benefits; something that is regularly overlooked in the literature. Using the same example, substance use provides the benefits of feeling high and perhaps peer acceptance, and participation in a challenging academic task provides a sense of accomplishment and self-efficacy. The process of choosing one risk over another is another aspect of risk taking that must be explored in order to have a complete understanding of risk behavior.

Risk Perception

Perception of risk influences the decisions with regard to risk taking. One theory of risk perception posits that the perceived riskiness of an activity is influenced by a number of factors. These include whether the risk is voluntary or involuntary, whether the risks of the activity are known to the individual, and whether the risk is familiar or unfamiliar (Slovic, Fischhoff, & Lichtenstein, 1979). Consistent with this theory, an

investigation within a small sample of high school students across five risk behaviors found that adolescents who reported participation in risk behaviors also reported knowledge of risks, less risk to self and others, less seriousness of effects, more control over the risks and higher involuntary nature of the risk activity (Bethin, Slovic, & Severson, 1993).

This suggests that a cost-benefit analysis likely takes place wherein adolescents weigh the potential costs and benefits of participation in the behavior. There is evidence that adolescents' choice to participate in risk behaviors is more highly correlated with the benefits of taking the risk than with the consequences of the risk (Moore & Gullone, 1996; Smith & Rosenthal, 1995). For example, high school students were asked to report both positive and negative consequences of chosen risk behaviors and subsequently rated the likelihood for each consequence to occur and frequency of participation in each rated behavior. The pattern of significant moderate correlations (across risk behaviors such as smoking, drinking, dangerous driving, and sexual behavior) between frequency of participation and rated likelihood and pleasantness of the behavior indicate that students' decision-making process focuses on the positive consequences rather than the negative (Moore & Gullone, 1996).

Researchers cannot continue to assume that adolescents perceive risk behavior in the same manner as adults. If the decision-making process is different for adolescents then it follows that risk perception may also differ. This is consistent with the biological literature that provides evidence for continued cortical maturation throughout adolescence, especially in the areas of the brain responsible for organization and planning (Jernigan, Press, & Hesselink, 1990; Segalowitz & Davies, 2004). The behaviors that

place youth in adult roles may seem less of a risk to the adolescent compared to an adult who experiences life outside the adolescent's social context. For example, risk behavior can function as a method by which boys become men and leaders within their peer group and girls strive for womanhood, which carries with it the role of mother (Mitchell et al., 2001). A qualitative study that asked students how their perception of risk differed from their parents' perception revealed a pattern in which the adolescents reported certain activities (e.g., hitch hiking, drinking alcohol) as less risky compared to their parents' perceptions (Abbott-Chapman et. al., 2008). With this in mind, labeling a behavior as either risky or not risky based on adult perceptions is inaccurate, and instead defining behaviors based on outcomes is more appropriate. In addition, the consideration of adolescent perception of risk provides a richer understanding of the cognitive process that takes place in the choice to participate in one behavior over another. As adolescent perception of risk becomes a focus of research and practice, risk behavior measurement strategies must be revised. Developers must focus not only on the incidence of the behavior, but must also attempt to gather information on the decision-making process itself.

Risk Behavior Assessment

Self report. Risk behavior and risk perception are commonly measured through self-report, and because adolescents may feel the need to misrepresent behaviors and perceptions there is concern about the validity of self report data. However, several research studies have concluded that self report is a valid and reliable measure of constructs such as personality traits and substance use (Farrell, Danish & Howard, 1991; Johnson, 1985; Moskowitz, 1986). Although it is best to evaluate the validity of self-

report information with behavioral observation, physical evidence (drug screen) or permanent records, those methods are often difficult or impossible with risk behavior. Adolescents participate in risk behavior in private or with a select group of peers, and adults seldom have knowledge that the behavior took place. Due to the secrecy with which these activities occur, it is expected that parents' reports about their adolescent's participation in risk behaviors is not highly correlated with the adolescent's self-report (Brown, 1999). Therefore, an honest self-report is the most valid method of gathering data on risk behavior participation and the only way to understand an individual's perception of risk.

It is difficult to be certain that self reports are honest. A direct method for obtaining honest information was attempted by the addition of an item at the end of a risk behavior survey. This item asked respondents to rate the level of honesty with which the survey was completed. The results of this research found that most students (78% of males and 94% of females) reported complete honesty on a sexual behavior questionnaire (Siegel, Aten, Roghmann, 1998). The researchers concluded that the addition of the honesty item at the end of the questionnaire improved the validity of the results and the ensuing conclusions because the data from dishonest respondents were deleted from the dataset.

Indirect methods of identifying dishonest responses can also be used to ensure only valid responses are used in data interpretation. The Minnesota Multiphasic Personality Inventory (MMPI) contains several validity items. When endorsed in a specific manner, these items raise suspicion about the validity of a participant's responses (Graham, 2000). While this method is not often used in risk behavior assessment, it is

possible to add indirect validity items (e.g., paired response items) to questionnaires in order to add another layer of validity support. Paired responses items are items that ask for the same information using different words. For example, an item that asks the adolescent to rate how often he uses tobacco products is paired with an item that asks the adolescent to rate how often he uses cigarettes, chewing tobacco, or cigars. If the adolescent responds differently to the two items, an assumption is made that these responses were made without careful consideration of the items and other responses may also be invalid. The use of validity items, honesty items, and other checks for valid responses ensure the validity of self-report data and the inferences drawn from the data.

National and State Questionnaires. Several federal and state agencies have developed large scale adolescent risk questionnaires. The purpose of such questionnaires is to describe participation in health risk behavior across large samples of adolescents. These questionnaires are all similar in scope as they contain items that relate specifically to health risk behaviors such as substance use, sexual behavior, amount of physical activity, and nutritional choices. These questionnaires do not ask students to report exploratory risk behaviors that may provide resilience and positive outcomes for adolescents. The Youth Risk Behavior Survey (YRBS) is discussed here because it is a commonly cited survey given to high school students in most states and in over twenty major cities in the United States (CDC, 2006b).

The Youth Risk Behavior Survey (YRBS) was developed by the Centers for Disease Control and Prevention (CDC) in 1990 as part of an initiative to monitor the progress of the goals set by Healthy People 2010. The YRBS is provided to high schools

across the United States biannually for measurement of health risk behavior participation. The data are compiled by the CDC, provided to state and local organizations and published nationally in order to monitor the prevalence of health-related risk behaviors such as tobacco use, alcohol and substance use, physical activity, sexual activity and dietary behaviors (CDC, 2006c). This large national data set contributes important information on the developmental patterns of risk behavior across grade levels, historical trends in risk behavior, and has informed theory throughout the years.

The YRBS is revised every two years, but the format of the questions has remained the same. The items ask respondents to report how often in a specified amount of time they have participated in an activity and optional responses are listed in a multiple choice format. The risk behaviors surveyed are: 1) tobacco use, 2) unhealthy dietary behaviors, 3) inadequate physical activity, 4) alcohol and other drug use, 5) sexual behaviors, and 6) behaviors that may result in violence or unintentional injury (CDC, 2003). A recent version of the survey is 87 items in length. Reported internal reliabilities of the 1999 YRBS ranged from a kappa of .24 to .91, but some items showed significantly different prevalence rates across two weeks (Brenner, Kann, McManus, Kinchen, Sundberg, & Ross, 2002). Validity items are not included within the survey, but validity checks are completed on each questionnaire in order to remove random and continuous response sets. The data from the YRBS are widely utilized in published research, but it is unclear whether the data are used to inform mental health or positive behavior programs within schools. The biannual timing of the YRBS also limits the use of the information gained from the survey. Although the YRBS is a comprehensive survey of health risk behavior, it does not contain exploratory risk behavior items and its

use is focused on estimates of behavior incidence and historical trends within United States youth, rather than as a screening or outcome measure.

Instruments used in Schools. A large number of mental health and behavioral measures are more regularly used in schools to assess risk behavior and mental disorder symptoms. A comprehensive review is beyond the scope of this paper (see Levitt, Saka, Romanelli, & Hoagwood, 2007). An appropriate measure for use as a screening instrument is one that covers a broad array of symptoms and behaviors with fewer items (Levitt et al., 2007). A recent review of several broad, specialized and targeted mental health assessments used in schools provided psychometric information for many instruments often used in schools, and suggested that schools match the purpose of the assessment with the psychometric properties of the instrument. For example, an instrument with high sensitivity and low specificity (e.g., Pediatric Symptom Checklist (PSC), Jellinek, Murphy, & Burns, 1986) may identify a greater number of positive cases with a increased number of false positives, but an instrument with high specificity and low sensitivity (e.g., The Strengths and Difficulties Questionnaire [SDQ], Goodman, 1997) may better identify negative cases (Levitt et al., 2007). A school-wide mental health screening program may wish to use an instrument with high sensitivity in order to increase the number of positively identified cases and decrease the number of false negative cases. While this strategy has the potential to incorrectly identify students, the benefit of such a strategy is an increase in confidence that students who are screened into the normal range are indeed at a lower risk for difficulties.

Most of the mental health instruments reviewed by Levitt and colleagues (2007) focus on mental health difficulties and do not ask students, parents, or teachers to respond

to positive emotional and social behaviors. This is consistent with the societal stigma of mental illness and focus on negative symptoms and behaviors. However, the developers of the SDQ (Goodman, 1997) added a short subscale to assess prosocial behaviors such as helping others and positive friendships. The SDQ is a short multi-informant rating scale for use with children ranging in age from 3 years to 16 years. The items were developed based on diagnostic criteria described in the *Diagnostic and Statistical Manual Version IV* (APA, 2004), but does not contain any items that assess substance abuse or school-related violence that are so often a challenge in schools. While the psychometric properties of the SDQ are adequate (Goodman, 2001), the items may not be the best match for education use, and a more relevant instrument that makes use of the SDQ's principles of positive behavior and mental health difficulties is needed. There is a need for screening instruments that better identify students who are at-risk for emotional and behavioral difficulties, but who cannot yet be identified by current screening instruments (Levitt et al., 2007). The addition of items that rate exploratory risk behaviors may provide valuable information for those students who do not yet outwardly display behavioral difficulties in school, but who over time show a decrease in emotionally healthy behaviors.

A shift in the adolescent risk behavior research from a focus on physical health impairments to physical and psychological well-being with a link to educational attainment has gained strength, but the goals of this movement are incomplete. Research is needed to better understand the positive outcomes of health risk and exploratory risk behaviors. Is there a level of risk taking that allows optimal psychological growth during adolescence? Which behaviors comprise healthy risk or exploratory risk behaviors? In

order to answer these questions, a measure that includes both exploratory risk behavior and health risk behavior is needed.

The following is the first study in a research line to develop and evaluate a risk behavior screening measure that includes exploratory risk behaviors in addition to health risk behaviors for secondary schools. The measure includes risk participation items and corresponding risk perception items. This study addressed the following questions:

1. To what extent is an adolescent risk behavior measure that includes exploratory risk and health risk items a reliable measure of risk behavior and risk perception?
2. To what extent is an adolescent risk behavior measure that includes exploratory risk and health risk items contain one primary factor with two secondary factors across a large sample of high school students, and to what extent is this factor structure similar for females and males?
3. To what extent does a brief adolescent risk behavior rating scale developed using Item Response Theory (IRT) contain items that cover a wide ability range, and to what extent are the psychometric properties adequate across a large sample of high school students?

The research questions were answered across two phases of data analysis. During the first phase, exploratory factor analysis was employed to investigate the factor structure of the measure. It was anticipated that the measure would contain one strong factor representing the latent trait of risk involvement and two weak factors that represent health risk behaviors and exploratory risk behaviors. It was anticipated that the resulting version of the measure would contain approximately 25 items. The second analysis

employed IRT 2-parameter polytomous modeling for item analysis and item selection. It was anticipated that the resulting 25 items ranged in difficulty, discrimination of risk participation and perception, and contributed to the adequate reliability of the measure. For the behavior measure, exploratory items were expected to fall on the easy end of the ability scale and health risk items were expected to fall on the difficult end of the ability scale. It was expected that the opposite relationship would result for Part II of the measure.

Chapter 2: Methods

Participants

The target population was 9th through 12th grade Midwestern high school students from diverse racial backgrounds. Students were randomly sampled from urban public and alternative high schools in the Midwest. Alternative high schools were chosen in addition to public high schools because these students have a higher rate and intensity of health risk behavior than students who attend typical public high schools (Grunbaum, Lowry, & Kann, 2001). This heterogeneous sample provided a wide range of participation in and perceptions of exploratory and health risk behaviors. Data were collected at multiple sites in order to obtain a representative sample of students in grades 9 through 12.

Participants were 682 9th through 12th grade students with 616 from the general education high school setting and 66 from the alternative high school setting. Students were selected to participate through a random selection of classrooms at each school. The parents or guardians of students in each of the randomly selected classrooms were sent a parental consent form and letter describing the research project. If parents did not want their student to participate, they were asked to return the consent form to the school. Students whose parents returned the form, four students across both general and alternative education settings, were asked to work on assignments or free read during the data collection.

Across general and alternative education settings, 163 9th graders, 149 10th graders, 157 11th graders, and 152 12th graders with a mean age of 15.94 (SD = 1.22; range = 13 to 20) participated in the study. Females made up 53% of the total sample. Race/ethnicity of the total sample was 57% Caucasian, 19% African American, 4%

Hispanic, and 10% indicated another race/ethnicity (Asian, American Indian, Biracial or Other). There were 69 students who chose not to respond to the race/ethnicity question. Students also rated their grades and 46% reported Above Average or Excellent Grades, 34% reported Average grades, and 7% reported Poor to Failing grades. There were 89 students who did not respond to the question about grades.

Materials

Youth Risk Behavior Survey (YRBS). The YRBS was developed by the CDC in 1990 as part of an initiative to monitor the progress of the goals set by Healthy People 2010. The YRBS is provided to high schools across the United States biannually for measurement of participation in health risk behaviors. The data are compiled by the CDC, provided to state and local organizations and published nationally in order to monitor the prevalence of health-related risk behaviors such as tobacco use, alcohol and substance use, physical activity, sexual activity and dietary behaviors (CDC, 2006b).

The YRBS is revised every two years, but the format of the questions has remained the same throughout the years. The items ask respondents to report how often in a specified amount of time they have participated in an activity, and response options are listed in a multiple choice format. The risk behaviors surveyed are based on six categories of health risk behavior: 1) tobacco use, 2) unhealthy dietary behaviors, 3) inadequate physical activity, 4) alcohol and other drug use, 5) sexual behaviors, and 6) behaviors that may result in violence or unintentional injury (CDC, 2003). The most recent version of the survey is 87 items in length. There are two published reliability studies of the complete YRBS, and the most recent study reported reliability estimates of the 1999 YRBS. The reliability estimates ranged from a kappa of 23.6% to 90.5%, and

stability over time was found to be adequate for most items, but some items showed significant different prevalence rates across two weeks (Brener, Kann, McManus, Kinchen, Sundberg, & Ross, 2002).

Validity of the YRBS was established over the years as researchers continue to use the measure in the study of adolescent risk behavior. For example, the YRBS was used to study the relationship between risk behavior and ethnic identity (Love, Yin, Codina, & Zapata, 2006), physical dating violence (Howard, Wang, & Yan, 2007), and family structure (Paxton, Valois, & Drane, 2007), and is translated into other languages (Nintachan, & Moon, 2007). To date there is no published factor analysis of the complete YRBS. A search was done in PsychINFO with keys words such as “Youth Risk Behavior Survey,” “YRBS,” “Risk taking,” and “factor analysis.” However, a factor analysis of 40 items of the 1992 YRBS found a four factor structure within those items: sexual activity; alcohol, marijuana, and other drug use; smoking; and exercise (Kulbok & Cox, 2002).

Iowa Youth Survey (IYS). The IYS is similar to the YRBS, but is used only within the state of Iowa. It is comprised of similar items (66 items) about participation in risk behavior, but additional items are added to assess the student’s attitudes and beliefs about risk behavior, peer influence, school climate, family attitude toward risk behavior, and community environment. The additional sections of the survey add another 119 items to the survey, for a total of 185 survey items. There are presently no published reliability or validity data for the IYS.

The IYS has been given to 6th, 8th and 11th grade students across the state every three years since 1975. In 2005, a total of 98,246 questionnaires were returned, which

represented 98.4% of the public schools and 13.9% of the private schools in the state of Iowa (Research Institute for Studies in Education, 2006).

Adolescent Risk Behavior Questionnaire (ARQ). The ARQ is a comprehensive risk behavior questionnaire developed in Australia and designed for use with adolescents. It assesses health risk behavior and exploratory risk behavior. It has two sections that are scored separately: (1) a 22-item behavior questionnaire that evaluates the incidence of risk behaviors and (2) a 22-item risk beliefs questionnaire that evaluates adolescent perception of risk involved with each behavior. Item responses are based on a five-point Likert-type scale. A total score and four factor scores are calculated from each questionnaire. The four factor scores are: Thrill-seeking Risk (e.g., roller blading, sky diving), Rebellious Risk (e.g., smoking, staying out late), Reckless Risk (e.g., speeding, drinking and driving) and Anti-social Risk (e.g., cheating, teasing others). The four factor structure was confirmed through factor analysis and explained 50.1 % of the variance for the perception section and 53% of the variance for the behavior section. The estimated internal consistency reliability of the total score for the perception and behavior sections are reported as .97 and .99 respectively. The subscale internal consistency reliabilities are estimated as 0.8 for each subscale, except the anti-social scale for which the reliability ranged from .66 to .79 depending on age and gender (Gullone, Moore, Moss, & Boyd, 2000).

Procedures

Data collection. Data collection took place during advisory period at each of the school sites. Classroom teachers administered the Adolescent Exploratory and Risk Behavior Rating Scale (AERRS) to students. Student responses were anonymous.

Randomly selected students (n= 11) were also asked to answer five open-ended questions about the rating scale. The questions were attached to the end of the AERRS and students maintained anonymity while providing their responses. The purpose of the questions was to gain insight into student perception and understanding of the items.

Instrument Construction. The Adolescent Exploratory and Risk Behavior Rating Scale (AERRS) was developed based on a review of the literature and present evidence in support of potential predictors and descriptors of various risk behaviors. The construction of the instrument was done with the most recent literature on self-report methods considered. Construction of the AERRS began with a thorough review of the risk behavior literature using computerized databases (PsychINFO and ERIC) and reference lists from the articles obtained from the online index searches. Items were generated based on the literature across various disciplines of psychology and existing risk behavior questionnaires. The risk behavior questionnaires used to develop the present measure were the Youth Risk Behavior Survey (CDC, 2006c), the Adolescent Risk Behavior Questionnaire (Gullone et al., 2000), and the Iowa Youth Survey (Research Institute for Studies in Education, 2006).

The AERRS is comprised of two sections: Part I - participation in risk behavior and Part II - perception of risk for each behavior. The initial version of the instrument contained 43 Likert-type items in each section. In the participation section of the AERRS, students were asked to rate how often they participate in each behavior on a scale of 1 (*never*) to 4 (*often*). The perception items look similar to the participation items with risk perception rated on a scale of 1 (*not at all risky*) to 4 (*extremely risky*). The total scores for the AERRS (likely two scales: exploratory risk behaviors and health risk behaviors)

are sums of the rating scale item scores with higher scores indicating greater participation in the behavior for the AERRS Part I and perception that the behavior is a higher risk for Part II.

An honesty appeal was written and presented at the beginning of the instrument along with the directions for the administrator of the instrument. The honesty appeal was read aloud and students were asked to follow along visually. Validity items are rarely used for self-report risk behavior questionnaires, but have been shown to provide meaningful data about the honesty with which the ratings were given (Siegel, Aten, Roghmann, 1998). Validity items that explicitly ask about honesty were included in the instrument. In addition, items that attempt to identify dishonesty without explicitly asking the respondent to report a level of honesty were also included in the AERRS. Paired item sets were randomly placed throughout the instrument. Each pair asks students to respond to the same behavior, but different words and phrases were used for each item in the pair. Therefore, if the student reads each item carefully, the response to each of the items should be the same and if the student does not read carefully, responses are likely to differ. Care was taken not to place a member of the item pair adjacent or within two items from the other member to avoid misperception of researcher intent (Schwarz, 1999).

Data analysis. All AERRSs were inspected for unacceptable endorsement of the validity items and invalid response sets, such as random responding and selection of the same response choice throughout the rating scale. Instruments were removed from the analysis if the student responded to the honesty item with “Strongly Disagree” or “Disagree.” Instruments were also considered invalid and removed from the analysis if two of the three pairs of validity items showed dissimilar responses.

Demographics of participant groups were described in terms of gender, age, race/ethnicity, grade level, school grades, and type of school attended. Demographic data were described for the total sample, the samples used for each of the four analyses, for the sample of invalid responders to Part I, and for the sample of invalid responders to Part II.

A number of participants ($n = 215$) was randomly selected from each dataset (Part I and Part II) for a set of classical psychometric analyses. The purpose was to use classical test theory methods to develop the shortened version of the AERRS and to test the assumptions of Item Response Theory (IRT). Exploratory factor analysis (principal axis factoring) was used to investigate the factor structure and to construct validity of the measure and test the unidimensionality assumption of IRT. The factor structure was tested for the total sample and for males and females separately. Factor analysis was done for Part I and Part II of the AERRS separately, as each part measures a different construct. In addition, biserial correlations, inter-item correlations, and coefficient alpha were used to further explore the adequacy of the AERRS items and scales. These analyses also tested the local independence requirement of IRT modeling.

Next, items were deleted from the initial version based both qualitative and quantitative data. Qualitative information gathered from students who answered anonymous interview questions was considered along with content of items. The content considerations included validity items, behaviors that have potentially lethal consequences (e.g. suicidal thoughts), equal coverage of exploratory and health risk behaviors, coverage of school-related behaviors, covert behaviors, behaviors for which

data cannot be retrieved from other data sources, and items relevant to all ages of students.

Quantitative information was gathered through correlational analyses and factor analysis. Salvia and Ysseldyke (2004) recommend items that correlate at least moderately (.2 to .3 or more) with the total score are needed to optimally measure the expected construct. Any items with item-total correlations of less than .2 were considered for deletion. Inter-item correlations were also examined for clusters of items that were strongly correlated ($> .6$). The results of the factor analysis were also examined, and Thurston's rule of .4 was used as a guideline for item deletion. Items with factor loadings of .3 or lower were considered for deletion. The results from the factor analysis and point biserial correlation analysis of both Part I and Part II were reviewed to ensure that the items retained for the final version did not negatively impact either scale.

Validation of the items selected for the final draft of the AERRS was performed using IRT. Part I and Part II were analyzed separately similar to the factor analyses, correlations and coefficient alpha analyses. The literature suggests sample sizes of at least 500 for analysis within IRT (Hambelton & Jones, 1993; Truskosky, 2000); and therefore, the total valid dataset was used for this analysis. The IRT analysis was performed with PARSCALE software using Graded Response Model for 2-parameter analysis of polytomous items. The IRT 2-parameter model estimates an item slope (a) parameter and 3 item location (b) parameters for each 4-category item. Item slope provides information about item discrimination wherein a steep slope means that a small change in the trait will result in an increased probability that the item will be endorsed for that trait. Item location provides information about item difficulty or the trait magnitude where there is a

50% probability that the item will be endorsed. Item analysis by way of IRT includes evaluation of item parameters and model fit for each item. Slope and location parameters were examined for each of the 25 items across both the behavior and perception measures, and Chi-square indices of item fit were examined for model fit.

Chapter 3 - Results

All participant data were screened to identify erroneous values and to evaluate response patterns on the individual and group level. Subsequently, the data were screened to evaluate the assumptions for planned analyses, which included independence and unidimensionality of the measured construct. In addition, instruments with invalid response sets were removed from the data analysis. Approximately one fifth (n=141) of the participants who completed Part I of the instrument responded in a way that questioned the response validity and were marked invalid. Approximately one third (n=248) of the participants who completed Part II of the instrument responded in a way that questioned the response validity and were also marked invalid. The higher number of invalid response sets for Part II is likely due to fatigue as the perception items are not interspersed throughout the AERRS. The demographics of the invalid responders are described in Table 3 and did not markedly differ from the valid samples.

Table 3

Demographics of the invalid samples and samples used for the analyses.

	Part I Invalid (n=141)	Part II Invalid (n=248)	Part I CTT (n=215)	Part I IRT (n=541)	Part II IRT (n=344)
Age [Mean(SD)]	16.16(1.22)	15.88(1.25)	15.86 (1.26)	16.04 (1.19)	15.86 (1.26)
Gender					
Female	48 (34%)	97 (39%)	112 (52%)	106 (50%)	312 (58%)
Male	39 (28%)	74 (30%)	81 (38%)	52 (24%)	198 (37%)
Missing	54 (38%)	77 (31%)	22 (10%)	57 (26%)	31 (6%)
School Type					
General	128 (91%)	221 (89%)	199 (93%)	191 (89%)	488 (90%)
Alternative	13 (9%)	27 (11%)	16 (7%)	24 (11%)	53 (10%)
Grade					
9th	33 (23%)	57 (23%)	52 (24%)	51 (24%)	129 (24%)
10th	18 (13%)	41 (17%)	45 (21%)	52 (24%)	131 (24%)
11th	38 (27%)	53 (21%)	36 (17%)	53 (25%)	119 (22%)
12th	35 (25%)	61 (25%)	47 (22%)	52 (24%)	117 (22%)
Missing	16 (12%)	36 (14%)	35 (16%)	7 (3%)	45 (8%)
Race					
Caucasian	65 (46%)	118 (48%)	116 (54%)	139 (65%)	322 (60%)
African American	27 (19%)	54 (22%)	40 (19%)	29 (14%)	100 (19%)
Hispanic	12 (9%)	10 (4%)	7 (3%)	9 (4%)	18 (3%)
Other	18 (13%)	25 (10%)	15 (7%)	26 (11%)	51 (9%)
Missing	19 (13%)	41 (16%)	37 (17%)	12 (6%)	50 (9%)
School Grades					
Excellent	25 (18%)	35 (14%)	46 (21%)	48 (22%)	103 (19%)
Above Average	39 (28%)	52 (21%)	57 (27%)	68 (32%)	145 (27%)
Average	46 (32%)	96 (39%)	90 (42%)	81 (38%)	185 (34%)
Below Average	5 (4%)	15 (6%)	9 (4%)	10 (5%)	27 (5%)
Failing	7 (5%)	12 (5%)	9 (4%)	3 (1%)	10 (2%)
Missing	19 (13%)	38 (15%)	4 (2%)	5 (2%)	71 (13%)

Note. CTT = Classical Test Theory. IRT = Item Response Theory.

Qualitative Analysis of Interview Questions

A review of the open-ended interview questions revealed that the students who answered the questions generally understood the items and had no questions. However, some students did have questions and comments about the items. One student wrote that it was hard to rate the items because “some things aren’t a risk,” and another student wrote, “I kinda didn’t understand the risk questions, so I just assumed you were suppose to mark how risky you thought the [item] was.” The first response validates the idea that adolescents perceive risk differently from adults, and provides some evidence that measurement of risk perception may lead to a better understanding of adolescent risk behavior, as this particular student did not view some of the items as risks. The second response suggests that the instructions for the risk perception items may need clarification, but that even though this student questioned how to respond, he was able to interpret the instructions correctly.

Students were also asked whether any items should be added or removed from the questionnaire. While seven students responded that no items needed to be added or removed, three students indicated that some items (speed limit items, repetitive items, and parent items) needed to be removed, and one student responded that some of the items should include follow-up questions. None of the students provided much detail about why they thought the items should be added or removed. One student responded that the items “covered most teen issues” and that all items “are important.” The items that students listed for removal were considered for deletion.

Classical Analyses

AERRS Part I – Behavior. The sample ($n = 215$) demographics are described in Table 2. The mean score for the sample was 2.06 ($SD = .35$). The mean exploratory scale score was 2.69 ($SD = .48$) and health scale score was 1.68 ($SD = .50$). No significant gender differences were found in total risk, health and exploratory risk behaviors. The coefficient alphas for the total scale score, Health Risk scale score, and Exploratory Risk scale score were $\alpha = .85$, $\alpha = .91$, $\alpha = .78$ respectively. Point biserial correlations ranged from $r = .057$ to $r = .681$ (Table 4), with the highest correlations between the health risk behavior items and total score.

The Kaiser-Meyer-Olkin measure of sampling adequacy (.797) and Bartlett's test of sphericity ($p > .001$) indicate that assumptions for factor analysis were met. The sample was subjected to a principal axis analysis, which yielded 11 factors with eigenvalues greater than one. After varimax rotation, the percent of variance accounted for by the first extracted factor was 12.42% and 7.47% of the variance was accounted for by Factor 2. Health risk behavior items loaded heavily on Factor 1 and exploratory risk behavior items loaded heavily on Factor 2 (Table 5).

Table 4

Item-total correlations for the initial AERRS

	Part I		Part II	
	Total	Health	Total	Health
1 I talk with my parents about my personal life	.110	-.092	.093	-.133
2 I carry a gun or knife on school property.	.637**	.774**	.351**	.357**
3 I steal from others.	.639**	.739**	.372**	.514**
4 I cheat on my school work/tests.	.590**	.643**	.362**	.506**
5 I use illegal drugs, other than marijuana.	.671**	.805**	.349**	.480**
6 I drink beer, wine, or liquor.	.764**	.827**	.693**	.756**
7 I talk to and get to know new people.	.105	-.184**	.322**	-.004
8 I drive without a license.	.655**	.724**	.412**	.420**
9 I use marijuana.	.722**	.827**	.609**	.694**
10 I use tobacco products (cigarettes, cigars, chew, etc.).	.711**	.775**	.562**	.687**
11 I stand up to my peers on issues I care about deeply.	.247**	.011	.434**	.177**
12 I get drunk.	.713**	.787**	.728**	.798**
13 I try sports/games I have never tried before.	.219**	-.049	.293**	-.027
14 I enter competitions(sports, cards, band, speech, etc.)	.174*	-.095	.226**	-.068
15 I drive over the posted speed limit.	.602**	.606**	.488**	.451**
16 I stand up to people who are bullying other students.	.479**	.258**	.270**	-.032
17 I get into physical fights with others.	.620**	.646**	.443**	.483**
18 I tell the truth even if it means I will be disciplined.	.293**	.074	.300**	-.016
19 I participate in extreme sports (skateboarding, snowboarding, etc.).	.496**	.396**	.360**	.251**
20 I have sex without any form of birthcontrol.	.595**	.708**	.394**	.574**
21 I stay out past midnight on weeknights.	.522**	.486**	.467**	.501**
22 I volunteer my time in the community.	.291**	.039	.127	-.162*
23 I dress differently than my peers.	.207**	-.071	.326**	.151*
24 I lie to my family about where I am or what I am doing	.557**	.611**	.371**	.485**
25 I ask girls/boys for a date.	.389**	.172*	.273**	.107
26 I gamble (lottery, betting on sports, cards, or races) my money/possessions.	.627**	.653**	.442**	.478**
27 I raise my hand to ask or answer questions in class.	.157*	-.126	.108	-.186**

28	I use cigarettes, cigars or smokeless tobacco.	.693**	.754**	-.002	.543**	.674**	-.102
29	I make new friends.	-.096	-.401**	.682**	.228**	-.116	.646**
30	I spend more than 2 hours a day watching television or playing video games.	.173*	-.020	.478**	.036	.053	-.022
31	When my friends ask me to do something I disagree with, I stand up to them.	.299**	.068	.592**	.231**	-.046	.532**
32	I drive more than 10 mph over the speed limit.	.623**	.627**	.118	.499**	.520**	.077
33	When I have a personal problem, I talk to my family members.	.243**	-.012	.639**	.121	-.131	.463**
34	I drink alcohol.	.730**	.779**	.032	.723**	.785**	.050
35	I skip school without telling my family.	.651**	.694**	.032	.515**	.716**	-.233**
36	I talk about my goals even if they are different from those of my friends.	.142*	-.151*	.705**	.194**	-.138*	.619**
37	I think about killing myself.	.632**	.748**	-.145*	.173*	.270**	-.129
38	I have sex without using condoms.	.623**	.735**	-.134	.467**	.594**	-.116
39	I drive after drinking alcohol or taking drugs.	.622**	.765**	-.203**	.589**	.706**	-.070
40	I tease and make fun of other students or adults.	.658**	.654**	.141*	.398**	.468**	-.033
41	I tell lies about other students or adults.	.695**	.720**	.080	.416**	.540**	-.122
42	I carry a weapon on school property.	.644**	.770**	-.159*	.351**	.396**	.004
43	When I use alcohol, I have more than 2 drinks within an hour.	.730**	.784**	.022	.660**	.746**	.001

Table 5

Rotated Factor Matrix for Part I of the AERRS

<u>AERRS Items</u>	<u>Factor</u>	
	<u>1</u>	<u>2</u>
I talk with my parents about my personal life		.354
I carry a gun or knife on school property.		
I steal from others.	.412	
I cheat on my school work/tests.	.439	
I use illegal drugs, other than marijuana.	.468	
I drink beer, wine, or liquor.	.787	
I talk to and get to know new people.		.643
I drive without a license.		
I use marijuana.	.663	
I use tobacco products (cigarettes, cigars, chew, etc.).	.704	
I stand up to my peers on issues I care about deeply.		.578
I get drunk.	.834	
I try sports/games I have never tried before.		.599
I enter competitions(sports, cards, band, speech, etc.)		.497
I drive over the posted speed limit.	.379	
I stand up to people who are bullying other students.		.533
I get into physical fights with others.	.420	
I tell the truth even if it means I will be disciplined.		.570
I participate in extreme sports (skateboarding, snowboarding, etc.).		
I have sex without any form of birthcontrol.	.526	
I stay out past midnight on weeknights.	.444	
I volunteer my time in the community.		.452
I dress differently than my peers.		
I lie to my family about where I am or what I am doing	.415	
I ask girls/boys for a date.		
I gamble (lottery, betting on sports, cards, or races) my money/possessions.	.407	
I raise my hand to ask or answer questions in class.		.474
I use cigarettes, cigars or smokeless tobacco.	.686	
I make new friends.		.653
I spend more than 2 hours a day watching television or playing video games.		
When my friends ask me to do something I disagree with, I stand up to them.		.521
I drive more than 10 mph over the speed limit.	.472	
When I have a personal problem, I talk to my family members.		.430
I drink alcohol.	.818	
I skip school without telling my family.	.725	
I talk about my goals even if they are different from those of my friends.		.595
I think about killing myself.		
I have sex without using condoms.	.552	
I drive after drinking alcohol or taking drugs.	.697	
I tease and make fun of other students or adults.	.400	
I tell lies about other students or adults.	.455	
I carry a weapon on school property.	.350	
When I use alcohol, I have more than 2 drinks within an hour.	.790	

Note. Factor loadings less than .3 were suppressed. Factor 1 represents Health Risk and Factor 2 represents Exploratory Risk.

The factor structure of the measure was further explored to investigate the extent to which the factor structure was similar across genders. Items generally loaded similarly on Factor 1 (Health Risk factor) for both genders; however, there were some differences. Items that represented more extreme health risk behavior (carrying weapons, physical fights, and extreme sports) correlated more highly onto the Health Risk factor for male students compared with female students. Items that reference deceit (cheating, lying to parents) had higher factor loadings on the Health Risk factor for female students compared to male students. Health risk behavior items were those that loaded onto the Health Risk factor for both females and males. Items loaded onto Factor 2 (Exploratory Risk factor) similarly across both genders and the items with the highest loadings were the exploratory risk behavior items.

AERRS Part II – Perception. The sample ($n = 215$) demographics are described in Table 2. The mean score for the sample was 2.47 ($SD = .50$). The mean exploratory scale score was 1.71 ($SD = .54$) and health scale score was 2.91 ($SD = .73$). Female students rated exploratory ($t = 1.98, p = .05$) and health risk behaviors ($t = 3.63, p < .001$) significantly greater risks than male students, which led to a significant gender difference on the total score of the risk perception measure ($t = 4.13, p < .001$). The coefficient alphas (α) for the total scale score, Health Risk scale score and Exploratory Risk scale score were .93, .96, and .89 respectively. Item-total correlations ranged from $r = .057$ to $r = .681$ (Table 4), with the highest correlations between the health risk behavior items and total score.

The Kaiser-Meyer-Olkin measure of sampling adequacy (.912) and Bartlett's test of sphericity ($p > .001$) indicate that assumptions for factor analysis were met. The sample was subjected to a principal axis analysis, which yielded 8 factors with eigenvalues greater than one. After varimax rotation, the percent of variance accounted for by the first extracted factor was 20.05%. Factors 2 and 3 accounted for 14.70% and 13.33% of the variance respectively. The rotated factor matrix revealed a more complex item matrix than Part I of the measure. Items that loaded heavily on Factor 1 were generally health risk items, but several of the exploratory risk items also loaded onto Factor 1. Exploratory risk items loaded heavily on Factor 2 and health risk items loaded heavily on Factor 3 (see Table 6). Items considered for deletion from the instrument were those with communalities lower than .30 and those items that did not relate strongly (i.e., factor loadings of .40 or below) to Factor 1 (Risk Perception factor), Factor 2 (Exploratory Risk factor) or Factor 3 (Health Risk factor).

Table 6

Rotated Factor Matrix for Part II of the AERRS

AERRS Items	Factor		
	1	2	3
I talk with my parents about my personal life		0.44	
I carry a gun or knife on school property.	0.82		0.39
I steal from others.	0.75		0.26
I cheat on my school work/tests.	0.61		
I use illegal drugs, other than marijuana.	0.83		
I drink beer, wine, or liquor.	0.80		-0.33
I talk to and get to know new people.	-0.30	0.66	
I drive without a license.	0.71		
I use marijuana.	0.82		
I use tobacco products (cigarettes, cigars, chew, etc.).	0.74		-0.31
I stand up to my peers on issues I care about deeply.		0.52	
I get drunk.	0.77		-0.27
I try sports/games I have never tried before.		0.65	
I enter competitions(sports, cards, band, speech, etc.)		0.65	
I drive over the posted speed limit.	0.59		
I stand up to people who are bullying other students.		0.59	
I get into physical fights with others.	0.61		
I tell the truth even if it means I will be disciplined.		0.48	
I participate in extreme sports (skateboarding, snowboarding, etc.).	0.38	0.27	
I have sex without any form of birthcontrol.	0.72		
I stay out past midnight on weeknights.	0.40	0.33	-0.35
I volunteer my time in the community.		0.61	
I dress differently than my peers.	-0.20	0.65	
I lie to my family about where I am or what I am doing	0.54		
I ask girls/boys for a date.		0.52	
I gamble (lottery, betting on sports, cards, or races) my money/possessions.	0.62		
I raise my hand to ask or answer questions in class.	-0.25	0.64	
I use cigarettes, cigars or smokeless tobacco.	0.73		-0.27
I make new friends.	-0.51	0.66	
I spend more than 2 hours a day watching television or playing video games.		0.59	-0.25
When my friends ask me to do something I disagree with, I stand up to them.		0.63	
I drive more than 10 mph over the speed limit.	0.62	0.24	
When I have a personal problem, I talk to my family members.		0.63	0.21
I drink alcohol.	0.76		-0.33
I skip school without telling my family.	0.63		
I talk about my goals even if they are different from those of my friends.	-0.25	0.69	
I think about killing myself.	0.76		0.25
I have sex without using condoms.	0.74		
I drive after drinking alcohol or taking drugs.	0.81		
I tease and make fun of other students or adults.	0.60	0.26	
I tell lies about other students or adults.	0.69		0.27
I carry a weapon on school property.	0.80		0.40
When I use alcohol, I have more than 2 drinks within an hour.	0.76		

Note. Factor loadings less than .2 were suppressed. Factor 1 represents Risk Perception, Factor 2 represents Exploratory Risk, and Factor 3 represents Health Risk.

The factor structure of the measure was further explored to investigate to what extent the factor structure was similar across genders. Items did not load similarly on the Exploratory Risk or Health Risk factors across genders. Exploratory items loaded onto the Exploratory Risk factor and health risk behavior loaded onto Health Risk factor for females, but for males the item loadings were more complex and did not correspond with the specified factor labels. Health risk behavior items loaded onto Factor 1, but many of the items that loaded onto the Health Risk factor for females did not load (factor loading of less than .30) onto a similar factor for males. Exploratory items and health risk behavior items loaded onto Factor 2. For example, the exploratory item “I stand up to people who are bullying other students” and the health risk item “I get into physical fights” both loaded onto Factor 2. The exploratory risk behavior items did not load onto a single extracted factor for male participants.

Item Deletion

Qualitative data from the interview questions and quantitative data from the classical analyses were reviewed to determine which items to retain for the final version of the AERRS. In addition, the content of the items was examined to ensure a variety of behaviors were measured. Students who answered the interview questions listed speed limit questions, parent items, and repetitive items as needing removed from the AERRS. It is assumed the repetitive items are the paired validity items, and these items were not considered for deletion due to the importance of such items in determining valid response sets. However, speed limit questions and parent items were considered further with the addition of the quantitative data.

The quantitative data were reviewed in order to select 11 items for each measure (behavior and perception) that would ensure adequate psychometric properties of the AERRS. Many of the items had point biserial correlations that met the standard criteria of .2. In that case, content and factor loading was considered. Some items with a point biserial correlation of less than .2 were retained due to the content covered by the items. Even though these items correlated with the total scores at a less than optimal level, these items correlated moderately with either the Exploratory Risk or Health Risk subscale scores.

Items with a factor loading of at least .3 on the Health Risk factor were retained for the health risk subscale and items with a factor loading of at least .3 on the Exploratory Risk factor were retained for the exploratory risk subscale. Again, there were many items that had high factor loadings on each of the Factors, and the decision to retain or delete was based on content and the items that had the highest correlations with either Health Risk or Exploratory Risk factor. There were few conflicts between Part I and Part II of the measure; however, there were two items for which the biserial correlation was adequate for one part of the measure, but poor for the other part of the measure. In this case, both items were deleted from the AERRS. Items that were part of a validity item pair were not deleted and items that measured critical risk information were not deleted (i.e., suicidal thoughts, and weapons on school property). The items retained for the final version of the measure are shown in Table 7 along with the item correlations with the total and subscale scores.

Table 7

Point biserial correlations of items retained for the AERRS

	Items Retained	Exploratory Risk		Health Risk		Total	
		Score	Score	Score	Score	Score	Score
1	I carry a gun or knife on school property.	.012	.415**			.370**	
2	I cheat on my school work/tests.	-.104*	.539**			.418**	
3	I drink beer, wine, or liquor.	.050	.745**			.678**	
4	I use marijuana.	-.068	.669**			.550**	
5	I use tobacco products (cigarettes, cigars, chew, etc.).	-.045	.595**			.498**	
6	I have sex without any form of birthcontrol.	-.150**	.517**			.375**	
7	I use cigarettes, cigars or smokeless tobacco.	-.054	.584**			.484**	
8	I drink alcohol.	.027	.742**			.667**	
9	I skip school without telling my family.	-.158**	.671**			.506**	
10	I think about killing myself.	-.052	.281**			.219**	
11	I tease and make fun of other students or adults.	-.019	.440**			.376**	
12	I tell lies about other students or adults.	-.078	.483**			.383**	
13	I carry a weapon on school property.	-.003	.397**			.347**	
14	When I use alcohol, I have more than 2 drinks within an hour.	.027	.741**			.664**	
15	I stand up to my peers on issues I care about deeply.	.525**	.111**			.372**	
16	I try sports/games I have never tried before.	.615**	-.040			.286**	
17	I enter competitions (sports, cards, band, speech, etc.)	.543**	-.096*			.199**	
18	I stand up to people who are bullying other students.	.520**	.018			.287**	
19	I tell the truth even if it means I will be disciplined.	.519**	-.041			.237**	
20	I participate in extreme sports (skateboarding, snowboarding, etc.).	.315**	.207**			.346**	
21	I volunteer my time in the community.	.550**	-.175**			.135**	
22	I dress differently than my peers.	.330**	.142**			.297**	
23	I ask girls/boys for a date.	.312**	.193**			.332**	
24	I talk about my goals even if they are different from those of my friends.	.585**	-.090*			.226**	
25	When my friends ask me to do something I disagree with, I stand up to them.	.487**	-.004			.250**	

Note. Total score correlations are the primary emphasis for interpretation.

* $p = .05$. ** $p < .01$.

Item Response Theory

AERRS Part I – Behavior. Data from the full sample of valid responses (n=541) were used for the IRT analysis. See Table 3 for the demographic information for both Part I and Part II samples used in the IRT analyses. An examination of the chi square test for item fit (Table 8) revealed 18 of the 25 items were identified as not a good fit for the model ($p < .05$). Of the items that were identified as a good fit within the model, all were exploratory risk behavior items. It is ideal to have responses in every cell of the response distribution (Edelen & Reeve, 2007), and the present distribution of sample responses for each item had at least one response in every cell (Table 9). Due to the lack of item fit, the assumption of local dependence was evaluated. The items with high inter-item correlations were examined for inflated slope estimates, but all were within an acceptable range and actually fell within the low end of the item slope range.

Table 8

 χ^2 item fit results for Part I and Part II of the AERRS

	Items Retained	Part I		Part II	
		χ^2	df	χ^2	df
1	I carry a gun or knife on school property.	108.45	16	176.5	16
2	I cheat on my school work/tests.	26.65	21	34.55	19
3	I drink beer, wine, or liquor.	82.74	21	48.76	13
4	I use marijuana.	88.74	20	103.81	13
5	I use tobacco products (cigarettes, cigars, chew, etc.).	392.95	20	97.2	15
6	I have sex without any form of birthcontrol.	34.82	20	23.08	12
7	I use cigarettes, cigars or smokeless tobacco.	203.95	10	47.22	14
8	I drink alcohol.	58.08	22	43.58	13
9	I skip school without telling my family.	38.97	22	26.59	16
10	I think about killing myself.	37.15	20	51.16	13
11	I tease and make fun of other students or adults.	44.26	22	53.76	17
12	I tell lies about other students or adults.	54.94	20	40.15	16
13	I carry a weapon on school property.	33.23	12	0.00	0.00
14	When I use alcohol, I have more than 2 drinks within an hour.	99.92	21	74.44	16
15	I stand up to my peers on issues I care about deeply.	29.35	18	77.1	19
16	I try sports/games I have never tried before.	32.15	20	76.75	14
17	I enter competitions (sports, cards, band, speech, etc.)	51.59	22	71.65	14
18	I stand up to people who are bullying other students.	46.41	21	73.59	17
19	I tell the truth even if it means I will be disciplined.	29.74	22	128.89	18
20	I participate in extreme sports (skateboarding, snowboarding, etc.).	21.11	22	36.89	17
21	I volunteer my time in the community.	27.49	22	181.59	10
22	I dress differently than my peers.	25.74	20	102.34	15
23	I ask girls/boys for a date.	9.98	19	74.77	18
24	I talk about my goals even if they are different from those of my friends.	20.33	17	118.69	18
25	When my friends ask me to do something I disagree with, I stand up to them.	28.82	19	101.65	15

Table 9

Distribution frequency of sample responses for Part I

	Items Retained	Category Responses			
		1	2	3	4
1	I carry a gun or knife on school property.	447	23	13	12
2	I cheat on my school work/tests.	235	182	65	13
3	I drink beer, wine, or liquor.	237	91	114	53
4	I use marijuana.	366	51	28	50
5	I use tobacco products (cigarettes, cigars, chew, etc.).	385	32	25	53
6	I have sex without any form of birthcontrol.	361	65	38	31
7	I use cigarettes, cigars or smokeless tobacco.	389	35	21	50
8	I drink alcohol.	228	100	107	60
9	I skip school without telling my family.	324	84	59	28
10	I think about killing myself.	384	63	35	13
11	I tease and make fun of other students or adults.	168	192	101	34
12	I tell lies about other students or adults.	367	102	20	6
13	I carry a weapon on school property.	449	22	11	13
14	When I use alcohol, I have more than 2 drinks within an hour.	286	71	58	80
15	I stand up to my peers on issues I care about deeply.	35	98	200	162
16	I try sports/games I have never tried before.	63	165	200	67
17	I enter competitions (sports, cards, band, speech, etc.)	114	136	123	122
18	I stand up to people who are bullying other students.	71	142	196	86
19	I tell the truth even if it means I will be disciplined.	260	100	69	66
20	I participate in extreme sports (skateboarding, snowboarding, etc.).	177	180	107	31
21	I volunteer my time in the community.	177	136	130	52
22	I dress differently than my peers.	71	142	186	96
23	I ask girls/boys for a date.	39	112	224	120
24	I talk about my goals even if they are different from those of my friends.	29	90	181	195
25	When my friends ask me to do something I disagree with, I stand up to them.	70	109	184	132

Note. 1 = *Never*, 2 = *Rarely*, 3 = *Sometimes*, 4 = *Often*

The calibration of the 25 retained items with the Graded Response Model (GRM) resulted in slope estimates that ranged from .04 to .96 (standard error range of .03 to .12). The standard error of the item with the lowest slope estimate (.04) was .03, indicating this item has a low reliability. Item locations ranged from -1.50 to 9.09 (standard error range of 2.23 to .12). The item locations reflect a large range of risk behavior, which was expected as the AERRS measures both exploratory and health related risk behavior. However, typical item locations range from -3 to +3 (Embretson & Reise, 2000), and the extreme difficulty of some of the AERRS items suggests that in order to be endorsed these items require a particularly high propensity for risk. The item slope and location parameters and their standard errors are listed in Table 10.

Table 10

Item Parameters for Part I and Part II of the AERRS

Item	Part I				Part II			
	α	β_1	β_2	β_3	α	β_1	β_2	β_3
1	0.18	6.95	8.99	11.32	0.566	-2.503	-1.305	-0.478
2	0.82	-0.08	1.96	4.29	1.541	-1.171	0.027	0.854
3	0.50	-1.01	1.03	3.37	2.983	-1.434	-0.236	0.591
4	0.27	1.98	4.02	6.35	2.248	-1.709	-0.511	0.316
5	0.24	-2.14	-0.10	2.24	2.063	-1.515	-0.317	0.51
6	0.48	1.97	4.00	6.34	1.396	-2.197	-0.999	-0.172
7	0.04	5.08	7.12	9.45	2.245	-1.56	-0.362	0.465
8	0.49	-0.60	1.44	3.77	2.577	-1.428	-0.23	0.597
9	0.45	0.87	2.91	5.24	1.904	-1.39	-0.192	0.635
10	0.44	2.16	4.20	6.53	1.356	-2.219	-1.021	-0.194
11	0.75	-1.08	0.96	3.29	1.937	-0.717	0.481	1.308
12	0.61	1.30	3.34	5.67	2.176	-1.058	0.14	0.967
13	0.39	6.60	8.64	10.97	0.739	-5.55	-4.352	-3.525
14	0.33	-0.39	1.65	3.99	1.696	-1.561	-0.363	0.464
15	0.87	-3.39	-1.35	0.98	0.918	0.173	1.371	2.198
16	0.96	-2.37	0.13	2.47	0.813	1.638	2.836	3.663
17	0.51	-1.74	0.30	2.63	0.72	1.605	2.803	3.63
18	0.78	-2.42	-0.38	1.95	1.355	-0.355	0.843	1.67
19	0.44	-0.19	1.85	4.19	1.136	-0.297	0.901	1.728
20	0.82	-0.89	1.15	3.48	1.314	4.348	5.546	6.373
21	0.66	-1.18	0.86	3.20	0.868	1.459	2.657	3.484
22	0.82	-2.69	-0.65	1.68	0.709	0.535	1.733	2.56
23	0.96	-3.02	-0.98	1.36	0.948	0.272	1.47	2.297
24	0.83	-3.64	-1.60	0.73	1.077	1.274	2.472	3.299
25	0.73	-3.04	-1.00	1.34	0.771	-1.074	0.124	0.951

Note. Items 1-14 are Health Risk items and items 15-25 are Exploratory Risk items.

Health risk behaviors had the highest item difficulties and exploratory risk behaviors had the lowest item difficulties. There were two items that asked students to rate how often they bring a weapon onto school property (paired validity items) and both showed equally high (9.09 and 8.74) item difficulty parameters. These two items also showed equal item discrimination. The alcohol paired validity items showed a similar

pattern with equal item difficulties and item discrimination values; however, the tobacco use items showed differential values. The item that used the words “tobacco products” had an item difficulty of 0.00, but the item that listed several tobacco products (i.e. cigarettes and cigars) had an item difficulty of 7.22. The opposite relationship was found for item discrimination values as the “tobacco products” item (.24) had a higher discrimination value than the “cigarettes and cigars” item (.04). The item that asked students to rate how often they talk about their goals even when they are different from their friends’ goals had the lowest item difficulty value.

Generally, exploratory risk items had higher item slope parameters compared to the health risk behaviors, which suggests it is these items that provide the most information about propensity for risk behavior. The item information curves for four of the AERRS items are presented in Figure 1 and include exploratory risk items and health risk items. The items presented were chosen to display the varying magnitude of information and the location across the trait spectrum in which information is maximized. Item 2 (cheat on school work/tests) provides information only for students who endorse a high level of risk behavior, but the steep curve represents a high level of discrimination for these students. Item 8 (drink alcohol) provides less information and is less discriminating, but provides information across all levels of the risk trait. The exploratory items also show differential information dependent on the slope parameter and item location with item 17 (enter competitions) providing information generally in the middle range of scores and item 23 (ask someone on a date) providing information for students who endorse a low level of risk behavior.

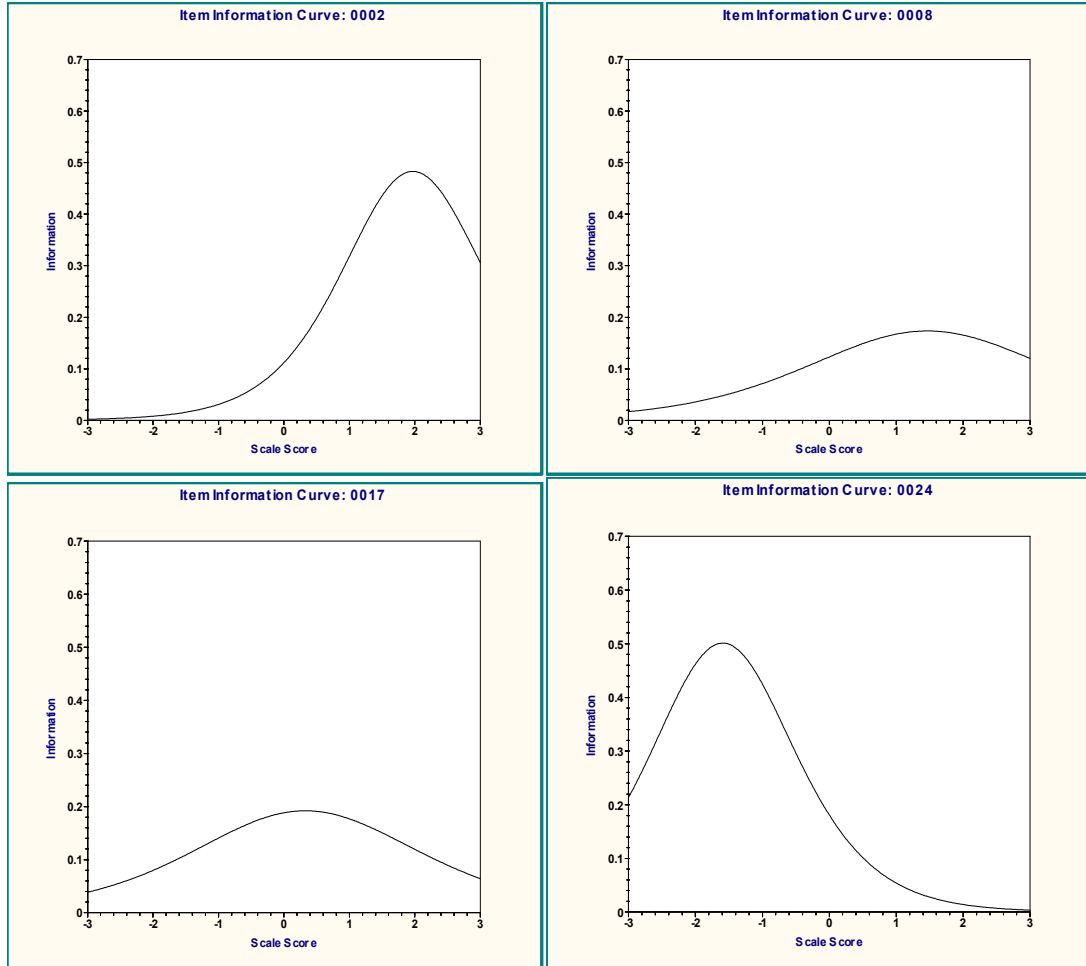


Figure 1. Item information curves for items in Part I of the AERRS. Items ask students to rate the risk of cheating (Item 2), alcohol use (Item 8), entering competitions (Item 17) and talking about personal goals with friends (Item 24).

More interesting were the items that fell in the middle of the item difficulty range as there was a mix of health risk items and exploratory risk items. There were four health risk behavior items and two exploratory risk behavior items with item difficulty values at or near the median value of 1.24. Content covered in the health risk items was alcohol use and teasing peers and adults, and the content covered in the exploratory items was telling

the truth in the face of punishment and participation in extreme sports. This result suggests that it takes a similar propensity for risk taking to participate in these various behaviors. It is possible that because of a similar inclination to participate in risk behaviors, there is potential to easily exchange one behavior for the other. Figure 2 presents the item characteristic curves (ICCs) for Item 8 (alcohol item) and Item 20 (extreme sports item). The curves are similar for these items in that students who have a low propensity for risk taking endorse “never,” but that students with moderate to high propensity for risk taking endorse “sometimes” and “never.”

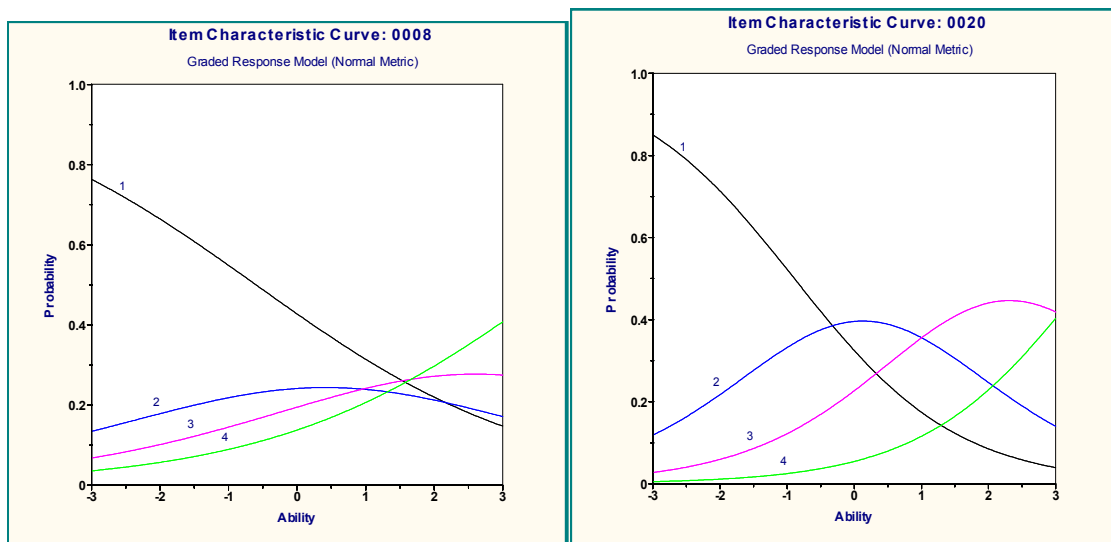


Figure 2. Item characteristic curves for Item 8 and Item 20. Item 8 asks students to rate alcohol use and Item 20 asks students to rate participation in extreme sports with 1 = *Never*, 2 = *Rarely*, 3 = *Sometimes*, 4 = *Often*.

The test information function in Figure 3 demonstrates how measurement precision varies across the range of risk behavior propensity. The standard error function is also represented in Figure 3, and shows that reliability varies across the risk behavior

range with lower reliability observed at the extreme negative end of the risk behavior spectrum; however, standard error is low across most of the risk behavior range and suggests adequate reliability of the measure.

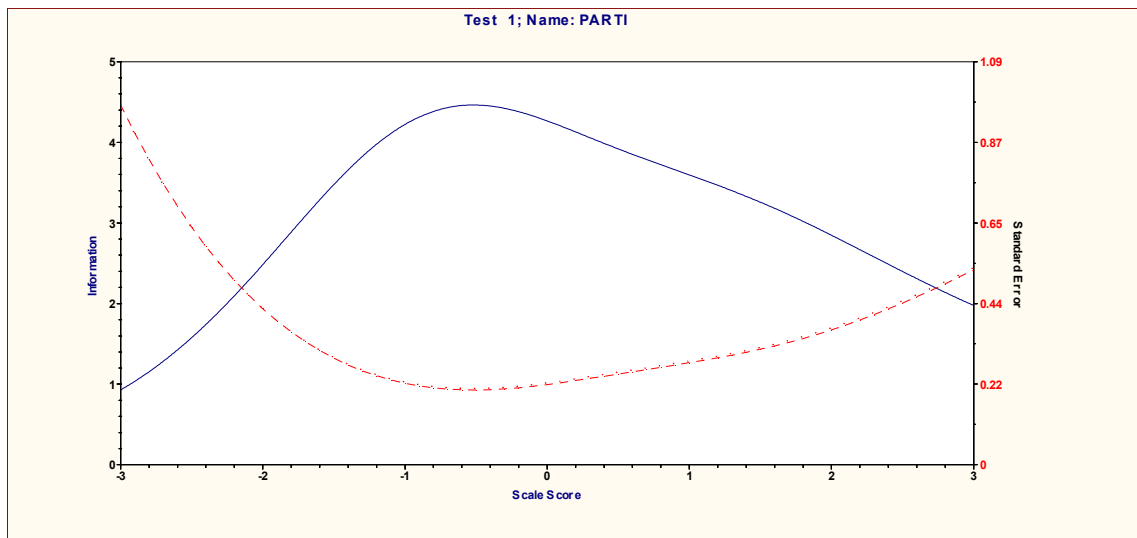


Figure 3. The test information function and standard error function of Part I.

AERRS Part II – Perception. Data from the full sample of valid responses (n=344) were used for the IRT analysis. An examination of the chi square test for item fit revealed that none of the 25 items were identified as a good fit for the model ($p < .05$). Similar to Part I, the distribution of sample responses for each perception item had at least one response in every cell (Table 11).

Table 11

Distribution frequency of sample responses for Part II

	<u>Items Retained</u>	<u>Category Responses</u>			
		1	2	3	4
1	I carry a gun or knife on school property.	42	12	17	249
2	I cheat on my school work/tests.	52	84	87	97
3	I drink beer, wine, or liquor.	41	71	82	126
4	I use marijuana.	55	36	55	174
5	I use tobacco products (cigarettes, cigars, chew, etc.).	60	57	55	148
6	I have sex without any form of birthcontrol.	43	24	53	200
7	I use cigarettes, cigars or smokeless tobacco.	54	61	65	140
8	I drink alcohol.	51	65	81	123
9	I skip school without telling my family.	52	87	68	113
10	I think about killing myself.	44	23	34	219
11	I tease and make fun of other students or adults.	55	122	82	61
12	I tell lies about other students or adults.	53	84	101	82
13	I carry a weapon on school property.	48	18	16	238
14	When I use alcohol, I have more than 2 drinks within an hour.	55	49	69	147
15	I stand up to my peers on issues I care about deeply.	147	108	38	27
16	I try sports/games I have never tried before.	219	68	19	14
17	I enter competitions (sports, cards, band, speech, etc.)	221	61	26	12
18	I stand up to people who are bullying other students.	88	136	68	28
19	I tell the truth even if it means I will be disciplined.	91	107	93	29
20	I participate in extreme sports (skateboarding, snowboarding, etc.).	106	95	67	52
21	I volunteer my time in the community.	263	30	12	15
22	I dress differently than my peers.	211	77	16	16
23	I ask girls/boys for a date.	170	103	27	20
24	I talk about my goals even if they are different from those of my friends.	156	111	38	15
25	When my friends ask me to do something I disagree with, I stand up to them.	214	65	20	21

Note. 1 = *Never*, 2 = *Rarely*, 3 = *Sometimes*, 4 = *Often*

Due to the lack of item fit, the assumption of local dependence for Part II was also investigated. The items with high inter-item correlations were examined for inflated slope estimates (Edelen & Reeve, 2007), but all were within an acceptable range with two of the items having the lowest slopes within the range. The calibration of the 25 retained items with the Graded Response Model (GRM) resulted in slope estimates that ranged from .57 to 2.98 (standard error range of .32 to .07) with higher slope parameters for the health risk perception items compared to the exploratory risk perception items. Item locations ranged from -4.48 to 5.42 (standard error range of .87 to .10). As with Part I, the item locations reflect a large range of risk behavior, which was expected as items cover both exploratory and health related risk behavior. The item slope and location parameters are listed in Table 10.

In Part II, exploratory risk behaviors had the highest item difficulties and health risk behaviors had the lowest item difficulties, which is reversed from Part I. Item difficulty for the perception items is interpreted as the level at which there is 50% probability students endorse the behaviors as risky. Therefore, the health risk items have low item difficulties because it is easy to view these behaviors as risky, and the exploratory items have higher item difficulty parameters because students find it more difficult to view these behaviors as risky. The behavior that is the most difficult to perceive as risky was volunteering time in the community and the behavior that was easiest to perceive as risky was carrying a weapon to school. The health items with the highest item difficulty values were teasing and telling lies about others, and the exploratory items with the lowest item difficulty values were standing up to bullies, telling the truth when faced with discipline, and participation in extreme sports. The ICCs

in Figure 4 represent responses for an exploratory risk item (Item 18, stand up to bullies) and a health risk item (Item 11, teasing others). These two items show that students find these two behaviors to be similarly risky even though the impact of each behavior is quite different.

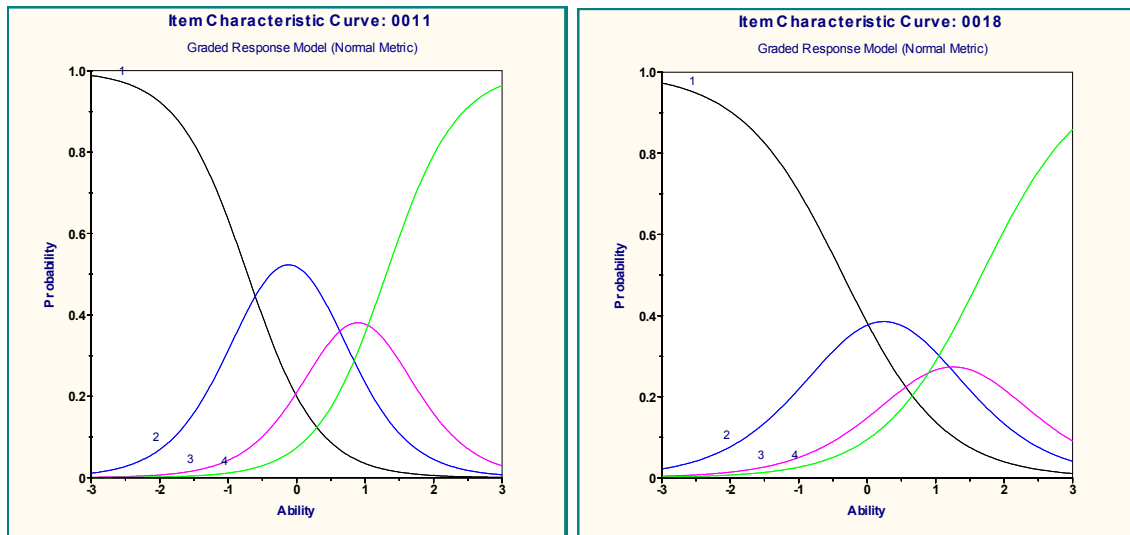


Figure 4. Item characteristic curves for Item 11 and Item 18. Item 11 asks students to rate the riskiness of teasing others and Item 18 asks students to rate the riskiness of standing up to bullies with 1 = *Not Risky*, 2 = *A Little Risky*, 3 = *Risky*, 4 = *Very Risky*.

In addition, the item information functions of each of the items were examined to ensure that the measure provided adequate information across both the trait spectrum. The item information functions provided in Figure 5 were chosen to show that items provide information across the ability scale and that the health risk items tended to provide the most information for students who find it easy to perceive risk and

exploratory items provided the most information for students who find it difficult to perceive risk.

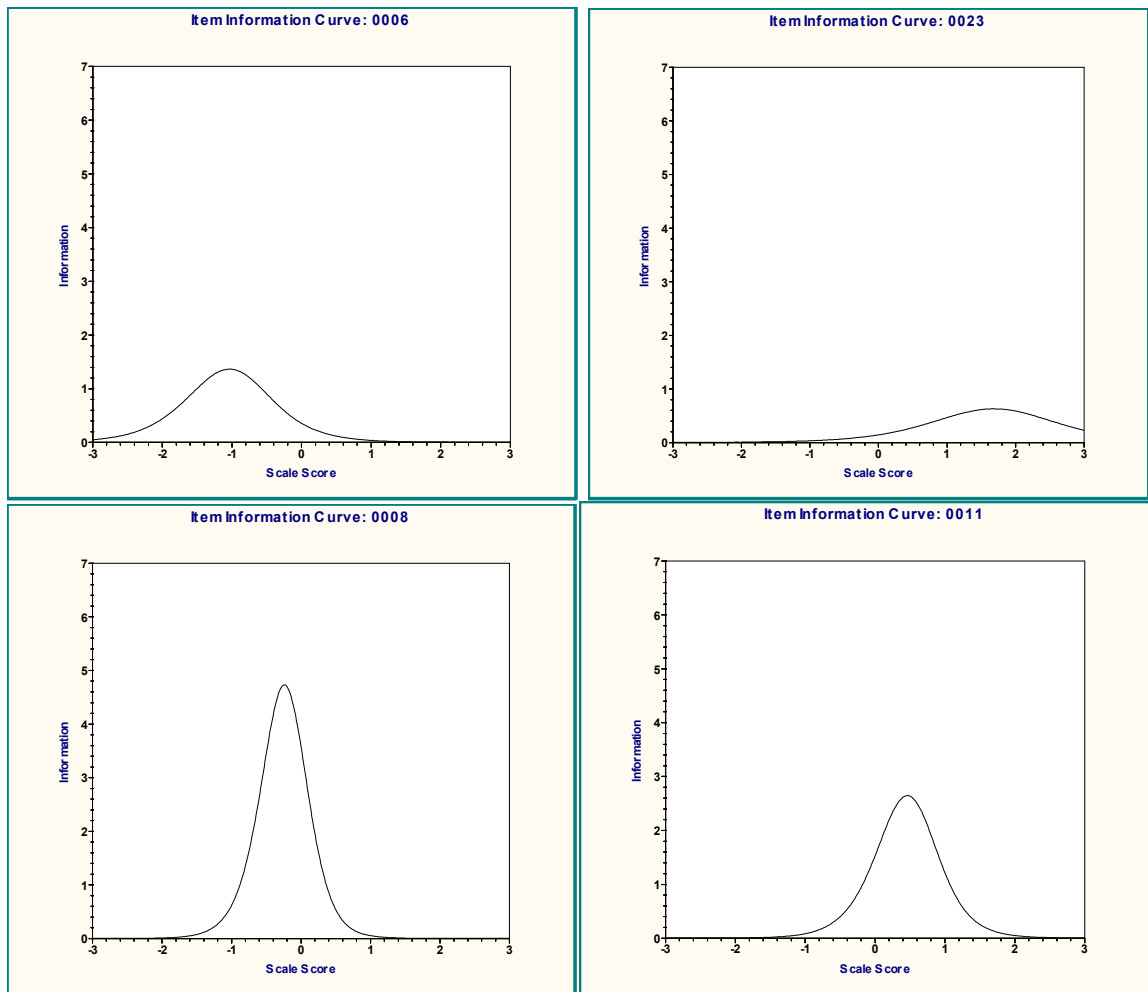


Figure 5. Item information functions for Pat II of the AERRS. Items ask students to rate the riskiness of having sex without birthcontrol (Item 6), alcohol use (Item 8), teasing (Item 11) and asking someone on a date (Item 23).

The test information function in Figure 6 demonstrates how measurement precision varies across the range of rated risk perception. The standard error function is also represented in Figure 6, and shows that reliability varies across the range of risk perception with lower reliability observed at the extreme negative end of the risk

perception spectrum; however, standard error is low across most of the risk perception range and suggests adequate reliability of the measure. While Part I of the measure provided more information at the extreme poles of the risk propensity spectrum, the test information function indicates that Part II of the measure provides almost no information outside the mid-range of the perception ability scale (-1.5 to 1.5).

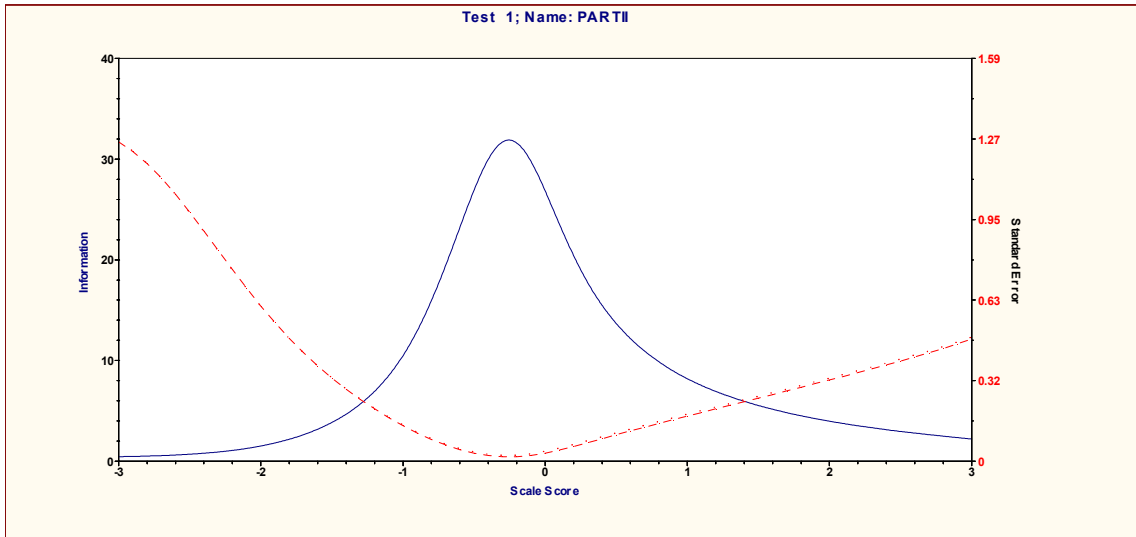


Figure 6. The test information function and standard error function of Part II.

Chapter 4 - Discussion

The primary goal of this project was to develop and evaluate a brief adolescent risk behavior measure that included exploratory and health risk behavior items and that measured both risk behavior and risk perception. Reliability and validity of the measure were initially tested using classical test theory methods. The first research question focused on the extent to which the AERRS is a reliable measure of health and exploratory risk behavior and perception. It was expected that the total score and each of the two subscale scores would have adequate reliability for Part I and Part II of the measure. Coefficient alphas of the initial version were above .70, indicating acceptable internal consistency reliability for the measure; however, to be used as part of a decision-making process within schools, the reliability would need to reach at least .80 for a screening instrument (Salvia and Ysseldyke, 2004).

The second research question addressed the factor structure of the AERRS. The factor analysis revealed varying results dependent upon the construct measured and gender of the student population. Part I (behavior measure) of the measure did yield a primary factor, but this factor was principally made up of health risk behaviors. Exploratory risk behaviors were represented by Factor 2. The initial hypothesis of primary and secondary factors was confirmed in Part II of the measure. Factor 1 (the primary factor) yielded adequate item loadings for several health and exploratory risk items, and secondary factors of health risk (Factor 3) and exploratory risk (Factor 2) emerged from the analysis. These results suggest more research is needed on the factor structure of the AERRS, especially Part I of the measure. A follow-up confirmatory

factor analysis with the resulting 50 item measure (25 items in Part I and Part II) is a logical next step in the development of the AERRS.

Gender differences were also examined within the factor structure and in participation and perception scores. It is generally accepted that males participate in risk behavior at a higher rate than females (Byrnes et al., 1999) and that this difference in participation rate may lead to a difference in factor structure across genders. However, previous research (Gullone et. al., 2000) found a similar factor structure for both males and females in the development of an adolescent risk behavior questionnaire. The present results indicate that the factor structure may be different for males and females, especially for risk perception. While, the factor structure of Part I (the behavior measure) was similar for males and females with health risk items loading onto Factor 1 and exploratory risk items loading onto Factor 2, there were some differences across genders. Items such as carrying weapons onto school property, physical fights, and extreme sports resulted in higher coefficients for male students, and items such as cheating on tests and assignments and lying to parents resulted in higher coefficients for female students. This difference is likely due to differential participation rates in these behaviors across genders.

The factor structure of Part II (the perception measure) requires a more complex interpretation. The results for the female participants were similar to the results of Part I in that a two-factor solution was found with perception of health risk behavior loading onto one factor and exploratory perceptions loading onto a second factor. However, the item loadings are more complex for male participants. Factor 1 was represented by the health risk perception items; however, Factor 2 contained both exploratory items and

health risk perception items, and the exploratory risk behavior items did not load onto a single extracted factor for male participants. Continued development of the AERRS is needed and future studies must continue to examine gender differences in factor structure with subsequent investigations on the implications of any differences.

As previously noted, prior studies have found that males generally participate in health risk behaviors at a higher rate than females (see Byrnes et al., 1999), but in the present sample self-reported participation in both health risk behaviors and exploratory risk behaviors was similar across males and females. A recently published study on gender differences found a similar result and concluded that females have recently increased their participation in health risk behaviors due to societal changes in gender roles and expectations (Abbott-Chapman et al., 2008). The current sample of females reported similar health risk behavior participation, but also similar exploratory risk participation. Gullone and Moore (2000) found that males reported higher overall risk scores and higher health risk participation rates, but reported similar participation in exploratory type risk behaviors. It seems female adolescents have, for years, experienced risk through exploratory type behaviors, but for reasons yet to be uncovered may be turning to health risk behavior for risk experiences. Interdisciplinary research that involves psychological, sociological and education science is necessary to uncover the reasons behind the changing trends, and technologically advanced measurement strategies may be needed for such comprehensive investigations.

Finally, the third research question focused on the psychometric measurements that resulted from the use of Item Response Theory (IRT). IRT was formulated decades ago (Lord & Novick, 1968), but with the increase in computer technology IRT is used

more often in the development of psychological and educational measures. A previous study that used IRT to develop a risk behavior measure found the method to be useful in understanding participation in risk behavior as a latent trait with risk items across all levels of adolescent ability (Mpofu et al., 2006). Based on this previous research, it was hypothesized that risk behavior is a unidimensional construct that consists of a wide spectrum of behaviors extending from exploratory risk behavior to health risk behavior. While the present exploratory factor analysis did not support the unidimensional hypothesis for Part I of the AERRS, the IRT analyses provided a more detailed analysis of the items and the dimensionality of the risk construct.

First, the IRT analysis found low standard error of measurement across the risk propensity scale of Part I indicating adequate reliability for the measure for student across the risk ability scale. Typically, the ability scale in IRT analyses is interpreted as the ability of the person to answer items correctly; for example, in an academic achievement test. When attitudes or personality traits are measured with IRT, a polytomous model is used and the term “ability” is interpreted differently because there are no right or wrong answers. Risk behavior ability is interpreted as the student’s propensity for risk taking. The item location parameter reveals which types of risk behaviors students at various “ability” levels are likely to take. The items within Part I of the AERRS spanned a wide range of the ability scale with exploratory risk behavior items at the negative pole of the ability scale and health risk behavior at the positive pole of the ability scale. These results suggest that students find it easier to participate in exploratory risk behaviors compared to health risk behaviors, which was the expected result. However, some of the item location parameters were quite large (i.e., 7-9), which suggests the items were too

difficult for students to endorse. However, these items cover behaviors that are expected to be extremely difficult for adolescents choose, such as carrying weapons to school, marijuana use, and suicidal thoughts. These items might be considered critical items and, if endorsed, immediate action is taken.

Some health and exploratory items had similar item difficulty values located in the middle of the parameter range. These results, while preliminary, suggest that adolescents find certain health risk behaviors as easy a choice for participation as some exploratory risk behaviors. Even though it may seem that the physical, psychological and social experiences of the behaviors may be quite different, perhaps the behaviors provide a similar risk taking experience. If that is the case, it may be possible to replace the health risk behavior with the exploratory risk behavior through intervention. These may also be important items in the aim to identify social-emotional or mental health difficulties prior to onset of serious symptoms. When adolescents increase their risk taking ability enough to endorse the items that fall in the middle of the item difficulty range, this may be a critical indicator and a time when early intervention is crucial. Intervention at this early stage of increased participation in health risk behaviors is likely to be more effective than waiting to intervene once habits have formed.

Part II of the AERRS did not have exploratory and health risk perception items with similar item difficulty values, and the results showed a high standard error of measurement (which is inversely related to reliability) for those students who fall at the extremes of the perception ability scale. However, adequate reliability was found for students in the middle range of the perception scale. In addition, the items fell across a wide range of the ability spectrum with exploratory items on the difficult end of the

spectrum and health risk items on the easy end of the spectrum. While this may seem counterintuitive, it is the expected result. Exploratory items were difficult for adolescents to perceive as risky and the health risk items were easier to perceive as risky. Students have a greater propensity for participating in behaviors they perceive as less risky and are less likely to participate in behaviors they perceive as more risky (Gullone & Moore, 2000). Understanding how adolescents rank the level of risk for various behaviors can inform intervention development efforts; for example, it may be possible to develop educational interventions that increase the risk perception of a health risk behavior. It may also be beneficial to target students who do not endorse health risk items as risky because it is likely these students participate in health risk behaviors and increase the possibility for negative psychological and educational outcomes.

Limitations

While the instruments were completed anonymously and validity items were utilized, there remains potential for invalid and falsified responses within the data. Psychological measurement scholars have debated the limitations of self-report for decades (Farrell, Danish & Howard, 1991; Johnson, 1985; Moskowitz, 1986); however, it is often the only method by which some information can be gathered (e.g., sexual activity and cheating on school work). Teachers and parents are good sources of information with regard to adolescent behavior, but the best source of information is the adolescent as long as honest responses are provided. Given the number of students who indicated dishonest responses and the number of instruments discarded due to invalid responses on the paired items, the number of students remaining who provided dishonest responses is likely not large enough to significantly alter the results of the study. However, because the invalid

response sets were discarded, it may be possible that the population was altered and a more restrictive range of behaviors/perceptions found than those of the original population of students sampled.

The two parts of the AERRS were not counter balanced to prevent order effects which lead to a large number of students who were unable to respond to all items. The larger number of invalid responses for Part II also suggests that students felt some fatigue. This can be remedied in future studies though either a counter balanced presentation of the items or by interspersing the perception items throughout the AERRS. However, order effects are less likely to create limitations in future studies because the final version of the AERRS developed through this project is now 50 total items as compared to 86 items of the initial version. In future studies, it is likely that fatigue will be less problematic due to the shorter length of the measure.

Limitations with regard to the IRT analyses were two-fold. First, due to the number of invalid responses on Part II of the measure, the sample size for the perception measure was less than the suggested sample size for IRT analysis. A sample size of 500 is often recommended (Hambelton & Jones, 1993; Truskosky, 2000), but other psychometricians have suggested that a sample size as small as 200 is adequate (Orlando & Marshall, 2002; Thissen, Steinberg, & Gerrard, 1986). Second, the Chi square tests of item fit indicated the IRT model used did not represent the data. Edelen and Reeves (2007) suggest that a larger sample size is necessary with increased complexity of the model and decreased model fit. Therefore, due to the increased complexity of the 2-parameter polytomous model and less than optimal item fit results, a larger sample size

for the perception measure was indicated and cautious interpretation of the IRT results is required.

Psychological measurement development is an iterative process that takes place across many studies, and the initial results are dependant on the sample from which the data were derived. The present sample was limited by the over sampling of female students, but strengthened by the representative sample of minority students, students from an alternative setting, and the equal distribution of students at all high school grade levels. Such a wide sample distribution is a good reflection of the population of interest and resulted in responses across all categorical response choices for each risk behavior. However, many participants chose not to provide demographic data, which generated missing data and limits the conclusions drawn from the data. It is also important to note that the validity of the AERRS has yet to be established and that any conclusions or interpretation about the data gathered with the AERRS are limited. In order to strengthen validity claims, studies that compare the AERRS and other validated measures are needed. In addition, studies that use the data to make decisions in schools are also needed to strengthen claims of treatment validity.

Future directions

The AERRS has proven to exhibit adequate reliability, initial evidence of construct validity, a range of difficulty and discrimination within the items, and evidence of low standard error and high test information for students who fall in the middle range of risk propensity. Next steps in the evaluation of the AERRS shift in focus from item analysis and reliability to instrument validity. Future studies might test concurrent validity through a comparison of scores on the AERRS with scores from the YRBS, ARQ

or IYS. Investigations of predictive validity are needed to look at the relationship between risk behavior participation and school drop out, mental health difficulties, academic achievement, and other educationally relevant variables.

It is still unknown how the AERRS might be used, especially in applied settings such as schools. Studies that examine how exploratory and risk behaviors relate to academic achievement are important to the educational field. As previously stated, there is some concern that instruments currently used in schools to measure student mental health require that students report a certain level of symptoms in order to be identified for intervention (Levitt et. al., 2007). An instrument that measures pro-social behaviors (i.e., exploratory risk behavior) may provide key information about student mental health prior to the development of diagnosable mental disorders. The AERRS might be used in a longitudinal examination of whether students experience a decrease in pro-social behaviors prior to developing mental health difficulties. Such information is needed to provide targeted early intervention and prevention programs that decrease the potential of debilitating symptoms rather than providing reactive interventions once serious symptoms occur and begin to negatively affect student social and academic achievement.

The ultimate purpose of assessment is not to diagnose disorders or describe behaviors, but to provide treatment for those in need. Treatment validity is a measure of validity that explores how well the results of the assessment link to intervention efforts. Provision of prevention and intervention programs relies on valid and reliable assessment to identify students in need of services and provide information that leads to a specific treatment. Future studies of the AERRS must focus on how the measure can be used in a system of assessment and intervention. School systems are beginning to recognize the

need for systematic assessment and intervention in the area of mental health, as indicated by the increased number of discussions on the topic and the popularity of TeenScreen School and Communities (formerly Columbia University's Teen Screen Program). The TeenScreen program provides voluntary mental health screening in schools, community-based setting, and primary healthcare clinics (TeenScreen, 2009). A drawback of the TeenScreen assessment is that the items focus on symptoms, specifically symptoms that indicate risk for suicide. Another drawback of TeenScreen is that the focus is solely on negative behaviors and does not measure the positive behaviors that may be identified as protective factors for the student. As suggested earlier, there is a call for a measurement strategy that is sensitive to changes in behavior that are a precursor to serious mental health difficulties, rather than requiring already established symptoms to be reported.

As with TeenScreen, any measure used at the screening level is just the first step within a larger system of assessment and intervention aimed to improve student mental health. Gated systems utilize various assessments to route students into properly matched interventions. Screening measures are typically the first gate in the system and usually have a high sensitivity to mental health difficulties. If the student is identified based on screening results, diagnostic measures that provide more detailed measurement are used to validate the problem. Once the problem is validated, then interventions are put in place based on the severity of the problem. This type of system for mental health assessment and intervention fits well within the educational continuum of services currently provided to students across general and special education. Heartland Area Education Agency's model is a widely accepted model for the provision of educational services wherein educational resources are matched to student need with less intense needs provided few

resources and more intense needs provided numerous resources (Tilly, 2002). Adelman and Taylor (2003) developed a similar model specific to mental health and social-emotional needs. This model includes a three tier system where the first tier is comprised of general health, drug and alcohol, and social skills education for all students. At this level school-wide screening systems are implemented and use instruments like the AERRS to monitor student need and identify students for intervention. The second tier includes systems of early intervention such as drop-out and violence prevention programs and behavior accommodations. Tier three services include the most intense resources such as individual counseling/therapy and special education for students with emotional disorders. Any student with a positive screening at Tier 1 would participate in further assessment to validate the problem and then take part in a matched intervention either at tier two or tier three depending on the intensity of student need. The AERRS was developed as a Tier 1 screening instrument, and future studies will focus on its use within complex systems of prevention and intervention.

Once the reliability of the AERRS is recognized and its construct, criterion and treatment validity established for high school populations, a next logical step is to extend the use of the measure with middle school and older elementary students. Early intervention and prevention programs have gained favor in education as reactive strategies were found to be less effective. Students are participating in health risk behaviors at a young age, and as children develop, they are more likely to participate in risk behaviors (Tinsley et. al., 1995). Stipek, de la Sota and Weishaupt (1999) point out that prevention and intervention efforts are well suited for students in the upper elementary grades because it is a time when the social and psychological foundations for

participation in risk behavior begin. In addition, it is important to target these students before habits are formed, especially in the case of substance use where physical changes in the brain create serious difficulties in the effort to quit.

Development of the AERRS using IRT allows for further extensions of the measure using computer adapted testing (CAT). CAT is a method of testing that systematically provides students with items that match their ability level. Use of CAT in academic achievement tests allows students to answer only the items that match their ability level, increasing the efficiency with which tests are given. A high achieving student need only take more challenging items without having to spend time with the easy questions and a student with special needs in math is presented with only the simpler items, thus reducing frustration. This method of testing can match items to the types of risk behaviors the student endorses. The YRBS has 87 items and the IYS has 185 items, some of which are irrelevant to students who choose not to participate in health risk behaviors. Instead of all students having to answer every item on a lengthy survey, CAT might be used to create a more efficient assessment of risk behavior. This method of testing would require improvement of the AERRS as a larger item bank is needed in order to match item difficulty across a large range of student propensity for risk behavior. Future item development must focus specifically on items that provide information for students who fall at the extreme ends of the ability scale.

Conclusions

It is apparent from the attention given to this subject throughout the years that risk behavior in adolescence is an important focus for researchers, federal and state agencies and schools; however, goals differ across these settings. Researchers often focus on the

relationship between risk behavior and a diverse array of individual and social variables. The goal of state and federal agencies is to describe current participation in risk behavior and trends in participation over time. While these are important ambitions and provide general information to policy makers, goals at the school district level are quite different, and the smaller setting requires an alternate viewpoint of risk behavior and a different type of measurement strategy. School-based measurement strategies require frequent, efficient measurement of constructs that are relevant to the educational context and sensitive to the needs of schools.

Best practice in prevention and early intervention dictates the need for systematic identification of students in need of services. More and more, educational systems have chosen to use a data-based, problem solving approach to matching student needs with academic and social-emotional services. Generally, a problem solving approach includes problem identification, generation and selection of solutions, and an outcome assessment of the chosen solutions (Deno, 2002). Such an approach requires frequent and systematic data collection, which may be possible with further development of the AERRS. This instrument is not yet ready for applied use in the schools, but with continued research and increased support for such projects on the rise, the AERRS has the potential to become a key assessment within school-based mental health programs.

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Appendix A

Adolescent Exploratory and Risk Behavior Rating Scale

School: _____

Gender: Male Female

Age: _____

PART I: Risk Behavior Rating Scale

DIRECTIONS: Below is a list of statements about activities in which some people participate. Read each one carefully and circle the number that corresponds to the frequency with which you participate in that activity: Never, Rarely, Sometimes, Often.

There are no right or wrong answers. ALL RESPONSES ARE COMPLETELY ANONYMOUS.

	Never	Rarely	Sometimes	Often
1 I talk with my parents about my personal life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2 I carry a gun or knife on school property.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3 I steal from others.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4 I cheat on my school work/tests.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5 I use illegal drugs, other than marijuana.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6 I drink beer, wine, or liquor.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7 I talk to and get to know new people.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8 I drive without a license.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9 I use marijuana.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10 I use tobacco products (cigarettes, cigars, chew, etc.).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11 I stand up to my peers on issues I care about deeply.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12 I get drunk.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13 I try sports/games I have never tried before.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14 I enter competitions(sports, cards, band, speech, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15 I drive over the posted speed limit.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16 I stand up to people who are bullying other students.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17 I get into physical fights with others.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18 I tell the truth even if it means I will be disciplined.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19 I participate in extreme sports (skateboarding, snowboarding, etc.).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20 I have sex without any form of birthcontrol.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21 I stay out past midnight on weeknights.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22 I volunteer my time in the community.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23 I dress differently than my peers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24 I lie to my family about where I am or what I am doing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25 I ask girls/boys for a date.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26 I gamble (lottery, betting on sports, cards, or races) my money/possessions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27 I raise my hand to ask or answer questions in class.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28 I use cigarettes, cigars or smokeless tobacco.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29 I make new friends.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30 I spend more than 2 hours a day watching television or playing video games.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31 When my friends ask me to do something I disagree with, I stand up to them.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32 I drive more than 10 mph over the speed limit.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33 When I have a personal problem, I talk to my family members.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34 I drink alcohol.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35 I skip school without telling my family.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

36 I talk about my goals even if they are different from those of my friends.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37 I think about killing myself.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38 I have sex without using condoms.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39 I drive after drinking alcohol or taking drugs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40 I tease and make fun of other students or adults.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41 I tell lies about other students or adults.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
42 I carry a weapon on school property.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
43 When I use alcohol, I have more than 2 drinks within an hour.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PART II: Risk Perception Rating Scale

DIRECTIONS: Below is a list of statements about activities in which some people participate. Read each one carefully and circle the number that corresponds to the amount of risk you perceive in each activity.

There are no right or wrong answers. ALL RESPONSES ARE COMPLETELY ANONYMOUS.

	Not Risky	A little Risky	Risky	Very Risky
1 I talk with my parents about my personal life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2 I carry a gun or knife on school property.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3 I steal from others.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4 I cheat on my school work/tests.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5 I use illegal drugs, other than marijuana.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6 I drink beer, wine, or liquor.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7 I talk to and get to know new people.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8 I drive without a license.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9 I use marijuana.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10 I use tobacco products (cigarettes, cigars, chew, etc.).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11 I stand up to my peers on issues I care about deeply.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12 I get drunk.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13 I try sports/games I have never tried before.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14 I enter competitions(sports, cards, band, speech, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15 I drive over the posted speed limit.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16 I stand up to people who are bullying other students.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17 I get into physical fights with others.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18 I tell the truth even if it means I will be disciplined.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19 I participate in extreme sports (skateboarding, snowboarding, etc.).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20 I have sex without any form of birthcontrol.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21 I stay out past midnight on weeknights.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22 I volunteer my time in the community.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23 I dress differently than my peers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24 I lie to my family about where I am or what I am doing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25 I ask girls/boys for a date.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26 I gamble (lottery, betting on sports, cards, or races) my money/possessions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27 I raise my hand to ask or answer questions in class.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28 I use cigarettes, cigars or smokeless tobacco.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29 I make new friends.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30 I spend more than 2 hours a day watching television or playing video games.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31 When my friends ask me to do something I disagree with, I stand up to them.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32 I drive more than 10 mph over the speed limit.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33 When I have a personal problem, I talk to my family members.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34 I drink alcohol.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35 I skip school without telling my family.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- | | | | | |
|---|--------------------------|--------------------------|--------------------------|--------------------------|
| 36 I talk about my goals even if they are different from those of my friends. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 37 I think about killing myself. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 38 I have sex without using condoms. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 39 I drive after drinking alcohol or taking drugs. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 40 I tease and make fun of other students or adults. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 41 I tell lies about other students or adults. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 42 I carry a weapon on school property. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 43 When I use alcohol, I have more than 2 drinks within an hour. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
-
- | | | | | |
|--|----------|----------|-------|----------|
| | Disagree | Disagree | Agree | Agree |
| | Strongly | | | Strongly |
- 44 I responded honestly on each of the previous questions.
- | | | | | |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
- 45 In what grade of school are you?
- a. 9th
 - b. 10th
 - c. 11th
 - d. 12th
- 46 How do you describe your race/ethnicity?
- a. White
 - b. African American
 - c. Hispanic
 - d. Asian/Pacific Islander
 - e. Native American
 - f. Other/Mixed
- 47 Where are you now living?
- a. with a parent(s).
 - b. with a grandparent(s) or other family member(s)
 - c. with a foster family
 - d. in shelter care
 - e. in residential group care
 - f. independently
 - g. other
- 48 At school, my grades are mostly
- a. Excellent
 - b. Above Average
 - c. Average
 - d. Below Average
 - e. Failing