ABSTRACT

Title of Thesis: INITIAL DEVELOPMENT AND VALIDATION OF A QUESTIONNAIRE TO ASSESS RISK OF PERSONAL VICTIMIZATION AND BULLYING

Benjamin Joseph Perlow, Master of Arts, 2015

Thesis directed by: Professor Gary Gottfredson
Department of Counseling, Higher Education, and Special Education

The goals of the research were to (a) develop methods of predicting bullying and victimization rates for potential research and practice purposes, (b) compare methods for developing measures of prediction scales (factor based scales and criterion-related item selection), (c) compare the cross-validated validity of regression-weighted versus unit-weighted composites, and (d) assess the rates of correct and incorrect predictions when identifying people who are potentially at greatest risk of bullying or victimization. This research tested the factors on a university aged population. The factor based scales that best predicted bullying or victimization rates were negative self-esteem, hostile behaviors to others, and risky behaviors. Both the regression equations and the unit weighting method produced significant correlations between the predictive and outcome measures. Two potential applications of the questionnaires are to help researchers gain a better understanding of bullying or victimization and to target interventions with potential to prevent future bullying or victimization.

INITIAL DEVELOPMENT AND VALIDATION OF A QUESTIONNAIRE TO ASSESS RISK OF PERSONAL VICTIMIZATION AND BULLYING

by

Benjamin Joseph Perlow

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Advisory Committee:

Professor Emeritus Gary Gottfredson, Chair
Assistant Professor Colleen O'Neal
Associate Professor Matthew Miller

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Chapter 1: Introduction and Literature Review

Bullying and victimization affect many people nationwide. According to the 2009 National Youth Risk Behavior Survey, approximately 20% of high school students had been bullied on school property in the twelve months prior to the survey (Centers for Disease Control and Prevention, 2009). Bullying in the workplace has on some occasions led to job loss and even suicide for the victims (Schuster, 1996). However, few studies have examined bullying and victimization on college campuses (the time period connecting high school and the workplace for many people) (Coleyshaw, 2010).

A common definition of bullying is that it is a social process in which a person exerts power or influence over another in a negative manner repeatedly over time to achieve a desired effect or outcome (Besag, 1989; Olweus, 2013). The bullying can take many forms: physical bullying, verbal bullying, relational bullying, online bullying, sexual bullying, and discriminatory bullying. Victimization on the other hand requires only that a person be the recipient of aggressive attacks or other crimes and does not require an imbalance of power or a repetition of attacks (Salmivalli & Peets, 2011).

Currently, there are few (if any) compact victimization questionnaires designed for adults that assess the likelihood that a person will be bullied or victimized. In the present research, a multi-factorial questionnaire is being developed in an effort to provide greater insight into who is likely to be bullied or victimized. I hypothesized that it would measure seven factors that have been demonstrated by past research to be correlated with being victimized or bullied. These seven hypothesized dimensions are: coping style, self-esteem, risky behaviors, tendency to ingratiate oneself to others, aggressive behaviors, physical appearance, and friendship group. A shorter fourteen item measure is being

developed as well.

Risk Factors for Bullying and Victimization Coping Strategies

The manner in which a person deals with difficult situations and attempts to solve problems may determine whether the person is likely to be victimized or bullied in college. Weiten, Lloyd, and Hammer (2008) have proposed that there are three primary types of coping styles people use to deal with troubling situations: appraisal focused coping strategies, problem-focused strategies, and emotion focused strategies. Problem-focused strategies involve a person attempting to solve the problem that is occurring. An example of this type of strategy is somebody seeking advice about an issue. An inverse relationship has been reported between the use of problem solving coping strategies and being victimized (Andreou, 2001; Sullivan, Schroeder, Dudley, & Dixon, 2010). People who use this strategy actively seek out solutions to their problems and will often set up realistic steps to solve them, and they are therefore victimized less. In school, these adaptive coping strategies are also associated with more school engagement which has also been associated with less victimization and bullying (Furrer & Skinner, 2003; Juvonen, Graham, & Schuster, 2003).

Self-Esteem

A relationship between low self-esteem and bullying in schools has been shown in a variety of studies. Specifically, several studies have found low self-esteem among bullies, victims, and bully-victims (O'Moore & Kirkham, 2001; Slee, & Rigby, 1993). According to Olweus (1993), victims of bullying commonly have negative views of themselves and the situation, and often respond to being bullied by withdrawing.

There are several possible reasons why students with low self-esteem are more

likely to become victimized. Students with low self-esteem are often submissive, socially withdrawn, and unpopular with peers (Hawker & Boulton, 2000). This unpopularity may make it more likely for the student to be victimized. Additionally, having low self-esteem has been associated with a lack of fighting back against bullies (Banks, 1997). Being bullied and having low self-esteem furthermore may be a cyclical phenomenon in which people with low self-esteem are more likely to be victimized and this victimization lowers their self-esteem further (Olweus, 1993). In college, low self-esteem has also been correlated with more alcohol consumption, more sexual partners, and more HIV risk taking behaviors all which may further promote victimization due to the vulnerable position in which these behaviors place the person (Gullette & Lyons, 2006).

Risky Behaviors

Being victimized is also associated with being in risky situations and environments, as implied by Life Style Theory (M. R. Gottfredson, 1981) and Routine Activity Theory on Victimization (Cohen & Felson, 1979). According to Gottfredson (1981), there are two incontrovertible facts about victimization. The first is that the amount and kind of victimization a person experiences is based upon his/her exposure to crime, and the second fact is that some people are more exposed to crime than others. This differential amount of victimization is due to certain characteristics of an individual that puts that person in contact with motivated offenders, makes them a suitable target for victimization, and takes them away from a guardian that may protect him/her from the victimization (Cohen & Felson, 1979). An example of this may be an unaccompanied person flipping through a sum of money in his/her wallet in an area where pick-pockets are prevalent and egress is easy for a perpetrator.

In a study of homeless and runaway youth, a positive correlation was found between personal victimization and time on the streets (each additional month on the street increased the odds by 1.33), drug use (each additional month on the street increases the odds by 1.28), and contact with deviant youth and gangs (each additional month on the street increase the odds by 1.34) (Hoyt, Ryan, & Cauce, 1999).

Ingratiating and Conforming Behavior

Students in high school and middle school are less likely to be victimized if they ingratiate their peers (e.g., by complimenting them) and conform to their beliefs and values, particularly with respect to gender norms (Drury, Bukowski, Velásquez, & Lopez, 2012; Aspenlieder, Buchanan, McDougall, & Sippola, 2009). Students who transgress gender norms by dressing or behaving like the opposite sex are more likely to be bullied than are conforming peers. Conforming to stereotypes has also been implicated in higher peer ratings of pro-social behavior (a protective factor for victimization; Griese, 2011). Furthermore, the desire to fit in with peers was found to be negatively correlated with amount victimized in a pilot study in preparation for the present research (Perlow, 2012). This pilot study asked students in a large public university to think back upon their experiences in middle school to consider the amount they were bullied and how they related to their peers and behaved.

In the workplace, ingratiation appears to lessen the effects of abusive supervision (Harvey, Stoner, Hochwarter, & Kacmar, 2007). According to Tepper (2000), abusive supervision is defined as the "sustained display of hostile verbal and nonverbal behaviors, excluding physical contact" (p. 178). In a 2007 study, Harvey et al. found that employees with positive affect and who ingratiate their boss and peers by flattery and favors will

tend to be victimized less by abusive supervision than their peers and be less tense, less emotionally exhausted, and will not want to leave the job as badly.

Aggressive Behaviors

Many people who are victimized or are bullied become bullies themselves (Ma, 2001). The relationship between victim and perpetrator may be cyclical in that victims may become bullies, and then they are further victimized. In middle school, the discipline climate is important in determining whether a victim also becomes a bully (Ma, 2001). Unstructured permissive environments often permit victims of bullying to lash out against the bullies. Additionally, some researchers believe there are passive and aggressive victims of bullying. Aggressive victims become angry easily and are usually reactive in their anger (Pellegrini, Bartini, & Brooks, 1999). Aggressive victims are more likely to lash out at their peers when they are frustrated or upset than are passive victims.

The correlation between aggressive behaviors and victimization also appears to be due to lifestyle choices: People who commit aggressive behaviors often are found in locations frequented by other aggressive individuals who may cause them harm. For example, in areas with greater frequencies of bars, there are higher levels of alcohol related aggression and victimization (Treno, Gruenewald, Remer, Johnson, & LaScala, 2008).

Physical Appearance

People's appearance has also been associated with differing rates of being victimized. Many studies have examined the association between students' weight and victimization. From 2009-2010, about 35% of adults in the United States were obese (with a body mass index of 30 or greater; Flegal, Carroll, Kit, & Ogden, 2012).

Internationally, being overweight has been associated with increased amounts of verbal victimization (Guo, et al., 2010; Wang, Iannotti, & Luk, 2010). Underweight students in the United States are more likely to be physically bullied than normal weight peers (Wang, Iannotti, & Luk, 2010). Differing levels of victimization has also been associated with attractiveness; whereas, middle school students who self- report being more attractive than the average person state that they both sexually bully others more and are sexually bullied more by others. Males, who perceive themselves to be less attractive than their peers, report being sexually victimized more than their peers (Cunningham, Taylor, Whitten, Hardesty, Eder, & DeLaney, 2010). Sexual bullying refers to inappropriately touching or making sexual comments to someone who is weaker or less powerful than the individual performing the bullying.

Friendship Group

Negative friendship groups have been found to be correlated with increased victimization (especially relational victimization) (Kawabata, Crick, & Hamaguchi, 2010). A study by Daniels et al. (2010) in the United States found that approximately half of the variance in the relational victimization experienced by the subjects and about a third of the physical victimization experienced could be accounted for by the negative quality of the person's friendships with others. Negative qualities of friendships include the likelihood that a friend would betray the student or subject the student to other forms of relational or physical aggression.

Other Questionnaires

The questionnaire being designed is different from other victimization surveys and questionnaires in its purpose, method of delivery, and the item content. This

questionnaire is designed to help assess an individual's likelihood of being victimized due to personal characteristics. This differs in purpose from surveys put out by government organizations like the Bureau of Justice Statistics that gives a victimization questionnaire to a representative sample of the United States population to try to find trends in victimization rates around the country or other surveys looking at the relationship between the environment and victimization (Truman, Langton & Planty, 2012; G. D. Gottfredson & Gottfredson, 1985). Additionally, it differs from surveys that measure the amount that a student is bullied or victimized such as the Revised Olweus Bully/Victim Questionnaire (Olweus, 1996). The questionnaire is also composed of seven factors not found together in any other questionnaire.

Alternative Approaches to Development of a Prediction Device

Alternative Approaches to Scale Development

Hase and Goldberg (1967) compared six methods for developing scales: factor analytic, empirical group discriminative, intuitive-theoretical, intuitive-rational, stylistic-psychometric, and random. Using diverse criteria, the factor analytic, empirical group discriminative, intuitive-theoretical, and intuitive-rational methods were all demonstrated to be valid methods for creating questionnaires.

Stimulated by the Hase and Goldberg (1967) article, one purpose of this research paper is to compare alternative scale construction methods for creating prediction devices, especially with a small sample size. Following the use of intuitive-theoretical and intuitive-rational approaches to the development of an item pool, I used the exploratory factor analytic approach to homogeneous scale development as well as an empirically keyed method to create a criterion-related scale. Although both of these

methods have been used in the past for creating prediction devices, few research studies have compared the two to determine whether one method better predicts outcome variables. Factor analysis and the empirically keyed method combine items in different manners to create the prediction devices, and they often differ in interpretability during counseling. The following paragraphs describe the two approaches.

Factor Analysis. A goal of factor analysis is to determine how many latent variables account for the variance and covariance in the survey items (Brown, 2012). Factor analysis can be used to develop a set of homogenous scales for understanding the amount bullied or victimized. Homogenous scales are often easier to interpret than heterogeneous scales (such as empirically keyed scales) as homogenous scales are made up of items tapping a similar idea or construct. For example, the Neo-Personality Inventory is a commonly used measure for helping asses a person's personality in terms of five distinct homogenous domains: Extraversion, Agreeableness, Consciousness, Neuroticism, and Openness to Experience (Costa Jr. & McCrae, 1995). Each domain is easily interpretable as the items assessing each are similar in meaning and help convey the meaning of the construct.

Criterion Keying. In contrast, the empirically keyed method combines items based upon how well they correlate with the outcome variable; therefore, it does not usually produce a homogeneous scale with clear theoretical meaning. The empirically keyed scale seeks to predict bullying and victimization, and it is less concerned with the interpretation of risk factors.

Alternative Approaches to Creating Prediction Composites

Once potential predictor variables have been created using factor analysis

or another method, there is an issue regarding how the predictors should be selected and combined. Two methods compared in this research are giving the predictors weights based on regression equations or weighting each predictor equally. The literature on this is described next.

Regression Equations. One approach to optimal weighting is to use regression weights (Darlington, 1968). Regression weights minimize the sum of the squared differences between predicted and observed outcomes in the sample in which the equation is estimated. Put another way, minimizing the squared deviations from the regression line increases the regression equation's fit for the data. Regression weights are often *not* optimal when used to make predictions in a new sample as the weights capitalize on specific characteristics of the construction sample and give greater weight not only to the true-score component but also to the error component of some predictor variables. Cross validation is often helpful for getting an unbiased estimate of validity as the regression weights in a new sample will no longer capitalize on chance characteristics in the construction sample, as it involves a new sample of participants.

Unit-Weighted Composites. Wainer (1976) and Einhorn and Hogarth (1975) suggested that adding predictors of equal weight often produces more valid prediction equations on cross-validation than does the use of equations with regression weights, as the weighting is not affected by sample characteristics. Because the component weights are not dependent on the particular sample, they would not incorporate weights that depend on peculiarities of the construction sample. To create the unit weighted scales, the scales with the highest correlations with the outcome variables are standardized and then added together with unit weights (i.e., each receives a weight of 1). This manner of

combining predictors is easy to implement and understand once explained. Regression weighting can work well when sample sizes are very large (Davis-Stober, 2011; Garb, Wood & Fiedler, 2011), but may be inferior to unit weighting when samples are smaller. This research will provide a demonstration of the use of unit weighted composites, and produce more information about whether unit weighting better predicts outcome variables in a small sample size.

Research Aims

This research has several goals. These goals include developing factor-based scales that predict bullying or victimization, comparing the predictive ability of the factor based scales with an empirically keyed scale, comparing the validity of regression-weighting and unit-weighting, and assessing the rate of correct predictions for people who are potentially at greatest risk of bullying or victimization.

Hypotheses

Based upon a review of the research, several hypotheses are articulated to help define the relationships between seven hypothesized predictors and the likelihood of being victimized or bullied. Eight of these are substantive hypotheses about the nature and content of predictors of victimization and bullying. Three additional hypotheses relate to the method of developing a prediction device in a small sample. All eleven hypotheses follow:

1. Factor analysis will provide support for a seven-factor structure for predictors of bullying and victimization.
2. There will be a negative relationship between the use of problem-solving coping strategies and being victimized and bullied.

3. There will be a negative relationship between a person's self-esteem and his/her victimization and being bullied.
4. There will be a positive relationship between the amount of risky behaviors performed by a person and his/her victimization and being bullied.
5. There will be a negative relationship between ingratiating others and being victimized and bullied.
6. There will be a positive relationship between aggressive behaviors and being victimized and bullied.
7. There will be a positive relationship between looking different from the norm and being victimized and bullied.
8. There will be a positive relationship between having a negative friendship group and being victimized and bullied.
9. The unit-weighted equations will produce higher validity correlations than regression weighted equations on cross validation.
10. The short scale developed by criterion keying will be positively correlated with each of the regression equations and unit weighted equations from the factor-based battery.
11. The short predictive scale will efficiently predict the amount of victimization and bullying a person experiences.

Base Rate

To be of practical value, a predictive questionnaire should do a better job than the base rate at predicting the outcome variable (in this case either bullying or victimization; Meehl & Rosen, 1955). So, for example if 10% of college students as a whole were victimized within the last year, the prediction that a student would not be victimized,

would be correct 90% of the time. I hope the predictive questionnaire will improve upon this percentage.

It is difficult to ascertain an appropriate base rate for many of the outcome variables measured in this study as previous studies often look at just one aspect of the victimization scale or the bullying scale and often the samples used in the studies are not reflective of the samples at this particular university. Additionally, many of the time frames used in the studies reflect the bullying experiences of the students throughout their time at the university as opposed to the last year.

However, research suggests that 6.1% of college students were violently victimized annually between the years 1995 and 2002 (Baum & Klaus, 2005) and that 21.5% of university students were victimized during their time at the university (Jennings, Gover, & Pudrzynska, 2007). Kennedy & Taylor (2010) found that 7.9% of college students in their study had been threatened physically and feared for their lives. In a study by Walsh et al. (2012), 12.5% of college females reported having been sexually assaulted at least once.

A study by Chapell et al. (2004) found that 25% of college students have been bullied by another student since they had been in college (as defined by Olweus' previously described definition of bullying) and 20% had been bullied by a professor since the start of college. Additionally, 22% of college students reported being cyberbullied during their time at the university (a sub-component of the bullying questionnaire used in the study; MacDonald & Roberts-Pittman, 2010).

Due to the research suggesting that approximately 20-25% of students had been victimized or bullied during their four years at the university, I hypothesized that

approximately five percent of students would have experienced bullying or victimization within the last year. Therefore, I determined that an appropriate cut off score for determining how many people are at high risk for victimization or bullying within the last year would be two standard deviations.

Chapter 2: Method

Overview of Methods

The following flow chart in Figure 1 provides an overview of the methods used.

Flow chart of Methods

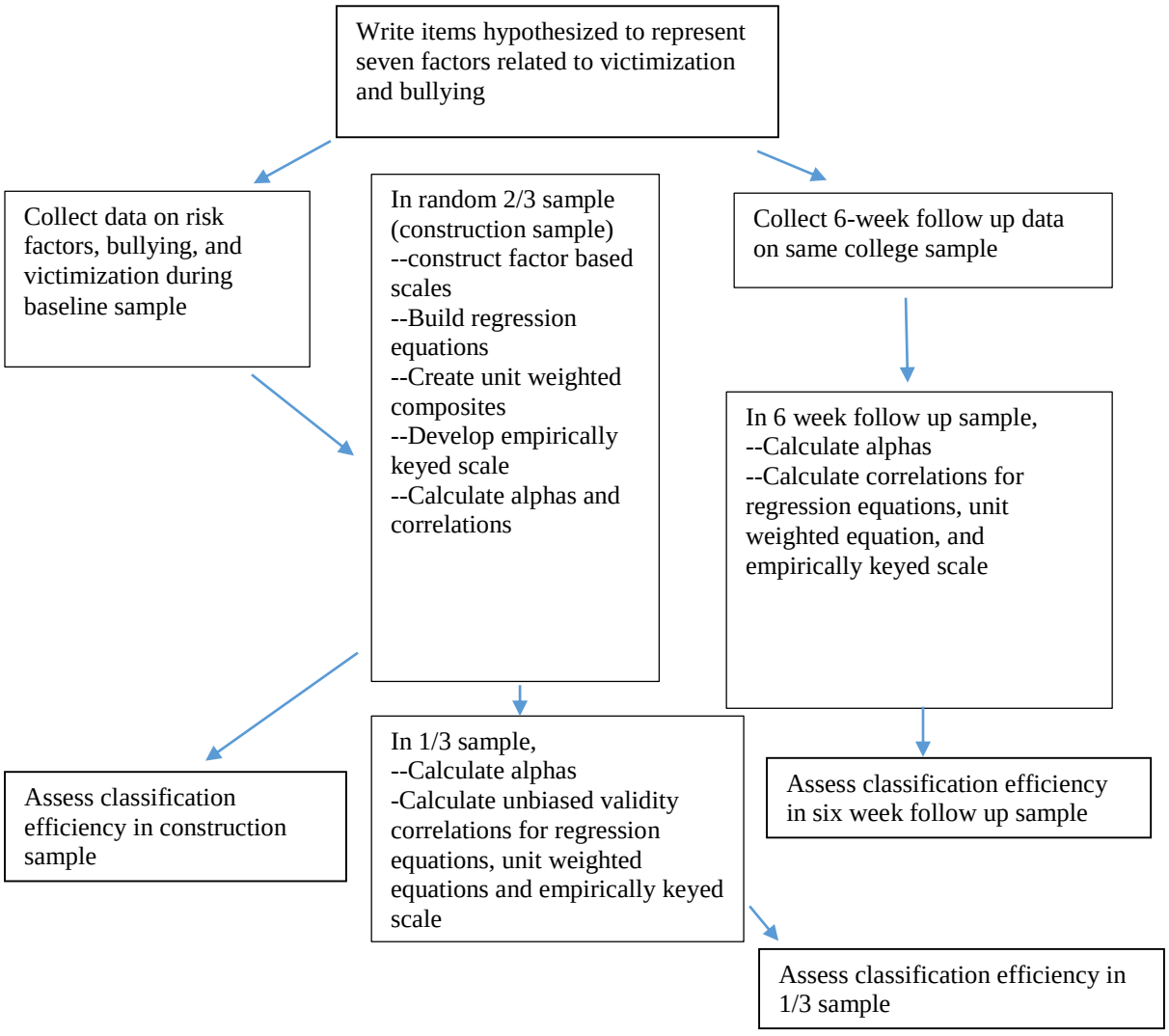

Figure 1. Flow chart showing the methods used in the study.

Procedure

A baseline survey was collected following an email solicitation. This baseline sample was randomly separated into (a) a 2/3 sample use for exploratory factor analysis and scale and predictor construction and (b) a 1/3 sample used for cross validation. The baseline survey was supplemented by a 6 week follow up of volunteers who completed the initial survey to assess re-test reliability and predictions over time.

The initial data were collected during baseline and six-week follow-up questionnaire surveys during the fall of 2012. During the baseline data collection, a sample of adult undergraduate students from a large mid Atlantic public university was contacted using an email reflector provided by the university registrar's office. The selection of the students depended upon the registrar who used a query program to retrieve email addresses for undergraduate students 18 years old and older, and then set up the reflector. The email provided a link to a survey on the Survey Monkey website. The students then read a consent form, and if they agreed to the terms, they proceeded to complete the questionnaire and the victimization measure (where they answered how frequently they were victimized in the last year). At the end of the survey, they were asked to provide the last four digits of their phone numbers (for identification purposes) and their email addresses if they wished to repeat the questionnaire in six weeks. These willing participants then were asked to complete the questionnaire again during the six-week follow up.

Participants

During the baseline collection, 6,000 individuals were sent an email inviting their participation if they were undergraduate students at the university and at least eighteen

years old. Of these invitees, 545 began the survey and 491 (8% of the participants who had been sent the invitation email) completed at least a third of the questionnaire. The ages of the participants ranged from 18-61 with the average age being 19.7 years old. Sixty-six percent of the respondents were female, and the sample members identified with several different races as shown in Table 1. Seventy-three percent of the participants reported that they would earn $20,000 or less during the current year and two percent reported that they would earn more than $75,000 over the course of the year. The reported income information is found in Table 2.

During the six-week follow up, 137 participants began the survey and 121 of those participants completed the follow-up survey. Of these, I was only able to match seventy-four to their baseline scores due to difficulty with the identification process (1% of the initial sample of 6000 and 15% of those who completed the survey at baseline). The demographic characteristics for the follow-up were similar to the characteristics of respondents in the baseline collection.

Table 1

Demographic Information (Column Percentages)

	Baseline			
Races Identified With	Total *N*=490	Two-thirds *n*=326	One-third *n*=164	6 Week *n*=74
African American	10.0	9.5	11.0	9.5
Caucasian	64.4	66.3	61.0	67.6
American Indian	0.0	0.0	0.0	0.0
Asian	13.8	13.8	14.0	6.8
Native Hawaiian	0.0	0.0	0.0	0.0
Hispanic	04.3	3.1	06.7	4.1
Other	02.2	2.8	1.2	5.4
2 or more races	05.1	4.6	6.1	6.8
Not Reported	0.2	0.3	0.0	0.0

Table 2

Student Income (Column Percentages)

	Baseline			
Financial Category	Total *N*=481	Two-thirds *n*=324	One-third *n*=157	6 Weeks *N*=74
$0-$10,000	48.1	48.6	47.0	40.5
$10,001-$20,000	23.4	23.5	23.2	29.7
$20,001-$30,000	15.9	16.8	14.0	14.9
$30,001-$50,000	5.9	4.3	9.1	9.5
$50,001-$75,000	2.9	4.0	0.6	5.4
Greater than $75,000	1.8	1.8	1.8	0.0
Missing Financial Information	2.0	0.9	4.3	0.0

Construction of Questions for Prediction Instrument

I wrote seventy items that I predicted would differentiate into seven factors after the factor analysis. The questions were designed to encompass different aspects of the constructs that I believe are important for measuring the likelihood of a college aged student being bullied or victimized based upon the literature reviewed in the introduction. Many of these questions were administered to a pilot sample of students who critiqued the questions in order to increase the likelihood that the participants would find the questions clear and meaningful (Perlow, 2012). The items can be found in Appendix A.

I created a victimization and bullying frequency measure to analyze how often an individual was victimized or bullied. A frequency measure asks a participant to answer

how often an event has occurred, in this case, over the last year. Items for the bullying subscale were derived by analyzing the items from the victimization scale of the Olweus Bully/Victim Questionnaire (Olweus, 1996) as described by Wang, Iannotti, Luk, & Nansel, 2010. The victimization and bullying subscale items can be found in Appendix B. The wording of the items in this study was changed from the Olweus survey to be more relevant to an adult population, to be more general, and to not be focused solely on a school setting. And, it is shorter than the Olweus scale; for example, items including gossiping or being locked inside were excluded.

Construction and Validation Samples

In order to provide unbiased estimates of the validities and reliabilities for the scales and equations, the baseline sample was randomly divided into a two-thirds construction sample and a one-third hold-back sample. The splitting of the sample was performed as the capitalization on chance in the calculation of the regression weights and in the selection of items for a criterion-keyed scale biases construction sample validity coefficients upwards. Especially in a small sample, the validity correlations for the regression equations and empirically keyed scale may be misleading. The 1/3 hold-back sample provides a method of obtaining unbiased estimates of validity.

The randomization was performed using the random.org random number generator. This generator relies on small changes in the amplitude of atmospheric noise to determine randomization as opposed to algorithms that can be reproduced (Drew & Haahr, 2002). I had the generator create a random sequence of 491 cases, and I determined that the first 164 cases would become the one-third sample.

Data Imputation

For participants who completed more than thirty-three percent of the questions but did not complete all of the questions, data imputation was performed. The most appropriate data imputation procedure for missing data is multiple imputation as this method allows researchers to use plausible values in place of missing items, where the imputed values are less biased estimates and it is possible to reasonably estimate the uncertainty with which parameters are estimated (Graham, Olchowski, & Gilreath, 2007). Multiple imputation is preferable to deletion procedures (such as listwise or pairwise deletion) even with large amounts of missing data due to the great potential for bias; there is possible bias in the sample if the participants who complete all of the data are not representative of the overall sample (Schafer & Olsen, 1998; Myers, 2011). The Graham, Olchowski, & Gilreath, 2007 article suggested that if the sample is missing between 10-30% of the data, 20 imputations should be used. For the sample of participants who completed at least 33% of the items, there was approximately 7% missing data. Twenty imputations were computed to be conservative in the amount of imprecision of the estimates due to too few of imputations.

Factor-Based Scale Development

Prior to employing the factor analysis, each item in the twenty imputations was centered on "4" in order to reduce multicollinearity and increase the real world meaning of the scores (Smith & Sasaki, 1979; Garson, 2012). I examined the factor structure of the 70 variables using exploratory factor analysis. This analysis method did not take the a-priori hypotheses into account. After determining how many factors to extract by examining a scree plot (found in Appendix C), I used a varimax orthogonal rotation. This rotation maximizes the variance of the squared loadings on the orthogonal factors.

Although some pundits (Russell, 2002) suggest that the assumption of uncorrelated factors is unrealistic, an orthogonal rotation which treats the factors as not necessarily highly correlated is suitable in this case as the primary purpose of this research is to predict outcome variables and not to represent the factors faithfully.

In order to perform the factor analysis using multiple imputation, I averaged together each coefficient in the twenty correlation matrices and imported the average correlation matrix into the SPSS statistical software program. The correlations were not transformed into *z*-scores before averaging as suggested by Fisher (1958) because some negative bias in the estimated average seemed more conservative than some positive bias (Schmidt, Oh, & Hayes, 2009; Field, 2005). The means, sample sizes, and standard deviations of the items in the twenty imputations were also averaged together from each of the imputations.

The exploratory factor analysis was conducted in the two-thirds construction sample. Items were deleted if they did not load highly onto a single factor or cross-loaded onto multiple factors. Items were deleted if they loaded below 0.3 on any factor or loaded at least 0.3 across multiple factors. However, on several occasions, items were maintained if they cross-loaded due to their importance for the reliabilities of the dominant factor or due to theoretical reasons. The factor based scales were scored by adding together the scores from the relevant items and reverse scoring the necessary items.

Reliabilities

Alphas were used to describe internal-consistency reliability of the resulting factor-based scales. The internal consistency reliabilities of the one third hold back

sample and the six week follow up sample are based upon the factors determined in the two-thirds construction sample. Internal consistency coefficients can be inflated in the construction sample because item selection may have capitalized on chance; therefore, unbiased internal consistency reliability scores can be found by assessing the reliability of the scales on the cross validation sample.

The test-retest reliability of the scores for the participants who completed the baseline items and six week follow up items was determined by measuring the correlations of the multiple imputed data set with the six week follow up data set. I then compared these values to the correlations of the baseline sample and the six week follow up sample that have been bootstrapped, using 5000 repetitions. Bootstrapping (Efron & Tibshirani, 1993) was also used to measure the test-retest reliability as this method is not reliant on normality or symmetry and is especially beneficial for small to moderate sample sizes. Bootstrapping provides confidence intervals for the correlation coefficients to determine their significance, bias corrected and accelerated confidence intervals were used in this study as these account for bias in the bootstrapped sampling distributions and therefore are an improvement over the percentile confidence intervals (Efron, 1987).

The Bullying or Victimization Measure.

In the surveys, the participants indicated how often they had been victimized within the last year. The questions on this Bullying or Victimization frequency questionnaire can be subdivided into two subscales–a bullying subscale and a victimization subscale. The items include physical victimization, verbal victimization, verbal bullying, relational bullying, online bullying, racial bullying, and sexual bullying. The questions can be found in Appendix B. These questions use a last-year frequency

scale. This scale ranges from 1=less than once in the last year to 6=several times a week over the last year. The scores were then added together to get a total score.

Due to the likelihood of participants not often being victimized and the resulting skewness of the data, this victimization measure was supplemented by a modified variety scale created by scores greater than one being recoded "2". (Hindelang, Hirschi, & Weis, 1981). The variety scales help protect against any one item having too much influence on the total scale score.

In short, scores on the frequency scales are often dominated by high frequency forms of bullying that are often less hurtful. Scores on the variety scales prevent the minor forms of bullying from altering the total score to a large degree.

Validity

The criterion-related validity of a measure pertains to how well the measure predicts the dependent variable, in this case victimization or bullying. The validities of two alternative approaches to forming a predictive composite were examined: regression weighting and unit weighting.

First, after the factors were established in the construction sample, scales based on the factors were correlated with the frequency and variety victimization measures: total victimization, bullying subscale, and victimization subscale. The scales with the highest correlations were then entered into regression equations. The resulting construction-sample regression equations were correlated with the victimization measures in the one-third hold back sample and the six week follow up sample to determine how well the regression equations relate to bullying and victimization in other samples and time points.

Second, unit-weighted composites were correlated with the outcome variables.

Unit weighting was accomplished by standardizing each scale and then adding together the standardized scales that correlated highly with the outcome variables (with each scale having a weight of "1"). This unit weighting equation derived in the construction sample was then correlated with the outcome variables for the one-third hold back sample (i.e., cross-validated; Dorans & Drasgow, 1980) and the six week follow up sample.

In order to determine whether the cutting scores appropriately identify high risk individuals at a substantial level more than chance, kappas were calculated (Cohen, 1960). The cut off values for high risk scores were ≥2 standard deviations on each of the prediction equations; the cutting score for the criterion variables was also 2 standard deviations above the mean. The 2 standard deviations above the mean score is appropriate as a cut off score as only about 5% of the population is likely to have scores above this threshold when variables are approximately normally distributed, a percentage consistent with the literature of people victimized in college cited in the introduction section. Cross tabulations were examined to determine the groupings of scores (i.e. whether high victimization rates matches with high scores from the prediction equations).

Empirically Keyed Scale Development

In order to create a short scale that can be easily administered to students, an empirically keyed scale was also created. This scale used the same one-third, two-thirds, and six week follow up samples as previously described. In order to create the scale, all of the items kept after the creation of the factor based scales were correlated with the victimization scales. Only the items kept after the creation of the factor based scales were used to keep consistency between the items sets used in the development of the two measures. The 14 items with the highest correlations with the three outcome variables

(total victimization, victimization subscale, and the bullying subscale) were added together to compose the new scale. This empirically keyed scale developed in the construction sample was correlated with the outcome variables in the one-third hold back sample and the six-week follow up sample

Reliabilities

The alphas were computed not only in the two-thirds construction sample, but also in the one-third and six week follow up samples to obtain unbiased estimates of the reliability of the scales in samples other than that used to compose it (Cureton, 1950; Locke, 1960; Nunnaly, 1967, pp. 280-281). The retest reliability of scales was ascertained by calculating correlations between scores from the baseline survey with those from the 6-week follow-up.

Validity

I measured the criterion related validity of the scale by correlating the scale with the victimization and bullying measures of the 1/3 sample and the six week follow up sample. Concurrent validity of the measure was assessed by correlating the criterion measures with scores from the regression equations for the factor-based scales and the unit-weighted composites. Kappa was also computed to describe how well the empirically keyed scale predicts who is likely to have high victimization and bullying scores.

Chapter 3: Results

Factor Analysis

Creation of the Factors

The number of factors retained for the factor analysis was determined by examining the flattening of the slope on a scree plot. The scree plot (Appendix C) indicated that the most appropriate number of factors to use for the exploratory factor analysis was seven. The seven factors accounted for 44% of the total variance in the items. Other numbers of factors were also examined but did not make sense theoretically. The results of the rotated factor analysis can be viewed in Table 3. The seven factors will be named: **Factor 1**=Negative Self Perception Scale, **Factor 2**=Hostile Behavior factor, **Factor 3**=Risk Taking factor, **Factor 4**=Ingratiating factor, **Factor 5**=Toughness factor, **Factor 6**=Drugs and Alcohol factor, **Factor 7**=Adaptive Coping factor.

The Negative Self Perception factor consists of items in which the participant views himself/herself or his/her friendship group poorly. Both negative perception of physical attributes or potential are included in this scale. Items with the highest factor loadings include: (a) “I have many positive traits” (reverse scored), (b) “Almost everybody else is better than I,” (c) “I do not know why anybody would like me.”

The Hostile Behavior Factor is composed of items that include the participant acting aggressively or harshly towards others or being prompted to act harshly towards others. Items with the highest loadings on this factor include: (a) “I sometimes threaten people,” (b) “When I get together with my friends, we sometimes threaten others,” (c) “Some people think that I am a bully.”

The Risk Taking Factor includes items where the participant is performing risky

behaviors or contemplating performing these at risk behaviors. Some of these items include: (a) “I enjoy taking risks,” (b) “I find the idea of going to dangerous places exciting,” (c) “I try to avoid risky situations” (reverse scored).

The Ingratiating Factor consists of items that include the participant trying to fit in with a group of people by acting like them or saying things that will make the group happy. Items include: (a) “I often respond to questions with answers that will make others happy,” (b) “I will say or do almost anything to fit in,” (c) “I think it is very important to impress others.”

The Toughness Factor is made up of items where the participant views himself/herself as being imposing or aggressive with others. The items with the highest loadings include: (a) “People see me as tough,” (b) “I am aggressive with others,” (c) “I do not think that I have an imposing presence” (reverse scored).

The Drug and Alcohol factor includes items that portray the participant drinking alcohol or doing drugs or spending time with friends who drink alcohol or do drugs. The items in this factor are: (a) “I often go to parties where there is alcohol,” (b) “People I hang out with enjoy getting drunk and doing drugs,” (c) “I would never go to a bar” (reverse scored.)

The Adaptive Coping factor includes three items where the participant tries to discover the underlying issue creating a problem with someone else. The items are: (a) “I often analyze the roots of my problems with others,” (b) “I try to discover multiple sides to my problems with others,” (c) “I try to discover the sources of my problems with others.”

Table 3

Rotated Factor Matrix

Item	**1**	2	3	4	5	6	7
I have many positive traits	**-.82**	-.04	.04	-.06	.06	.06	.10
Almost everybody else is better than I	**.71**	-.04	-.06	.24	.09	.00	.07
I do not know why anybody would like me	**.70**	.12	-.03	.06	.09	-.06	-.00
I usually feel like a failure	**.70**	.15	.03	.15	.02	-.08	-.04
I am attractive	**-.69**	.02	.08	.03	.08	.09	.01
Not very many people like me	**.67**	.13	.01	.00	.06	-.01	-.01
I do not think that I will ever succeed	**.66**	.07	.08	.07	.00	-.01	-.09
I think that I have the potential to be great	**-.64**	-.08	.12	-.11	.15	-.01	.07
I do not think that I am special	**.63**	-.04	-.04	.00	-.03	.02	-.07
I am strong	**-.60**	-.16	.06	-.03	.37	.14	-.02
I think that I am a good person	**-.47**	-.19	-.04	.13	-.05	.11	.11
People think that I look confident	**-.45**	-.20	.06	-.06	.30	.10	.12
I am slow	**.43**	.20	.07	.15	-.15	.02	.01
People are usually impressed when they see what I can do	**-.40**	-.10	.17	.01	.31	-.04	.07
My friends think that I am physically fit	**-.39**	-.04	.03	.08	.28	.08	-.06
My friends care if I do well in my work	**-.36**	-.22	-.05	.11	-.01	-.05	.07
I am fat	**.33**	.02	.04	.05	.09	.04	.06
I think being true to yourself is an exceptionally important quality	**-.31**	-.17	.06	-.26	.02	.06	.18
I sometimes threaten people	.11	**.68**	.13	.06	.30	-.06	.03
When I get together with my friends, we sometimes threaten others	-.01	**.61**	.02	.08	.16	.15	-.08
Some people think that I am a bully	.22	**.58**	.02	-.05	.15	-.06	.02
My friends vandalize buildings	.06	**.52**	.19	.13	.05	.13	-.00
I have called people hurtful names based on their race or religion	.02	**.49**	-.02	.05	.17	-.04	-.03
People I spend time with have threatened to hurt me	.21	**.47**	.16	.13	-.06	-.05	.07
I sometimes make fun of people online	.01	**.45**	.10	-.05	-.07	-.05	.01
I enjoy spreading false rumors about people	.13	**.44**	.05	.01	-.05	-.12	-.06
My friends often encourage me to lie to others	.13	**.44**	.03	.19	-.09	.12	-.18
I often say things that hurt people's feelings	.26	**.43**	-.01	-.21	.24	-.06	.02
People I hang out with think aggression can be a good way of handling problems.	.07	**.43**	.13	-.01	.07	.17	-.23

I take responsibility for my issues	-.20	**-.42**	.07	-.15	.01	.01	.05
People I hang out with pressure me into stealing objects	.02	**.38**	.09	.06	-.08	.10	.00
I make people at my school do things that they do not want to do	-.00	**.32**	.08	.19	.15	.00	.01
I enjoy taking risks	-.06	.05	**.78**	-.11	.08	.04	-.01
I find the idea of going to dangerous places exciting	.03	.23	**.72**	.01	.08	.02	-.04
I try to avoid risky situations	.01	-.14	**-.62**	.06	-.16	-.16	.17
I am willing to try almost anything at least once	-.03	.00	**.51**	.03	.09	.14	.08
I would hitchhike	.01	.22	**.45**	.08	-.02	-.06	.05
I enjoy going to places that are away from the beaten path	-.05	-.01	**.36**	-.06	.03	.04	.13
I walk alone at night	.00	.11	**.34**	.19	.04	.04	.08
I often respond to questions with answers that will make others happy	.08	.05	-.16	**.59**	-.24	.00	-.10
I will say or do almost anything to fit in	.17	.28	.00	**.55**	-.03	-.01	-.06
I think it is very important to impress others	.01	-.02	.08	**.52**	.17	.08	.02
I wear certain outfits primarily because I think others will like them	.04	.09	.04	**.49**	.04	.13	.03
I am very nervous to express viewpoints contrary to others'	.31	.05	-.18	**.46**	-.22	-.13	-.04
I often do things to make others happy	-.12	-.07	.04	**.40**	-.16	.04	.11
I do certain activities to fit in with a group of people	.09	.26	.12	**.40**	-.05	.07	.07
I almost always respond to questions honestly regardless of what the person wants me to say	-.26	-.18	.07	**-.38**	.14	.07	.17
People see me as tough	-.14	.04	.11	-.03	**.63**	-.04	-.03
I am aggressive with others	.09	.45	.14	-.04	**.51**	.00	-.01
I do not think that I have an imposing presence	.08	-.16	.01	.08	**-.42**	-.09	.06
I try to avoid conflict when possible	-.06	-.11	-.19	.25	**-.34**	.01	.05
I would not back down from a fight	-.01	.15	.21	-.06	**.32**	.02	-.11
I often go to parties where there is alcohol	-.13	.02	.06	.06	.03	**.92**	.02
People I hang out with enjoy getting drunk and doing drugs	-.01	.15	.18	.13	-.05	**.64**	.01
I would never go to a bar	.12	.04	-.11	-.04	-.08	**-.61**	-.03
I often analyze the roots of my problems with others	-.09	-.01	.05	-.10	-.03	.05	**.77**
I try to discover multiple sides to my problems with others	-.06	-.06	.07	.03	-.08	.01	**.73**

I try to discover the sources of my problems with others	-.08	-.09	.07	.08	-.06	.00	**.65**

Note. Extraction Method used Principal Axis Factoring. The Rotation method used varimax with Kaiser normalization.

Reliabilities

The average internal consistency reliabilities of the scales can be found in Table 4. The average reliability scores from the twenty imputations were computed. Reliability scores from the one third sample and the two third sample are reported (along with the six week follow up) for comparison purposes; however, the scores of the one third sample are the most meaningful. The retest correlations for the factor based scores are found in Table 5 and the retest correlations for the individual items are found in Tables 6 and 7 in Appendix D.

The internal consistency reliabilities of the factor-based scales in the one third sample ranged from .63 (toughness factor) to .88 (negative self-perception factor). I consider six of the seven factor-based scales to have acceptable or better internal consistency, while toughness is of questionable homogeneity.

The retest reliability of factor-based scores ranged from .57 to .89. The retest reliability of the Adaptive Coping Factor is the lowest indicating that, in this sample, student responses for this scale are less stable over time than are the scales for the other factors. All of these correlations using both bootstrapping and the multiple imputation data set are significant at the .001 level.

Table 4

Internal Consistency Reliability of the Factor-Based Scales, by Sample

		Baseline			
Factor-based Scale	Number of Items	Average Alpha Whole (*N*=491)	Average Alpha one-third (*n*=164)	Average Alpha two-thirds (*n*= 327)	Average Alpha six week (*N*=74)
Negative Self Perception	18	.89	.88	.89	.92
Hostile Behavior	14	.81	.80	.81	.77
Risk Taking	7	.76	.75	.75	.80
Ingratiating	8	.72	.71	.72	.61
Toughness	5	.63	.63	.62	.62
Drug and Alcohol	3	.77	.76	.77	.77
Adaptive Coping Factor	3	.78	.74	.78	.77

Note. Tabled values are the average across the multiple imputation sets. Six-week = sample of respondents six weeks after baseline.

Table 5

Re-test Reliabilities of Factor-Based Scales

Scale	*Whole BL/6 Week Correlation MI (N=74)*	*Whole BL/6 Week Bootstrapping (5000 repetitions)*			
		Corr.	*SE*	*99% Bca CI LL*	*99% Bca CI UL*
Negative Self Perception	*.87***	.88	.05	.71	.94
Hostile Behavior	*.80***	.80	.04	.67	.90
Risk Taking	*.88***	.89	.03	.80	.94
Ingratiating	*.75***	.74	.05	.55	.86
Toughness	*.68***	.68	.11	.33	.90
Drug and Alcohol	*.87***	*.88*	*.05*	*.69*	*.96*
Adaptive Coping	.57***	.57	.13	.19	.85

Note. Whole BL/6 weeks= items were correlated between the relevant participants on the whole base line data set and the six week follow up dataset. MI=multiple imputed dataset. Bca= bias corrected and accelerated confidence intervals. LL=lower limit. UL=upper limit.
*p<.05, **p<.01, ***p<.001

Descriptive Information and Cut-off Scores for Factor-Based Scales

In addition to providing information to students regarding the likelihood that they

will be bullied or victimized, each scale also provides information regarding student behavior in the area it measures. In order to determine whether a score is worthy to note in clinical applications, cut off scores are helpful in interpreting the results. The means, standard deviations, and recommended clinical ranges of each factor are found in Table 8. These scores are based off of the construction sample. Scores from 1.5-1.99 standard deviations above (or below for adaptive coping) are considered at risk. Scores 2 standard deviations above (or below for adaptive coping) are considered at high risk.

Table 8

Factor Descriptive Information and Risk Ranges in the Construction Sample (n=327)

Factor	Mean	Standard Deviation	Lower than Average	Average	At-Risk	High Risk
Negative Self Perception	46.28	14.38	<24.72	24.72-67.84	67.85-75.03	>75.04
Hostile Behavior	26.63	8.64	<13.54	13.68-39.58	39.59-43.90	>43.90
Risk Taking	26.97	7.53	<15.68	15.68-38.26	38.27-42.02	>42.02
Ingratiating	29.01	6.91	<18.66	18.66-39.37	39.38-42.82	>42.82
Toughness	15.27	4.87	<7.97	7.97-22.57	22.58-25.00	>25.00
Drug and Alcohol	13.98	4.87	<6.69	6.69-21.28	21.29-23.71	>23.71
Adaptive Coping	15.48	3.68	>22.83	22.83-21.0	20.99-9.97	<9.97

Validity

The validity of the scales was partly determined using correlations. The correlations of the predictive scales with each other and the victimization and bullying scales in the construction sample are found in Table 9. The factor-based scales appear at least moderately independent of each other—a desirable feature of a set of candidates for

a predictive regression equation. The factors that correlated the highest with the victimization factors were entered into regression equations. The factors that were not highly correlated with the criterion were not included within the regression equations due to the possibility of multicollinearity. The factors that correlated the highest with the Total Victimization Factor and the Bullying Factor were the: Negative Self Perception Factor, Hostile Behavior Factor, Risk Taking Factor, and Ingratiating Factor. The Negative Self Perception Factor, Hostile Behavior Factor, Risk Taking Factor, and the Toughness Factor correlated highest with the Victimization Factor. The regression equations are found in Appendix E.

The validity of the regression equations and the unit weighted equations in the construction sample are analyzed in Table 10. The table indicates that the scores produced from the linear regression equations account for about 20% of the variance in the Total Victimization Frequency Scale and Bullying Frequency Subscale and about 10% of the variance in the Victimization Frequency Subscale. The scores from the linear regression models also account for between 10-16% of the variance in the outcome variety scales. The Unit Weighted equations have moderate to high correlations with the outcome variables, accounting for 10-18% of the variance in the outcome variety scales. Estimates of shrunken percentages of variance are also shown in Table 10 for the regression equations. These shrinkage estimates are inappropriate, however, as they do not account for the way equation construction capitalized on chance (Dorans & Drasgow, 1980).

The cross validated correlations for the regression equations in the one-third sample and six week follow up outcome variables are found in Table 11. The regression

equations created in the construction sample have mostly moderate to high correlations with the outcome frequency variables in the 1/3 sample, ranging from .25-.47. In most instances, the cross-validation correlations for the unit-weighted composite are higher than those for the regression-weighted composite, ranging from .34 to .49, although the difference is not statistically significant.

The regression equations also have weak to moderate correlations with the frequency outcome variables in the six week dataset using correlations from the multiple imputation dataset (ranging from .25-.34), and the slight superiority of the unit-weighted composite observed in the 1/3 validation sample is again observed in the cross-validation sample (correlations range from .35 to .39). The bootstrapped correlations of the scores for participants who completed items at baseline and the six week follow up are found in Table 12. There were moderate to high correlations using the bootstrapping procedure for this sample (range from .31-.46 for both the regression weighted composite and the unit-weighted composite). The means, confidence intervals, and cut off scores for the regression equations and outcome variables are found in Tables 13 and 14 located in Appendix F.

To determine if the cutting scores I set for these predictive equations place participants in groups at rates greater than chance, kappas are shown in Table 15. In addition to showing the kappas, the chart also shows the valid negative rate, the valid positive rate, the false negative rate, and the false positive rate. The regression equation scores and outcome variable scores were recoded “1” if less than two standard deviations above the mean and “2” if greater than or equal to two standard deviations above the mean.

A score is considered a valid negative when a student scores below two standard deviations above the mean on both the equation and the outcome score. A valid positive occurs when a student scores two standard deviations or above the mean on both the equation and the victimization outcome variable. A score is considered a false negative if the student scores under two standard deviations above the mean on the regression equation but above two standard deviations above the mean for the outcome variable. A false positive occurs when the student scores above two standard deviations above the mean on the regression equation but below two standard deviations above the mean for the outcome variables. Overall, the scales had combined valid negative and valid positive rates at about 90 percent. The scales also had false negative rates between 3 and 12 percent and false positive rates between 1 and 3 percent. The numbers for each group can be found in Tables 16-27 in Appendix G.

Table 9

Factor-Based Scale Correlations in Construction Sample

Factors	1	2	3	4	5	6	7	8	9	10
Bullying Subscale	1.00** 275	.49** 275	.96** 275	.43** 275	.23** 275	.11 275	.17** 275	.05 275	.09 275	.09 275
Victimization Subscale	.49** 275	1.00** 275	.72** 275	.20** 275	.23** 275	.19** 275	.09 275	.13* 275	.04 275	-.02 275
Total Victimization	.96** 275	.71** 275	1.00** 275	.41** 275	.26** 275	.15* 275	.17** 275	.08 275	.09 275	.07 275
Negative Self Perception	.43** 275	.20** 275	.41** 275	1.00** 327	.29** 327	-.04 327	.27** 327	-.10 327	-.13* 327	-.14* 327
Hostile Behaviors	.23** 275	.23** 275	.26** 275	.29** 327	1.00** 327	.26** 327	.23** 327	.34** 327	.07 327	-.12* 327
Risk Taking	.11 275	.19** 275	.15* 275	-.04 327	.26** 327	1.00** 327	.02 327	.28** 327	.21** 327	.08 327
Ingratiating	.17** 275	.09 275	.17** 275	.27** 327	.23** 327	.02 327	1.00** 327	-.17** 327	.09 327	-.05 327
Toughness	.05 275	.13* 275	.08 275	-.10 327	.34** 327	.28** 327	-.17** 327	1.00** 327	.07 327	-.11 327
Drugs and Alcohol	.09 275	.04 275	.09 275	-.13* 327	.07 327	.21** 327	.09 327	.07 327	1.00** 327	.05 327
Adaptive Coping	.09 275	-.02 275	.07 275	-.14* 327	-.12* 327	.08 327	-.05 327	-.11 327	.05 327	1.00** 327

Note. Sample size of outcome scales=275. Correlations are averages of those observed in multiple imputations. Sample size of predictive items=327.

*p<.05, **p<.01

Table 10

*Validity of Prediction Equations in the Construction Sample (*n=275*)*

Equation	R^2	Adj. R^2	Correlation
Linear regression for Total Victimization (Frequency)	.20	.19	
Linear regression for Bullying Factor (Frequency)	.21	.19	
Linear regression for Victimization Factor (Frequency)	.10	.08	
Standardized unit weighting for Total Victimization (Frequency)			.40*
Standardized unit weighting for Bullying Factor (Frequency)			.38*
Standardized unit weighting for Victimization Factor (Frequency)			.30*
Linear Regression for Total Victimization (Variety)	.10	.08	
Linear Regression for Bullying Factor (Variety)	.16	.15	
Linear Regression for Victimization (Variety)	.12	.11	
Standardized unit weighting for Total Victimization (Variety)			.42*
Standardized unit weighting for Bullying Factor (Variety)			.36*

Standardized unit weighting for Victimization Factor (Variety)		.31*

*p<.001

Table 11

Validation Sample Correlations Between Composite Predictors and Outcome Variables

Predictor Composite	1/3 sample (n=140)	BL predicting 6 week sample (n=74)
Linear regression for Total Victimization (Frequency)	.47***	.29*
Linear regression for Bullying Factor (Frequency)	.46***	.25
Linear regression for Victimization Factor (Frequency)	.31***	.34**
Standardized Unit Weighting for Total Victimization (Frequency)	.49***	.39**
Standardized Unit Weighting for Bullying Factor (Frequency)	.49***	.36**
Standardized Unit Weighting for Victimization Factor (Frequency)	.34**	.35**
Linear Regression for Total Victimization (Variety)	.25**	.38**
Linear Regression for Variety Bullying Factor (Variety)	.39***	.29*
Linear Regression for Variety Victimization Factor (Variety)	.43***	.32**
Standardized Unit Weighting for Total Victimization (Variety)	.48***	.34**

Standardized Unit Weighting for Bullying Subscale (Variety)	.45***	.30**
Standardized Unit Weighting for Victimization Subscale (Variety)	.34***	.37**

*p<.05, **p<.01, ***p<.001

Table 12

Bootstrapped Correlations between Whole Data BL and 6 Week Follow Up (n=74)

	Whole BL/6 Week Bootstrapping (5000 repetitions)			
Equations	*Corr.*	*SE*	*95% Bca CI LL*	*95% Bca CI UL*
Linear regression for Total Victimization (frequency)	.36	.09	.16	.54
Linear regression for Bullying Factor (frequency)	.38	.10	.19	.57
Linear regression for Victimization Factor (frequency)	.46	.09	.26	.62
Standardized unit weighting for Total Victimization (frequency)	.34	.08	.15	.49
Standardized unit weighting for Bullying Factor (frequency)	.37	.08	.21	.53
Standardized unit weighting for Victimization Factor (frequency)	.46	.09	.27	.62
Linear Regression for Total Victimization (Variety)	.34	.10	.12	.53
Linear Regression for Bullying Factor (Variety)	.31	.11	.10	.51
Linear Regression for Victimization Factor (Variety)	.42	.10	.21	.60
Standardized unit weighting for Total Victimization (Variety)	.31	.10	.08	.49
Standardized unit weighting for Bullying Factor (Variety)	.32	.09	.13	.50

Standardized unit weighting for Victimization Factor (Variety)	.43	.10	.23	.60

Note. Confidence intervals not containing zero are considered significant. Whole BL/6 weeks= equations were correlated between the relevant participants on the whole base line data set and the outcome variables from the six week follow up dataset. Correlations are between the equation score and the designated outcome variable score in the equation. Corr=correlations. SE=standard errors. Bca= bias corrected and accelerated confidence intervals. LL=lower limit. UL=upper limit.

Table 15

Predictions Using Equations in 1/3 Sample (n=140)

Equation	Kappa	Valid Negative (percent)	Valid Positive (percent)	False Negative rate (percent)	False Positive rate (percent)
Unit Weighted Equation for Total Victimization (frequency)	.15*	92	1	6	1
Unit Weighted Equation for Bullying Subscale (frequency)	.16*	93	1	6	1
Unit Weighted Equation for Victimization Subscale (frequency)	.23**	95	1	3	1
Regression Equation for Total Victimization (frequency)	.26**	91	1	6	1
Regression Equation for Bullying Subscale (Frequency)	.28**	92	1	5	1

Regression Equation for Victimization Subscale (Frequency)	.23**	95	1	3	1
Unit Weighted Equation for Total Victimization (Variety)	-.03	89	0	10	1
Unit Weighted Equation for Bullying Subscale (Variety)	-.02	92	0	6	1
Unit Weighted Equation for Victimization Subscale (Variety)	-.02	96	0	3	1
Regression Equation for Total Victimization Variety	17*	88	1	9	2
Regression Equation for Bullying Subscale Variety	.10	91	1	6	3
Regression Equation for Victimization Subscale Variety	.15*	86	1	12	1

*p<.05, **p<.01

Empirically Keyed Method

Scale Development

The scale was created in the two-third construction sample by correlating all of the items maintained after the factor based scale creation with the three victimization

measures. The 14 items with the highest correlations among all three of the outcome measures were added together to create the scale; the items with negative correlations were reversed scored. The correlations among the items and outcome variables are found in Table 28 in Appendix H. The cutoff scores for the scale can be found in Table 29 and are based on the construction sample.

Reliability

The average construction sample alpha of the scale was .82. The retest reliability of the scale was found by correlating the score of the empirically keyed scale of the relevant items in the baseline sample and the six week follow up sample. The retest reliability was determined both by using the multiple imputed dataset and a bootstrapped sample and can be found in Table 30. The retest reliability correlation of .9 indicates that the scale has strong test-retest reliability.

Validity

The criterion-related validity of the scale was determined by correlating the empirically keyed scale with the victimization and bullying outcome variables, both frequency- and variety-type scales. Furthermore, the correlations were performed with both the multiple imputed data and a bootstrapped dataset (with the 6 week follow-up sample). The bootstrapped data were expected to provide a better estimate of the correlations between the baseline empirically keyed scale and the six week follow up sample as this method better accounts for skewed data and small sample sizes. The results of these correlations can be found in Tables 31 and 32. The correlations between the empirically keyed scale and the outcome variables in the cross validation sample ranged from .19 to .48. The regression equations correlated higher with the Total

Victimization and Bullying Subscale scores than the Victimization Subscale. The empirically keyed scale had moderate correlations, ranging from .33-.41, with the outcome measures in the six week follow up sample.

To determine how well scores classified as "High Risk" on the empirically keyed scale identified those with the classification of "High" on the victimization or bullying outcomes, kappas were computed. The kappas, "valid negative percentage," "valid positive percentage," "false negative percentage," and "false positive percentage" can be found in Table 33. The numbers in each group can be found in Tables 34-39 in Appendix I. The combined valid negatives and valid positives was around 90% for each outcome variable, the false negative percentage ranged from three to nine percent, and the false positive percentage ranged from three to four percent. Similarly to the equations from the factor based scale, the empirically keyed scale did a poor job of predicting who is likely to get victimized.

The concurrent validity of the scale was assessed by correlating the empirically keyed scale and the regression equations of the factor based scales in the one-third sample. The results of these correlations are found in Table 40. The correlations ranged from .61-.90 showing strong concurrent validity with the factor based equations. Of course, one reason these correlations are high is that the same items are found in both types of scales.

Table 29

Cutoff Scores for the Empirically Keyed Scale on the Construction Sample (n=327)

Mean	Standard Deviation	Lower than Average	Average	At-Risk	High Risk

33.08	10.29	<7.65	7.65-48.51	48.52-53.65	>53.65

Table 30

Re-test Reliability of the Empirically Keyed Scale

BL/6 Week Pearson Correlation MI (N=74)	*BL/6 Week Bootstrapping (5000 repetitions)*			
	Corr.	*SE*	*95% Bca CI LL*	*95% Bca CI UL*
*.90**	*.90*	*.03*	*.84*	*.94*

Note. MI=multiple imputed data set. Whole BL/6 weeks= items were correlated between the relevant participants on the whole base line data set and the six week follow up dataset. Corr=correlation. SE=standard error. Bca=bias corrected and accelerated confidence intervals. LL=lower limit. UL=upper limit.
*p<.001

Table 31

Criterion-Related Validity of the Empirically Keyed Scale

Outcome Variable	Construction (n=275)	Validation (n=140)	Six Week Follow-Up (n=74)
Total Victimization (Frequency)	.49***	.46***	.36**
Bullying Scale (Frequency)	.48***	.48***	.33**
Victimization Scale (Frequency)	.32*	.19*	.34**
Total Victimization (Variety)	.44***	.38***	.41***
Bullying Scale (Variety)	.40***	.36***	.35**
Victimization Scale (Variety)	.29**	.28***	.35**

*p<.05, **p<.01, ***p<.001

Table 32

Predictive Validity of the Empirically Keyed Scale Using Bootstrapping (n=74)

Factor being correlated with BL empirically keyed item	Whole BL/6 Week Bootstrapping (5000 repetitions)			
	Corr.	SE	95% Bca CI LL	95% Bca CI UL
Six Week Total Frequency Victimization	.41	.10	.21	.59
Six Week Frequency Bullying Scale	.43	.10	.22	.62
Six Week Frequency Victimization Scale	.34	.12	.10	.57
Six Week Total Victimization (Variety)	.37	.10	.156	.559
Six Week Bullying Scale (Variety)	.36	.11	.14	.57
Six Week Victimization Scale (Variety)	.34	.12	.10	.56

Note. Confidence intervals not containing zero are considered significant. Whole BL/6 weeks= items were correlated between the relevant participants on the whole base line data set and the six week follow up dataset. MI=multiple imputed data set. Corr=correlation. SE=standard error. Bca=bias corrected and accelerated confidence intervals. LL=lower limit. UL=upper limit.

Table 33

Predictions Using Empirically Keyed Scale on 1/3 Data Set (n=140)

Equation	Kappa	Valid Negative (percent)	Valid Positive (percent)	False Negative rate (percent)	False Positive rate (percent)
Empirically Keyed Equation for Total Victimization (frequency)	.21*	90	1	6	3
Empirically Keyed Equation for Bullying Subscale (frequency)	.23**	91	1	5	3

Empirically Keyed Equation for Victimization Subscale (frequency)	-.04	92	0	4	4
Empirically Keyed Equation for Total Victimization (variety)	.04	86	1	9	4
Empirically Keyed Equation for Bullying Subscale (variety)	.09	90	1	6	4
Empirically Keyed Equation for Victimization Subscale (variety)	-.04	93	0	3	4

*p<.05, **p<.01

Table 40

*Concurrent Correlations between the Empirically Keyed Scale and the Other Prediction Methods in the 1/3 Sample (*n=*164)*

Prediction Equation	**Correlation**
Unit Weighted Total Victimization	.67*
Unit Weighted Bullying Subscale	.67*
Unit Weighted Victimization Subscale	.68*
Regression Equation Total Victimization (Frequency)	.89*
Regression Equation Bullying Subscale (Frequency)	.90*
Regression Equation Victimization Subscale (Frequency)	.76*
Regression Equation Total Victimization (Variety)	.82*
Regression Equation Bullying Subscale (Variety)	.88*
Regression Equation Victimization Subscale (Variety)	.61*

*p<.001

Chapter 4: Discussion

Factor Structure of Potential Predictive Items

This study provides information about how specific factors relate to bullying and victimization and how different methods may improve upon the development of prediction devices. As predicted, the items represented seven distinct factors after factor analysis. But these factors were somewhat different than hypothesized. The seven rotated factors were interpreted as follows: Negative Self Perception, Hostile Behaviors, Risk Taking Behaviors, Ingratiating Behavior, a Toughness factor, a Drug and Alcohol factor, and an Adaptive Coping Strategies factor.

The physical appearance items did not hang together as predicted. Many of these items such as "I am fat," "I am strong," and "I am attractive" became incorporated in the Negative Self –Perception factor suggesting that how a person views his/her physical appearance is highly tied to his/her self –concept and self –esteem.

The negative friendship items also did not hang together as predicted. Many of these items had loadings on the Hostile Behavior factor or the Negative Self- Perception factor. This suggests that the negative friendship group itself is not a homogeneous construct but contributes to whether a person is hostile to others. Examples of items that were predicted to be part of a homogeneous negative friendship group but became incorporated in the Hostile Behavior factor include: "People I hang out with think aggression can be a good way of handling problems," "My friends often encourage me to lie to others," and "People I hang out with pressure me into stealing objects."

Furthermore, the items dealing with drug and alcohol use did not hang together as part of the Risk Taking factor as predicted but instead became part of a separate

homogenous group. This suggests that drug and alcohol use have more in common with each other than they have with other forms of risk taking.

Correlations of Potential Predictors with Bullying and Victimization

The set of scales can provide information about how the students perform on each of the victimization and bullying related factors. My a priori hypotheses predicted that each of the factors would be significantly correlated with the three outcome variables. These hypotheses were not all supported. The three factors that appear to be most highly related to both victimization and being bullied are Negative Self-Perception, Hostile Behavior, and Risk Taking. The negative relationship between these factors and the bullying and victimization outcome variables is consistent with previous research by Olweus, M. R. Gottfredson, and Ma suggesting that people who think badly about themselves, put themselves in dangerous situations, or are aggressive with others are more likely to be the recipient of aggressive attacks or bullying.

The Ingratiating factor appears to be positively correlated with being bullied (opposite the direction hypothesized; Table 9.) Therefore, the more a person performs behaviors to try to fit in or impress others instead of being true to him/herself, the more he/she is likely to be bullied. This finding is in contrast to research by Drury et al. and Harvey et al. who found that people who try to ingratiate themselves to others were less likely to be ridiculed by students regarding gender norms or by bosses in the workplace respectively. In this study, questions regarding trying to fit in with others were not geared towards gender norms specifically, and it may be that gender norms is a specialized context in which trying to fit in with other people may reduce bullying or victimization.

Being tough and not wanting to back down from a fight is positively correlated

with being victimized (but not bullying). Adaptive Coping and Drug and Alcohol use were not significantly correlated with either victimization or bullying in the present samples. The non-significant results were surprising as several studies (including those by Andreou and Treno et al.) have found relationships between adaptive coping or drug and alcohol use and victimization. In this study, both the Adaptive Coping and the Drug and Alcohol Use factors retained three items after the factor analysis. It may be that these items did not fully capture the intended constructs and that more nuanced items may need to be included in future research to help differentiate victims from non-victims.

Reliability of Factor Based Scales

The internal consistency reliability coefficients for the factor-based scales ranged from .63 (Toughness) to .88 (Negative Self-Perception) indicating that six of the seven scales adequately measure homogeneous latent factors, even on different samples than on which they were created. The reliability of the Toughness scale is lower than desired; however, reliability depends upon the sample of people taking a measure. Therefore, administering the measure to a sample of participants more diverse with respect to toughness than in the present sample could result in a higher reliability estimate.

Bootstrapping

The bootstrapping method was used in conjunction with a bivariate correlation of the multiply imputed data to ascertain the retest reliability of the measures as this method was expected to be less affected by skewness and smaller sample sizes than other methods. The retest correlations for all of the factor-based scales ranged from .57 (99% CIs .19-.85) to .89 (99% CIs .80-.94) and were similar on both the multiple imputed dataset and when using bootstrapping. These scores indicate that the sample participants

answered the items similarly at the baseline and six week follow-up.

Validity of Prediction Devices Using Regression versus Unit Weights

My a-priori hypothesis that unit weighted equations would produce higher cross validated validity correlation scores than the cross validated validity correlation scores of the regression weighted equations was based upon research by Wainer (1976) and Einhorn and Hogarth (1975). In this study, on both the factor based scales and the empirically keyed scale, the unstandardized linear regression weights and unit weighting produced similar results in determining the validity of the scales. There were few patterns where one method better predicted a particular outcome measure. As previous research suggests, both methods appear to be reasonable methods to determine criterion-related validity. Therefore, unit weighted composites may be appropriate when using a small sample size or if there is limited opportunity to develop regression weights.

Comparison of Variety and Frequency Outcomes

The research study also sought to determine whether testing the criterion validity of the factor based scales and the empirically keyed scale against an outcome variety scale (as suggested by Hindelang, Hirschi, & Weis, 1981) produced higher validity correlation scores as compared to testing the criterion validity against a frequency outcome measure.

On several occasions, the variety and frequency measures produced similar correlations with the regression equations or empirically keyed scale (Table 11). However, the regression equations predicting the frequency outcome measure produced higher kappas suggesting that the regression equations predicting the frequency outcomes are more accurate in determining whether a student will be at high risk for victimization

(Table 15).

Empirically Keyed Scale

The empirically keyed scale was developed by correlating each of the items left after the factor analysis with the outcome measures and then adding together the items with the highest correlations. This fourteen-item measure had a surprisingly high internal consistency of .82 and a high retest reliability coefficient of .90 (95% Confidence intervals ranging from .84-.94). The scale also had medium to strong correlations with the frequency six-week follow-up outcome measures (correlations ranging from .34 to .43) and variety six-week follow-up outcome measures (correlations ranging from .34-.37) supporting hypothesis 11. The empirically keyed scale had high correlations with the regression equations and unit-weighted equations, supporting hypothesis 10. The empirically keyed scale also did a comparable job to the regression equations at predicting who will get victimized and bullied (as evidenced by the kappa scores and valid negative rates) and therefore may have implications for future research on determining people likely to be victimized. However, the homogenous factor based scales are more interpretable and easier to explain to students if using the scales as preliminary prevention questionnaires.

Efficiency of Cutting Scores

Cohen's kappa was used to assess the agreement between risk classification based on the prediction devices and actual victimization. Participants were likely to have low total victimization and bullying factor scores if they had low regression equation scores (as predicted). However, the regression equations did a poor job of predicting whether a participant will have high victimization scores at a level greater than chance. The

equations produced low valid positive rates, which were generally equaled or doubled or more by the obtained false positive rates. The valid positive rates were (between zero and one percent) and false negative rates between 3 and 12 percent. Overall, the equations correctly predicted the bullying or victimization level of the participants at a rate around 90 percent, a rate slightly lower than the base rate of 95%.

Conclusions, Inferences, Implications

Identification of High-Risk Persons. Overall, with this sample, the equations produced in the construction samples correlated similarly with the outcome variables on the construction and validation samples. However, even though the correlations between the equations and outcome variables are often moderate to high, the low valid positive rate and often low kappas suggest that the factor based scales and the empirically keyed scale will have minimal ability to predict who is likely to have high victimization rates. One possible reason for the low positive valid rate is the criteria of classifying significant victimization as two standard deviations or greater above the mean. Future research may want to discover the effect of changing the criteria for high victimization. This research is another demonstration of the difficulty of attempting to predict low base rate phenomena. In retrospect setting the cutting scores at two standard deviations above the mean was likely too high in part because of the marked positive skew in the bullying and victimization.

Etiology of Victimization and Bullying. Whether or not it is useful to predict the specific individuals who will be victimized and bullied, the battery may be used to provide more information regarding the causes of present bullying or victimization as the factor based scales had high internal consistency. This research demonstrated that the three factors

that produced the highest correlations with being bullied or victimized are negative self-esteem, risky behaviors, and hostile behaviors. Potentially, schools or other organizations may wish to use the questionnaires as prediction devices to better determine who may benefit from increased attention; the schools may wish to provide early prevention interventions to help increase a student's self-esteem or reduce their risky or hostile behaviors if deemed appropriate.

Limitations and Future Directions

The primary limitation of the present research is that there was a high level of initial non-response and subsequent attrition in the sample, especially between the baseline and six week follow up. This attrition was due to participants not participating in the six week follow up and difficulty with pairing some of the scores from the baseline and six week follow up samples. Given the poor response rates, the sample still may not be reflective of the university population as a whole. The inventory might be administered to additional students in the future to determine how well the scale predicts the victimization and bullying of students under a variety of different circumstances and different ages. The scale should also be examined with different racial groups to determine whether personal risks to victimization differ by group.

Future research should attempt to discover more and better variables that predict victimization. Two of the factors (drugs and alcohol and adaptive coping) did not significantly correlate with the outcome variables. Additionally, this research did not seek to determine whether an oblique rotation or an orthogonal rotation better works in predictor development against a criterion; new empirical research comparing use of the two rotation types should be conducted to learn if investigators make different scale

construction decisions with implications for usefulness in practical prediction applications when using the two approaches.

Ethical Issues and Potential Victim Harm

When discussing the results of the surveys with students, effort should be made to not harm the victim further by blaming him/her for the victimization. Research by Shana Maier (2008) details how victims of trauma (especially rape) may experience re-victimization by being blamed for the trauma by people in authority (i.e. doctors or police). The blame and stigmatization are likely to make the victim not want to report being raped or victimized in the future.

Therefore, results are best used either for research purposes or potentially to predict future bullying or victimization. When combined with results from previous research, the identification of factors associated with bullying or victimization may provide further information on methods to help foster the development of protective factors for students or decrease potential risk factors.

Appendix A: Items in Factors

Negative Self Perception Factor

X 2 I think that I am a good person. Rev

X 6 I am fat.

X 7 My friends care if I do well in my work. Rev

X 9 I do not think that I am special.

X 13 I am strong. Rev

X 16 I do not know why anybody would like me.

X 20 I am attractive. (rev)

X 23 I usually feel like a failure.

X 30 Almost everybody else is better than I.

X 32 I think being true to yourself is an exceptionally important quality. Rev

X 34 I am slow.

X 37 I have many positive traits. (rev)

X 41 People think that I look confident. Rev

X 44 People are usually impressed when they see what I can do. Rev

X 51 Not very many people like me.

X 55 My friends think that I am physically fit. Rev

X 58 I think that I have the potential to be great. Rev

X 65 I do not think that I will ever succeed.

Hostile Behavior Factor

X 5 I make people at my school do things that they do not want to do.

X 12 I often say things that hurt people's feelings.

X 14 People I hang out with think aggression can be a good way of handling problems.

X 15 I take responsibility for my issues. Rev

X 21 My friends often encourage me to lie to others.

X 26 I sometimes make fun of people online.

X 28 People I hang out with pressure me into stealing objects.

X 33 I enjoy spreading false rumors about people.

X 35 My friends vandalize buildings.

X 40 I have called people hurtful names based on their race or religion.

X 42 People I spend time with have threatened to hurt me.

X 47 I sometimes threaten people.

X 56 When I get together with my friends, we sometimes threaten others.

X 61 Some people think that I am a bully.

Risk Taking Factor

X 10 I try to avoid risky situations. Rev

X 17 I enjoy taking risks.

X 24 I enjoy going to places that are away from the beaten path.

X 31 I find the idea of going to dangerous places exciting.

X 45 I walk alone at night.

X 59 I would hitchhike.

X 66 I am willing to try almost anything at least once.

Ingratiating Factor

X 4 I almost always respond to questions honestly regardless of what the person wants me to say. Rev

X 11 I often respond to questions with answers that will make others happy.

X 18 I often do things to make others happy.

X 25 I think it is very important to impress others.

X 39 I will say or do almost anything to fit in.

X 53 I am very nervous to express viewpoints contrary to others'.

X 60 I do certain activities to fit in with a group of people.

X 67 I wear certain outfits primarily because I think others will like them.

Toughness Factor

X 19 I try to avoid conflict when possible. Rev

X 48 People see me as tough.

X 54 I would not back down from a fight.

X 68 I am aggressive with others.

X 69 I do not think that I have an imposing presence. Rev

Drugs and Alcohol Factor

X 3 I often go to parties where there is alcohol.

X 38 I would never go to a bar. Rev

X 49 People I hang out with enjoy getting drunk and doing drugs.

Adaptive Coping Factor

X 1 I try to discover the sources of my problems with others.

X 50 I often analyze the roots of my problems with others.

X 57 I try to discover multiple sides to my problems with others.

Dropped Questions

X 8 I plan out steps to solve my problems.

X 22 I accept blame for my problems with others.

X 27 I am small. Rev

X 29 I seek out people that I have issues with to confront them.

X 36 I try to ignore problems that I have with others.

X 43 I sometimes take my own problems out on my friends or family.

X 46 I often view other people's opinions to be more important than my own.

X 52 I would never go home with a stranger. Rev

X 62 People think that I am weak. Rev

X 63 My friends would be disappointed in me if I got in trouble at school. Rev

X 64 I often hold grudges towards people who have wronged me.

X 70 My friends are positive influences on me. Rev

Appendix B: Victimization and Bullying Measure

Victimization and Bullying measure

Victimization Subscale

1. Someone stole something worth less than $5.00 from you?
2. Someone stole something worth more than $5.00 from you?
3. Someone physically attacked you and hurt you.
4. Someone threatened you with a beating.
5. Someone threatened you with a knife or gun.

Bullying Subscale

1. I was left out of things, excluded, or ignored.
2. I was made fun of or teased in a harmful way.
3. I was called names based upon my race, color, or religion.
4. I was made fun of online.
5. I was called hurtful names with a sexual meaning.

Appendix C: Scree Plot

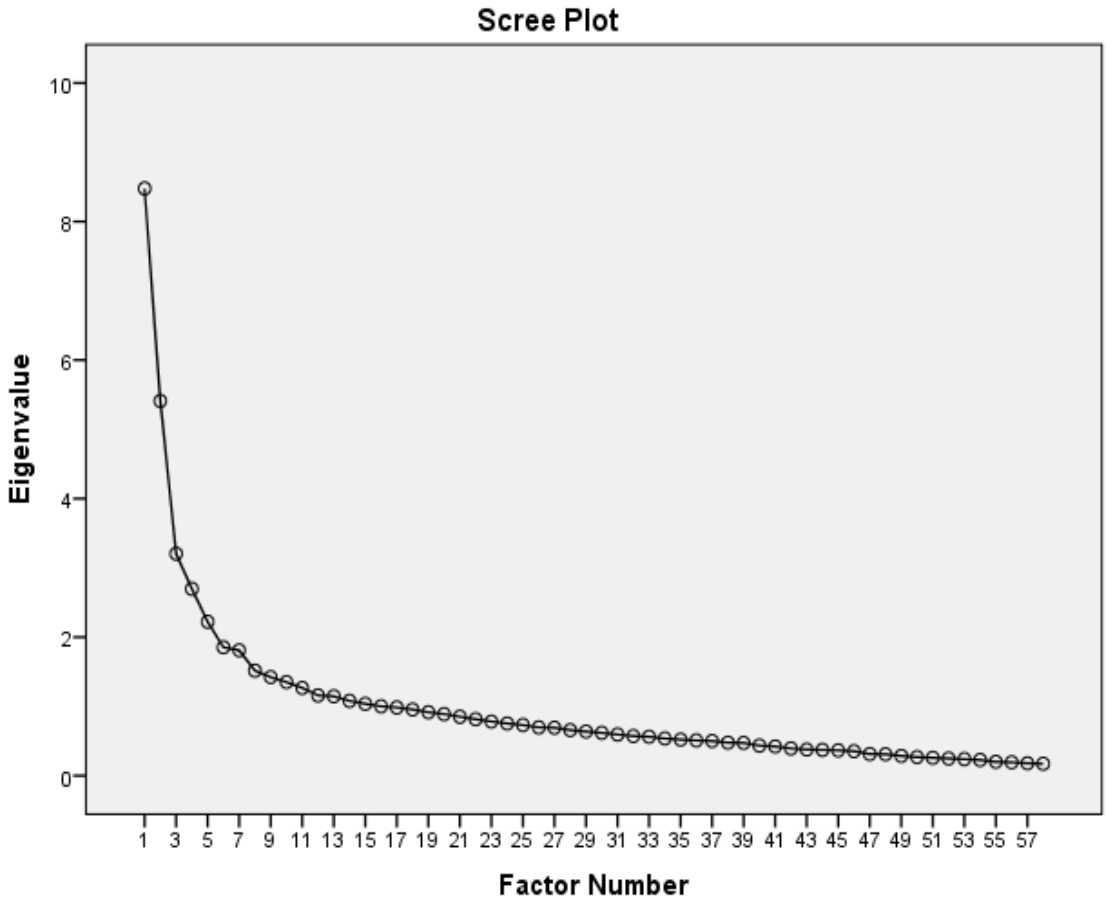

Figure 2. Scree plot of Factor Analysis.

Appendix D: Re-test Reliability of Items

Table 6

Re-test Reliability of Items

Item	*Whole BL/6 Week Pearson Correlation MI (N=74)*	*Whole BL/6 Week Bootstrapping (5000 repetitions)*			
		Corr.	*SE*	*99% Bca CI LL*	*99% Bca CI UL*
I try to discover the sources of my problems with others.	*.51***	*.51*	*.11*	*.19*	*.78*
I think that I am a good person	*.67***	*.67*	*.07*	*.43*	*.84*
I often go to parties where there is alcohol.	*.91***	*.92*	*.03*	*.83*	*.97*
I almost always respond to questions honestly regardless of what the person wants me to say	*.65***	*.65*	*.07*	*.42*	*.80*
I make people at my school do things that they do not want to do.	*.53***	*.53*	*.14*	*.17*	*.78*
I am fat.	*.74***	*.74*	*.08*	*.45*	*.91*
My friends care if I do well in my work.	.49***	.49	.08	.27	.69
I do not think that I am special.	.70***	.70	.07	.48	.85
I try to avoid risky situations.	.76***	.76	.05	.58	.88
I often respond to questions with answers that will make others happy.	.48***	.48	.11	.18	.72
I often say things that hurt people's feelings.	.56***	.56	.09	.29	.77
I am strong.	.67***	.67	.07	.45	.83
People I hang out with think aggression can be a good way of handling problems.	.62***	.62	.10	.32	.82

I take responsibility for my issues.	.52***	.52	.13	.17	.80
I do not know why anybody would like me.	.69***	.69	.11	.37	.89
I enjoy taking risks.	.74***	.74	.06	.55	.89
I often do things to make others happy.	.50***	.51	.11	.23	.75
I try to avoid conflict when possible.	.48***	.48	.11	.17	.76
I am attractive.	.83***	.83	.05	.70	.93
My friends often encourage me to lie to others.	.53***	.53	.10	.27	.76
I usually feel like a failure.	.68***	.68	.07	.45	.84
I enjoy going to places that are away from the beaten path.	.73***	.73	.08	.46	.89
I think it is very important to impress others.	.64***	.64	.08	.38	.82
I sometimes make fun of people online.	.57***	.57	.09	.31	.77
People I hang out with pressure me into stealing objects.	.63***	.63	.20	.13	.88
Almost everybody else is better than I.	.75***	.75	.07	.53	.89
I find the idea of going to dangerous places exciting.	.81***	.81	.05	.667	.91
I think being true to yourself is an exceptionally important quality.	.52***	.52	.13	.21	.81
I enjoy spreading false rumors about people.	.54***	.55	.12	.21	.778
I am slow.	.74***	.74	.07	.55	.88
My friends vandalize buildings.	.71***	.71	.15	.15	.96
I have many positive traits.	.80***	.80	.07	.54	.92
I would never go to a bar.	.72***	.73	.10	.41	.93
I will say or do almost anything to fit in.	.57***	.57	.12	.22	.83

I have called people hurtful names based on their race or religion.	.62***	.62	.10	.32	.85
People think that I look confident.	.74***	.74	.07	.53	.86
People I spend time with have threatened to hurt me.	.61***	.63	.09	.39	.85
People are usually impressed when they see what I can do.	.51***	.51	.10	.22	.73
I walk alone at night.	.65***	.65	.07	.45	.81
I sometimes threaten people.	.65***	.65	.09	.35	.87
People see me as tough.	.65***	.65	.07	.44	.82
People I hang out with enjoy getting drunk and doing drugs.	.73***	.73	.07	.53	.88
I often analyze the roots of my problems with others.	.43***	.43	.11	.10	.69
Not very many people like me.	.81***	.82	.05	.66	.92
I am very nervous to express viewpoints contrary to others'.	.68***	.68	.06	.50	.82
I would not back down from a fight.	.62***	.62	.08	.39	.79
My friends think that I am physically fit.	.80***	.81	.05	.65	.91
When I get together with my friends, we sometimes threaten others.	.35**	.35	.13	.01	.70
I try to discover multiple sides to my problems with	.50***	.49	.12	.15	.74

others.					
I think that I have the potential to be great.	.71***	.72	.09	.43	.87
I would hitchhike.	.67***	.68	.10	.34	.88
I do certain activities to fit in with a group of people.	.57***	.56	.08	.31	.75
Some people think that I am a bully.	.59***	.60	.10	.31	.82
I do not think that I will ever succeed.	.59***	.60	.12	.26	.83
I am willing to try almost anything at least once.	.74***	.74	.06	.58	.86
I wear certain outfits primarily because I think others will like them.	.57***	.57	.09	.33	.76
I am aggressive with others.	.67***	.68	.11	.32	.90
I do not think that I have an imposing presence.	.59***	.61	.09	.35	.79

Note. Confidence intervals not containing 0 are considered significant. Whole BL/6 weeks= items were correlated between the relevant participants on the whole base line data set and the six week follow up dataset. MI=multiple imputed data set. Bca= bias corrected and accelerated confidence intervals. LL=lower limit. UL=upper limit.
*p<.05, **p<.01, ***p<.001

Table 7

Re-test Reliability of Victimization Items

Item	*Whole Victimization BL/6 Week Pearson Correlation MI (N=74)*	*Whole Victimization BL/6 Week Bootstrapping (5000 repetitions)*			
		Corr.	*SE*	*99% Bca CI LL*	*99% Bca CI UL*
Someone stole something worth less than $5.00 from you?	*.60**	*.61*	*.11*	*.27*	*.84*
Someone stole	*.60**	*.61*	*.15*	*.09*	*.89*

something worth more than $5.00 from you?					
Someone physically attacked you and hurt you.	*.07*	*.07*	*.14*	*-.13*	*.48*
Someone threatened you with a beating.	*.54**	*.54*	*.12*	*.20*	*.81*
Someone threatened you with a knife or gun.	*.70**	*.70*	*.16*	*.36*	*1.00*
I was left out of things, excluded, or ignored.	*.76**	*.77*	*.06*	*.59*	*.88*
I was made fun of or teased in a harmful way.	.72*	.72	.08	.47	.89
I was called names based upon my race, color, or religion.	.52*	.59	.17	.15	.91
I was made fun of online.	.83*	.84	.10	.48	.98
I was called hurtful names with a sexual meaning.	.19	.53	.12	.19	.80

Note. Confidence intervals not containing 0 are considered significant. Whole BL/6 weeks= items were correlated between the relevant participants on the whole base line data set and the six week follow up dataset. MI=multiple imputed data set. Bca= bias corrected and accelerated confidence intervals. LL=lower limit. UL=upper limit.
*p<.001

Appendix E: Regression and Unit Weighted Equations

1) **Standardized unit weighting on Total Victimization Scale (Frequency and Variety)**

Y= (*z*_Negative self-perception) + *(z*_Hostile behavior) + (*z*_Risk taking) + (*z*_Ingratiating)

2) **Standardized unit weighting on Bullying Subscale (Frequency and Variety)**

Y= (*z*_Negative self-perception) + (*z*_Hostile behavior) + (*z*_Risk taking) + (*z*_Ingratiating)

3) **Standardized unit weighting on Victimization Subscale (Frequency and Variety)**

Y= (*z*_Negative self-perception) + (*z*_Hostile behavior) + (*z*_Risk taking) + (*z*_Toughness)

4) **Regression equation on Total Victimization Scale (Frequency)**

Y= 5.015 + .107(Negative self-perception) + .057(Hostile behavior) + .072(Risk taking) + .023(Ingratiating)

5) **Regression equation on Bullying Subscale (Frequency)**

Y= 1.421 + .092(Negative self-perception) + .034(Hostile behavior) + .044(Risk taking) + .021(Ingratiating)

6) **Regression equation on Victimization Subscale (Frequency)**

Y= 3.467 + .016(Negative self-perception) + .019(Hostile behavior) + .026(Risk taking) + .018(Toughness)

7) **Regression Equation on Total Victimization (Variety)**

Y= 8.556 + .033(Negative self-perception) + .040(Hostile behavior) + .039(Risk taking) + .007(Ingratiating)

8) **Regression Equation on Bullying Subscale (Variety)**

Y= 4.347 + .029(Negative self-perception) + .018(Hostile behavior) + .022(Risk taking) + .004(Ingratiating)

9) **Regression Equation on Victimization Subscale (Variety)**

Y= 4.190 + .005(Negative self-perception) + .021(Hostile behavior) + .016(Risk taking) + .008(Toughness)

Appendix F: Cutoff Scores on Construction Sample

Table 13

Cutoff Scores for Regression Equations on Construction Sample (n=327)

Equation	Mean	Standard Deviation	Less than Average	Average	At-Risk	High Risk
Unit Weighted Total Victimization (Frequency and Variety)	0	2.46	<-3.68	-3.68-3.68	3.69-4.91	>4.91
Unit Weighted Bullying Subcale (Frequency and Variety)	0	2.46	<-3.68	-3.68-3.68	3.69-4.91	>4.91
Unit Weighted Victimization Subscale (Frequency and Variety)	0	2.47	<-3.70	-3.70-3.70	3.71-4.93	>4.93
Regression Total Victimization (Frequency)	14.09	1.90	<11.3	11.3-16.93	16.94-17.88	>17.88
Regression Bullying Subscale (Frequency)	8.38	1.53	<6.10	6.10-10.67	10.68-11.43	>11.43
Regression Victimization Subscale (Frequency)	5.69	.42	<5.07	5.07-6.31	6.32- 6.52	>6.52
Linear Regression Total Victimization (Variety)	12.40	.77	<11.26	11.26-13.55	13.56-13.93	>13.93
Linear Regression Bullying Subscale (Variety)	6.88	.53	<6.10	6.10-7.67	7.68-7.93	>7.93
Linear Regression Victimization Subscale (Variety)	5.53	.28	<5.12	5.12-5.94	5.95-6.08	>6.08

Table 14

Cutoff Scores for Victimization Measures on Construction Sample (n=275)

Factor	Mean	Standard Deviation	Average	At-Risk	High Risk
Total Victimization	14.02	4.39	10.0-20.60	20.61-22.79	>22.79
Bullying Factor	8.33	3.53	5.0-13.62	13.63-15.38	>15.38
Victimization Factor	5.69	1.41	5.0-7.80	7.81-8.50	>8.50
Total Victimization (Variety)	12.40	1.78	10.0-15.06	15.07-15.95	>15.95
Bullying Factor (Variety)	6.87	1.38	5.0-8.93	8.94-9.62	>9.62
Victimization Factor (Variety)	5.53	.82	5.0-6.75	6.76-7.16	>7.16

Appendix G: Item Groupings and Kappas for Equations

Table 16

Groupings for Unit Weighted Equation for Total Victimization (values represent frequencies of people in 1/3 sample; n=140*)*

		Total Victimization		Kappa
		1	**2**	
Unit Weighted Equation for Total Victimization	**1**	129	9	.146*
	2	1	1	

Note. **1**= <2 standard deviations group and **2**= ≥2 standard deviations group.

Table 17

Groupings for Unit Weighted Equation for Bullying Subscale (values represent frequencies of people in 1/3 sample; n=140*)*

		Bullying Subscale		Kappa
		1	**2**	
Unit Weighted Equation for Bullying Subscale	**1**	130	8	.162*
	2	1	1	

Note. **1**=<2 standard deviations group and **2**= ≥2 standard deviations group.

Table 18

Groupings for Unit Weighted Equation for Victimization Subscale (values represent frequencies of people in 1/3 sample; n=140*)*

		Victimization Subscale		Kappa
		1	**2**	
Unit Weighted Equation for Victimization Subscale	**1**	133	4	.229**
	2	2	1	

Note. **1**=<2 standard deviations group and **2**= ≥2 standard deviations group.

Table 19

Groupings for Regression Equation for Total Victimization (values represent frequencies of people in 1/3 sample; n=140*)*

		Total Victimization		Kappa
		1	**2**	
Regression Equation for Total Victimization	**1**	128	8	.255**
	2	2	2	

Note. **1**= <2 standard deviations group and **2**= ≥2 standard deviations group.

Table 20

Groupings for Regression Equation for Bullying Subscale (values represent frequencies of people in 1/3 sample; n=140*)*

		Bullying Subscale		Kappa
		1	**2**	
Regression Equation for Bullying Subscale	**1**	129	7	.279***
	2	2	2	

Note. 1= <2 standard deviations group and 2= ≥2 standard deviations group

Table 21

Groupings for Regression Equation for Victimization Subscale (values represent frequencies of people in 1/3 sample; n=140)

		Victimization Subscale		Kappa
		1	**2**	
Regression Equation for Victimization Subscale	**1**	133	4	.229**
	2	2	1	

Note. 1= <2 standard deviations group and 2= ≥2 standard deviations group

Table 22

Groupings for Regression Equation for Total Victimization Variety Scale (values represent frequencies of people in 1/3 sample; n=140)

		Total Victimization		Kappa
		1	**2**	
Linear Regression Equation for Total Victimization Variety	**1**	123	12	.167*
	2	3	2	

Note. 1= <2 standard deviations group and 2= ≥2 standard deviations group

Table 23

Groupings for Regression Equation for Bullying Variety Subscale (values represent frequencies of people in 1/3 sample; n=140)

		Bullying Subscale		Kappa
		1	**2**	
Linear Regression Equation for Bullying Subscale Variety	**1**	127	8	.10
	2	4	1	

Note. 1= <2 standard deviations group and 2= ≥2 standard deviations group

Table 24

Groupings for Regression Equation for Victimization Variety Subscale (values represent frequencies of people in 1/3 sample; n=140)

		Victimization Subscale		Kappa
		1	**2**	
Linear Regression Equation for Victimization Subscale Variety	**1**	120	17	.15**
	2	1	2	

Note. 1= <2 standard deviations group and 2= ≥2 standard deviations group

Table 25

Groupings for Unit Weighted Equation for Total Victimization Variety Scale (values represent frequencies of people in 1/3 sample; n=140)

		Total Victimization		Kappa
		1	**2**	
Unit Weighted Equation for Total Victimization Variety	**1**	124	14	-.026
	2	2	0	

Table 26

Groupings for Unit Weighted Equation for Bullying Variety Subscale (values represent frequencies of people in 1/3 sample; n=140)

		Bullying Subscale		Kappa
		1	**2**	
Unit Weighted Equation for Bullying Subscale Variety	**1**	129	9	-.024
	2	2	0	

Table 27

Groupings for Unit Weighted Equation for Victimization Variety Subscale (values represent frequencies of people in 1/3 sample; n=140)

		Victimization Subscale		Kappa
		1	**2**	
Unit Weighted Equation for Victimization Subscale Variety	**1**	134	4	-.019
	2	2	0	

Appendix H: Correlations among Items from Empirically Keyed Scale and Outcome Variables

Table 28

Correlations between Items Used to Make Empirically Keyed Scale and Outcome Variables from Construction Sample (n=275)

Item	Total Victimization	Bullying Subscale	Victimization Subscale
I am fat	.26***	.26***	.17**
My friends care if I do well in my work	-.32***	-.33***	-.18**
I do not think that I am special	.23***	.24***	.12*
I do not know why anybody would like me	.36***	.37***	.20***
I am attractive	-.26***	-.26***	-.14*
My friends often encourage me to lie to others	.22***	.20***	.20***
I usually feel like a failure	.33***	.33***	.18**
I have many positive traits	-.30***	-.31***	-.17**
People I spend time with have threatened to hurt me	.34***	.30***	.30***
I sometimes threaten people	.22***	.19**	.21***
Not very many people like me	.47***	.48***	.27***
Some people think that I am a bully	.19**	.18**	.13*

I do not think that I will ever succeed	.27***	.27***	.17**
I am aggressive with others	.20***	.16**	.20***

*p<.05, **p<.01, ***p<.001

Appendix I: Item Groupings and Kappas for Empirically Keyed Scale

Table 34

Groupings for Empirically Keyed Scale and Total Victimization (Frequency) (numbers represent frequencies in 1/3 sample; n=140*)*

		Total Victimization (Frequency)		Kappa
		1	**2**	
Empirically Keyed Scale	**1**	126	8	.208*
	2	4	2	

Note. 1= <2 standard deviations group and 2= ≥2 standard deviations group

Table 35

Groupings for Empirically Keyed Scale and Bullying Subscale (Frequency) (numbers represent frequencies in 1/3 sample; n=140*)*

		Bullying Subscale (Frequency)		Kappa
		1	**2**	
Empirically Keyed Scale	**1**	127	7	.227**
	2	4	2	

Note. 1= <2 standard deviations group and 2= ≥2 standard deviations group

Table 36

Groupings for Empirically Keyed Scale and Victimization Subscale (Frequency) (numbers represent frequencies in 1/3 sample; n=140*)*

		Victimization Subscale (Frequency)		Kappa
		1	**2**	
Empirically Keyed Scale	**1**	129	5	-.041
	2	6	0	

Note. 1= <2 standard deviations group and 2= ≥2 standard deviations group

Table 37

Groupings for Empirically Keyed Scale and Total Victimization (Variety) (numbers represent frequencies in 1/3 sample; n=140*)*

		Total Victimization (Variety)		Kappa
		1	**2**	
Empirically Keyed Scale	**1**	121	13	.04
	2	5	1	

Note. 1= <2 standard deviations group and 2= ≥2 standard deviations group

Table 38

Groupings for Empirically Keyed Scale and Bullying Subscale (Variety) (numbers represent frequencies in 1/3 sample; n=140*)*

		Bullying Subscale (Variety)		Kappa
		1	**2**	
Empirically Keyed Scale	**1**	126	8	.09
	2	5	1	

Note. 1= <2 standard deviations group and 2= ≥2 standard deviations group

Table 39

Groupings for Empirically Keyed Scale and Victimization Subscale (Variety) (numbers represent frequencies in 1/3 sample; n=140)

		Victimization Subscale (Variety)		Kappa
		1	**2**	
Empirically Keyed Scale	**1**	130	4	-.04
	2	6	0	

Note. 1= <2 standard deviations group and 2= ≥2 standard deviations group

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