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Kelly Emelianchik-Key  
*Florida Atlantic University*

Rebekah J. Byrd  
*East Tennessee State University, byrdjrj@etsu.edu*

Amanda C. La Guardia  
*Sam Houston State University*

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# Adolescent Non-Suicidal Self-injury: Analysis of the Youth Risk Behavior Survey

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# Adolescent Non-Suicidal Self-Injury: Analysis of the Youth Risk Behavior Survey Trends



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Kelly Emelianchik-Key, Rebekah J. Byrd, Amanda C. La Guardia

Issues regarding the diagnosis and treatment of non-suicidal self-injury (NSSI) continue to be of increasing concern to practitioners in educational and mental health settings. Given this rising concern, it is important to note that the majority of research regarding self-injury has focused on the symptomology and treatment of Caucasian females; little work has been done regarding the prevalence, presentation and treatment of self-injury with other populations (Marchetto, 2006). This article provides a rationale for addressing gender, culture and other issues of diversity in relation to self-injurious behaviors, including analysis of the Youth Risk Behavior Survey to provide empirical evidence for why additional issues of diversity need to be addressed. Implications for clinical counseling practice are discussed.

*Keywords:* self-injury, NSSI, adolescent, youth risk, trends

Self-injury is a significant issue with a variety of psychological, social, legal and ethical consequences and implications (Froeschle & Moyer, 2004; McAllister, 2003; Nock & Mendes, 2008; White Kress, Drouhard, & Costin, 2006). Self-injurious behavior is commonly associated with the cutting, bruising or burning of the skin. It also can include trichotillomania, interfering with wound healing and extreme nail biting (Klonsky & Olino, 2008; Zila & Kiselica, 2001). In assessing severity, it is important to note that self-inflicted wounds typically do not require any medical attention, as those who engage in self-injury will usually care for any open wounds in order to prevent infection (Walsh, 2006). The typical duration of a self-injurious act is usually less than 30 minutes, resulting in immediate relief from the emotional turmoil precipitating the behavior (Alderman, 1997; Gratz, 2007). It is difficult to estimate the prevalence of self-injury for many reasons. Nock (2009) noted that reports indicating increased estimates in this behavior derive from “anecdotal reports and estimates from small cross-sectional studies” (p. 81). Given the many ethical and legal ramifications involved in working with clients that self-injure, it is important to understand how self-injury typically manifests itself, how it affects differing populations based on gender and cultural differences, and the level of danger it truly represents to the person choosing to utilize it.

## Self-Injury and Suicidal Intent

The current average age of those beginning to engage in self-injury is as early as 12 years old, but onset typically begins in adolescence (Lundh, Karim, & Quilisch, 2007; Trepal & Wester, 2007). Self-injury is found as a frequently occurring issue in the adolescent population (Jacobson, Muehlenkamp, Miller, & Turner, 2008; Nock, Joiner, Gordon, Lloyd-Richardson, & Prinstein, 2006). The majority of reported self-injury and research regarding it has been focused on Caucasian females. Within this particular population, self-injury is typically not associated with increased danger beyond the injury itself unless onset co-occurs with a psychotic episode or is co-morbid with suicidal ideation (Conaghan & Davidson, 2002; Walsh, 2006). Self-injury is the intentional harm to one’s self (usually in the form of cutting, burning, or hitting) to alleviate distress and regulate emotions (Nock & Favazza, 2009) with no intent to die. Usually, reporting of self-injury is necessitated by the concern that the act

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Kelly Emelianchik-Key, NCC, is an Assistant Professor at Florida Atlantic University. Rebekah J. Byrd, NCC, is an Assistant Professor at East Tennessee State University. Amanda C. La Guardia, NCC, is an Assistant Professor at Sam Houston State University. Correspondence can be addressed to Kelly Emelianchik-Key, Department of Counselor Education, 777 Glades Road, Building 47, Room 458, Boca Raton, FL 33431, [kemelian@fau.edu](mailto:kemelian@fau.edu).

may possibly result in unintentional death; however, practitioners often simply confuse the behavior with suicidal intention (McAllister, 2003; Trepal & Wester, 2007). Suicide attempts and intention are clearly defined in the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; American Psychiatric Association, 2013) as those that have the intent or aim to die. Self-injurious behaviors should be viewed as a form of self-help or coping to assist the person in feeling something different, instead of a suicide attempt (Favazza, 1998; Klonsky, 2007). A lack of consensus among researchers regarding the defining qualities of self-injurious behaviors has led to difficulty in discerning the difference between self-injury and suicide (Gratz, 2004; McAllister, 2003; Simeon, Favazza, & Hollander, 2001). As self-injury and other self-harming behaviors continue to be identified, researched and understood, new methods of evaluating these behaviors are developed. Suicide and self-injury are typically two different behaviors but often are aggregated in reports and evaluations. It was determined that data regarding the evaluation of risky adolescent behaviors might be useful for providing a tentative source for analysis. Given that self-injury, self-harm, and suicide attempts are a growing area of study, reliance on current and previous data sources for analysis of self-injury and self-harm behaviors can be used in order to highlight possible areas for research. Data from the Youth Risk Behavior Survey (YRBS; CDC, 2006), as gathered by the Centers for Disease Control and Prevention (CDC), has been used for the purpose of determining the prevalence of possible self-injurious behaviors among young women and young men from differing ethnic backgrounds.

Studies indicate mixed views on the degree of overlap between self-injury and suicidal ideation; therefore, data pertinent to the YRBS may only encompass youths within this overlap. Pattison and Kahan (1983) found that only 41% of those who self-injure reported suicidal ideation while self-injuring. "Another problem with much of the current literature is that little differentiation is made between self-injury and suicide attempts, which are very distinct behaviors" (Roberts-Dobie & Donatelle, 2007, p. 258). Therefore, it could be argued that if practitioners cannot clearly make a distinction between self-destructive acts, then adolescents reporting their behaviors might not be able to make the distinction between self-injurious intent and other possible intentions, such as suicide and frequent aggressive behaviors resulting in harm. Roberts-Dobie and Donatelle (2007) went on to state: "Self-injury is not a failed suicide attempt but often a coping mechanism for negative emotions" (p. 258). This conclusion also is shared by many researchers evaluating self-injury (Brown, Williams, & Collins, 2007; Gratz & Roemer, 2008; Klonsky, 2007; Marx & Sloan, 2002). The International Society for the Study of Self-Injury (ISSS), established in 2006, sought to clarify and understand self-injury and specifically define non-suicidal self-injury (NSSI). Following is their agreed upon definition:

The deliberate, self-inflicted destruction of body tissue resulting in immediate damage, without suicidal intent and for purposes not socially sanctioned. As such, this behavior is distinguished from: suicidal behaviors involving intent to die, drug overdoses, and other forms of self-injurious behaviors, including culturally-sanctioned behaviors performed for display or aesthetic purposes; repetitive, stereotypical forms found among individuals with developmental disorders and cognitive disabilities, and severe forms (e.g., self-immolation and auto-castration) found among individuals with psychosis. (ISSS, 2007)

It is important to note, however, that while there is a link between suicide and self-injury, it is a complicated relationship. Therefore, clinicians should always assess for suicidality when confronted with client self-injurious behaviors; however, immediately assuming suicide ideation or an active suicide attempt from reported self-injurious behavior can be therapeutically problematic. The essence of this complication presents a limitation in the analysis of the YRBS behavior data (CDC, 2006).

## **Treatment of Self-Injury**

If self-injury is left untreated, increased severity and possible suicidality or suicide attempts may occur; therefore, it is important to recognize self-injury and treat the client appropriately and quickly in order to prevent complications. Knowledge with regard to possible presentation of self-injurious behavior as it pertains to intersections of gender, age and ethnicity also is important. Additionally, clinicians must recognize typical signs of self-injurious behaviors in relationship to diagnostic criteria. The likelihood of self-injurious behavior as a coping mechanism becomes more prevalent within certain psychological issues. The diagnoses most commonly associated with self-injury include major depression, borderline personality disorder, post-traumatic stress disorder and eating disorders (Klonsky & Muehlenkamp, 2007; Marx & Sloan, 2002; Nehls, 1998; Sansone & Levitt, 2002; Sargent, 2003). Self-injury has been found to be associated with acute stress related to relational aggression, abuse and dating violence (Hays, Craigen, Knight, Healey, & Sikes, 2009; Turnage, Jacinto, & Kirven, 2003). Since self-injury also can be co-morbid with suicidality, selected psychological and emotional states will be reviewed separately in terms of their individual indicators related to self-injury, and their effects on the severity of possible danger or harm to provide a framework for the importance of data related to populations not typically studied in association with self-injurious behaviors.

Self-injury has commonly been associated with the diagnosis of borderline personality disorder (BPD), although this association may relate more to ongoing trauma issues (Alderman, 1997; Naomi, 2002). Given the continued prevalence of the diagnosis in relation to self-injury, attention to self-injury with BPD is warranted. Those who are diagnosed with BPD, or display borderline features, and are engaging in self-injury typically display other self-destructive behaviors and decision making (Gratz, 2006; Sansone, Wiederman & Sansone, 1998), tend to have unresolved anger that is noticeable in everyday relations, and also may exhibit a need to distract themselves from their emotions (M. Brown, Comtois, & Linehan, 2002). These characteristics will be prominent over other clinical symptoms associated with BPD. BPD also is more commonly diagnosed among females, as is self-injurious behavior (Lundh et al., 2007). If indeed self-injurious behaviors are associated with a history of trauma, perhaps the presentation of self-injurious behaviors are overlooked when working with male clients due to the association of self-injury with BPD.

## **Gender and Self-Injury**

Potential gender differences in the presentation of self-injury may exist for various reasons. Past studies focusing on particular forms of self-injury have focused on potentially unrepresentative female-only samples, thus misrepresenting the existence of a more diverse population of those engaged in self-injurious behaviors (Marchetto, 2006). Some research proposes that males are just as likely as females to self-injure and perhaps go about it differently or are more secretive (Gratz, 2001). Marchetto's study of 516 individuals engaged in skin-cutting as a form of self-injury found "no evidence for an overrepresentation of women" (p. 453). Other research supports this notion that there may not be a gender difference among certain types of self-injurious behavior (Izutsu et al., 2006; Muehlenkamp & Gutierrez, 2007). In addition, a recent study found no gender differences in prevalence of self-injury among college students, but noted that far fewer men were willing to complete the study (Heath, Toste, Nedecheva, & Charlebois, 2008). Furthermore, these authors warned against inaccurately interpreting the above issues as meaning a lower prevalence of self-injury exists among males. Seemingly, female adolescents are more likely to self-report instances of self-injury than male adolescents (Heath, Schaub, Holly, & Nixon, 2008), and male self-injurers are not diagnosed and conceptualized the same as females that self-injure (Healey, Trepal, & Emelianchik-Key, 2010). With these two compounding factors, males that self-injure are at a disadvantage to receive help with their self-injurious behaviors.

The information presented in this article is posed to present further evidence that suggests male self-injury exists and needs to be addressed in the assessment and treatment of presenting issues related to self-injury. Since depression is sometimes associated with suicidal ideation, self-injury and other harmful behaviors, recognition of the severity of client depressive symptoms through thorough assessment techniques becomes vital to treatment and selection of therapeutic interventions regardless of gender. Suicide is the third leading cause of death in adolescents and young adults, with 15% of those suffering from clinical depression ending their lives (Suicide Awareness Voices of Education, 2008). Symptoms, as outlined by the National Institute of Mental Health (2009), include and compare the early signs of making statements of prolonged despair or expressions of guilt as critical indicative signs of concrete plans for a suicide attempt. Occurrence of these signs becomes a major factor in assisting with assessment of severity. Suicidality has been linked to substance abuse, anxiety, mood disturbance and disruptive behaviors (Linehan, Comtois, Brown, Heard, & Wagner, 2006; Nock & Banaji, 2007; Wade & Pevalin, 2005). Risk factors that have been identified as highly correlated with successful suicide attempts include highly aggressive behaviors with a history of aggression, psychosis, impulsivity and bi-polar disorder (Renaud, Berlim, McGirr, Tousignant & Turecki, 2008). Becker and Grilo (2007) demonstrated that gender differences impacted how each risk factor affected the severity of the depression; however, low self-esteem was correlated with suicidality across both male and female populations. This article will use data from the YRBS and analyze it to provide empirical evidence for why issues of diversity need to be addressed within the self-injury and suicidality literature.

## Data Sources

The YRBS is a national school-based survey developed by the CDC in order to monitor issues such as obesity, substance abuse, dietary habits, and unintentionally injurious and violent behaviors. Data files are made available to the public after analysis is completed through the CDC; data from the 2005, 2009, 2011 and 2013 surveys were used in this analysis.

## Response Rate

As per the YRBS (CDC, 2005, 2009, 2011, 2013), at the school level, all regular public, Catholic, and other private school students, in grades 9 through 12, in the 50 States and the District of Columbia were included in the sampling frame. Puerto Rico, the trust territories, and the Virgin Islands were excluded. Schools were selected systematically with probability proportional to enrollment in grades 9 through 12 using a random start. All classes in a required subject or all classes meeting during a particular period of the day, depending on the school, were included in the sampling. Systematic equal probability sampling with a random start was used to select classes from each school that participated in the survey. In 2005, the overall response rate was 67% (158 schools participated); in 2009 the school response was 81% (158 participated); in 2011 it was 81% (158 participated); and in 2013 the response rate was 77% (148 participated). In total, 59,335 student responses were included in the datasets evaluated for the database review of behaviors associated with NSSI.

## Methods

YRBS (2005, 2009, 2011, 2013) data were retrieved from the CDC in order to analyze the relationship between depression and self-injurious behaviors, including direct bodily self-injury or frequent aggressive behavior that resulted in bodily injury. The YRBS was designed to monitor health risk behaviors for adolescents in high school. For this analysis, comparisons were made with regard to gender and ethnicity to evaluate issues related to possible self-injurious behaviors, since the YRBS

does not differentiate between suicidal attempts and self-injurious behaviors. Data screening methods also were used to evaluate the variables used in the study to assure they met the criteria for logistic regression. Cases with missing data for the self-injury and self-injurious aggression items were excluded.

### Variables

To assess for possible NSSI, items that pertained to self-injury and self-injurious aggression within the YRBS were pulled and re-coded into dichotomous variables to include the following questions: "During the past 12 months, how many times did you actually attempt suicide?" and "If you attempted suicide during the past 12 months, did any attempt result in an injury, poisoning, or overdose that had to be treated by a doctor or nurse?" If the participant attempted suicide six or more times but the injury did not require medical attention, the behavior was considered to possibly represent NSSI, since self-injury has been shown to have overlapping qualities with suicidal attempts and is not easily recognizable or differentiated among clients and professionals in the field. Additionally, the following questions were assessed due to research indicating that frequent aggressive behaviors resulting in harm could be viewed as a form of self-injury: "During the past 12 months, how many times were you in a physical fight?" and "During the past 12 months, how many times were you in a physical fight in which you were injured and had to be treated by a doctor or nurse?" For these questions, those respondents who got into fights four or more times in a 12-month period and had to be evaluated by a medical professional were thought to be possibly engaging in self-injurious aggressive behaviors. Correlations were completed on these items in order to justify their grouping as a variable.

The self-injurious behavior questions were correlated at  $r = .72, p < .001$  and coded as self-injurious when participants answered that they had attempted suicide more than four times in one year and/or had injured themselves physically, either requiring outside medical treatment or not requiring medical treatment. Questions regarding physical fighting were combined to form the aggression variable and were significantly correlated at  $r = .42, p < .01$ .

Self-injurious aggression was coded based on extremity of engagement in fighting and the resulting personal injury of the participant. As self-injury may manifest itself differently depending on gender and cultural expectations and experiences, extreme aggression that resulted in frequent hospitalization or medical care was considered to be a possible indicator of this alternative behavioral expression (Harris, 1995; McMahan & Watts, 2002). Self-injury has been shown to result in acting in or acting out behaviors as a way of engaging in emotional regulation (Bjärehed, Wängby-Lundh, & Lundh, 2012; Mikolajczak, Petrides, & Hurry, 2009). The way in which one chooses to manifest self-injury or the typology of the non-suicidal self-injurious behavior may present differently for males and females (Heath et al., 2008; Muehlenkamp & Gutierrez, 2007). Thus, both traditional and non-traditional methods for harm were evaluated for this study, as NSSI is sometimes thought to be a suicidal attempt or behavior by clinical professionals wanting to err on the side of caution because those who self-injure also may have co-occurring suicidal ideation. In contrast to the pressure for immediate and safe clinical intervention, however, those who choose to self-injure and those who attempt suicide often have differing attitudes toward life (Muehlenkamp & Gutierrez, 2004). For this study, logic seemed to dictate evaluating frequent suicide attempts that did not result in medical attention as a possible self-injurious behavior. To further evaluate the consideration of frequent suicide attempts (more than four in a year) as possible NSSI, correlations were conducted between the NSSI variable and items stating, "During the past 12 months, did you make a plan about how you would attempt suicide?" and "During the past 12 months, did you ever seriously consider suicide?" In the 2013 sample, the NSSI variable was significantly correlated with both items at  $p < .001$ , with

correlations of  $r = .241$  and  $.218$  respectively. Therefore, in the 2013 data set, there was indication that as the attempts increased the participant was more likely to state that they had seriously considered suicide or made a plan in the past year. However, the correlation was low, accounting for only 24 and 22% of participants who stated they had attempted four or more times in a year, a similarity with all other years included in this analysis. Thus, the fact that the majority of those who indicated they attempted suicide four or more times did not indicate they had made plans to commit suicide or had even thought about it seriously points toward an indication that the item also may be measuring NSSI rather than just suicide attempts.

With regard to the demographic variables, gender, ethnicity and depression were all coded dichotomously. Variables were created as described in order to complete a binary logistic regression. This analysis was chosen in order to evaluate the odds that a certain behavior would yield results with regard to the predictor variables used. Of those demographic variables included in the study and coded dichotomously from 2005, 60% identified as Caucasian and 37% identified as being from a marginalized or underrepresented group (e.g., Black/African American, Hispanic, multiple heritage). The remainder did not identify their ethnicity. With regard to gender or biological sex, 49% of the sample indicated they were female while 50% of the sample indicated they were male. The remainder did not respond to the item for male or female identification. Concerning age, 37% of the sample indicated they were 15 or younger and 63% of the sample was older than 15. All of the participants sampled were in grades 9–12. Demographic statistics were similar across each year of analysis.

## Results

Separate analyses were conducted for each year of the YRBS included in this review. Trends were assessed and will be discussed following the presentation of results. Binary logistic regressions were completed to determine predictors for both possible non-suicidal self-injurious behavior and potentially self-injurious aggressive behaviors. Categorical contrast baselines were set for: Caucasian, male, age less than 15, reports of no feelings of hopelessness, and no self-injurious aggression.

### YRBS 2005 Analysis

Using self-injurious behavior as an outcome variable and gender, age, ethnicity, extreme aggression and depression as covariates predictor variables, a binary logistic regression was completed on the available data set to analyze the goodness of fit. The result was Nagelkerke  $R^2 = .240$  which indicated that the variables included in the model accounted for 24% of the variance. The Hosmer and Lemeshow test used for the logistic regression was not significant ( $\chi^2 = 10.16, p = .180$ ), indicating that the predicted probabilities match the observed probabilities. These results show a probability that it is three times more likely that those engaging in extreme self-injurious aggression also will engage in self-injurious behaviors and 11 times more likely for those who are depressed to engage in self-injurious behaviors controlling for all other predictor variables (see Table 1). Age and race did not seem to play a significant role in predicting self-injurious behavior, as both age groups (early adolescents and late adolescents) were just as likely to engage in self-injury. In addition, those from different ethnic backgrounds were just as likely to engage in self-injury when controlling for all other factors. Males were half as likely as females to engage in self-injury. However, males were three times as likely to engage in extreme aggression while those who were reportedly depressed were twice as likely to engage in possible self-injurious aggressive behavior (see Table 2).



**Table 1.***Regression of Self-Injurious Behavior*

Variables	B	Expected B	r
Aggression*	1.220	3.388	.141*
Depression*	2.381	10.819	.319*
Late Adolescence (age)	.234	.791	-.037
Male*	.543	.581	-.090*
Caucasian	.056	1.057	.028

Note: \*Significant at  $p < .001$ , Nagelkerke  $R^2 = .240$

**Table 2.***Regression of Extremely Aggressive Behaviors*

Variables	Expected B	B
Male*	2.86	1.05
Depression*	1.92	.653

Note: \*Significant at  $p < .001$

**YRBS 2009 Analysis**

In Table 3, the regression for self-injurious behavior is presented. Given the base rates of the two coded options, 83% of the sample choose not to involve themselves in possible self-injurious aggressive behaviors (intentional fighting resulting in injury); therefore, the best predictive strategy is to assume that, for every case, the subject will choose not to participate in fighting behavior that would likely result in injury requiring medical attention. In essence, the odds of someone engaging in aggressive self-injury are approximately 20% ( $\text{Exp}B = .205$ ). In testing the predictive model of age, gender, race, depression and likelihood to engage in individual self-injury, results indicate that the model was significantly predictive at  $X^2 = 984.4$ ,  $p < .001$ . The Nagelkerke  $R^2 = .110$  is an indication that this model would only account for 11% of the variance in predicting self-injurious aggressive behaviors (intentionally fighting to result in injury). After adding the predictive model, 83% of cases were correctly classified, as opposed to an 80% classification rate prior to the addition of variables to the predictive model. The Hosmer and Lemeshow test was not significant ( $\chi^2 = 18.83$ ,  $p > .001$ ), indicating that the predicted probabilities match the observed probabilities. According to the predictive model, if the participant were female, she would be .326 as likely to engage in aggressive self-injurious behavior as compared to males. A Wald Test was used to examine the true value of the parameter based on the sample and all were found to be significant at  $< .001$ .

**Table 3.***Regression of Self-Injurious Behaviors*

Variables	B	Expected B	<i>r</i>
Aggression	1.220	3.388	.141*
Depression	2.381	10.819	.319*
Late Adolescence (age)	-.234	.791	---
Male	-.543	.581	-.090*
Caucasian	.056	1.057	---

Note: \*Significant at  $p < .001$ , Nagelkerke  $R^2 = .111$

**YRBS 2011 Analysis**

For the 2011 sample population, 1,300 participants indicated engaging in physical fights four or more times in a year, resulting in the need for medical attention more than once, which fit the criteria for self-injurious aggression (approximately 8% of those surveyed; self-injurious aggression variable). Of those included in analysis, 201 participants indicated that they had attempted suicide four or more times, attempts that did not require medical attention (NSSI variable). Of those students responding, over 4,000 (approximately 29%) indicated feeling sad or hopeless every day for 2 weeks or more in a row during the past year. Feeling sad or hopeless had a weak negative correlation with the NSSI variable with  $r = -.146$ ,  $p < .001$ . Similarly, feeling sad or hopeless had a weak negative correlation with self-injurious aggressive behaviors with  $r = -.097$ ,  $p < .001$ . NSSI and self-injurious aggression had a significant weak positive correlation with  $r = .195$ ,  $p < .001$ . Of those responding to the 2011 YRBS, 7,574 indicated they were Caucasian and 1,629 indicated they were younger than 15 years old.

The binary regressive model for the 2011 data indicates a resultant  $X^2(4) = 370.27$ ,  $p < .001$ . The Nagelkerke  $R^2 = .241$  indicates that this model would only account for approximately 24% of the variance in predicting self-injurious behaviors as defined by items 27 and 28 of the YRBS. Of those surveyed, 69.3% were included in analysis. The Hosmer and Lemeshow test was not significant ( $\chi^2 = 2.39$ ,  $p = .935$ ), indicating that the predicted probabilities match the observed probabilities. Wald statistics are significant at  $p < .001$  for the item indicating possible depression, age and the variable assessing possible aggressive self-injury (engaging in numerous physical fights). Wald statistics for race were approaching significance at  $p = .089$ ; however, age and gender were not significant. Therefore, these demographic variables were likely not contributing significantly to the prediction of NSSI as defined in this study.

Of those participants who identified as possibly engaging in non-suicidal self-injurious behaviors, 98.5% of cases were correctly classified by the model. The classification of cases was not changed when the variables of non-suicidal aggression, depression, age, gender and race were included. The calculated  $r$  statistic for non-suicidal aggression was .30, and .24 for the depression variable, indicating that both likely accounted for 54% of the predictive power of the model. The demographic variables could not be calculated due to their low contribution to the predictive model. While  $z^2$  was significant for age, the Wald statistic itself was not large enough to calculate a standard analogue of  $r$ .

It is important to note that the lower end of the confidence interval for all variables included in the model was less than one, with the exception of the item variable measuring depressive symptoms.

This finding is indicative of the likelihood that as non-suicidal aggressive behaviors increase, so too will the possibility for NSSI; however, this relational direction may not be true for all cases occurring within the 95% confidence interval. Nevertheless, we can be more confident in the relationship between indications of non-suicidal self-injurious behaviors (as defined by this study) and the depressive symptoms measured through item 24 of the YRBS.

The Hosmer and Lemeshow's measure of  $R^2$  is .24, indicating a moderate effect size. With regard to probability analysis of the significant variables, it should be noted that if a participant were feeling sad or hopeless, they would be 9.47 times more likely to engage in non-suicidal self-injurious behaviors as defined by this study. If a subject were engaging in multiple fights that resulted in injury, the participant would be 9.317 times more likely to engage in multiple "suicide" attempts that did not result in the need for medical attention. Finally, if a participant was younger than age 15 at the time of this survey, the subject was almost twice as likely to engage in non-suicidal self-injurious behavior (Table 4). Probabilities for binary regression of self-injurious aggression with regard to sex and depressive symptoms can be found in Table 5.

**Table 4.**

*Regression of Self-Injurious Behavior*

Variables	B	Expected B	<i>r</i>
Aggression*	2.232	9.317	.30*
Depression*	2.249	9.479	.24*
Age	.677	1.968	--
Male	.048	1.049	--
Caucasian	.290	1.336	--

Note: \*Significant at  $p < .001$ , Nagelkerke  $R^2 = .241$ , Initial -2LL = 1629.395

**Table 5.**

*Regression of Non-Suicidal Aggressive Self-Injury*

Variables	Expected B	B
Male*	3.098	1.131
Depression*	2.485	.910

Note: \*Significant at  $p < .001$ ; Nagelkerke  $R^2 = .068$ , Initial -2LL = 8717.850

### YRBS 2013 Analysis

For this sample population, 872 participants indicated that they engaged in physical fights four or more times in a year, resulting in the need for medical attention more than once. Of those students responding, over 4,000 indicated feeling sad or hopeless every day for 2 weeks or more in a row during the past year, and 177 participants indicated that they attempted suicide four or more times

but did not require medical attention for those attempts (conceptualized as possible non-suicidal self-injurious behavior). Of those indicating their ethnicity, 6,416 participants indicated that they were Caucasian. The binary regressive model for the 2013 data indicates a resultant  $X^2 (5) = 295.731, p < .001$ . As indicated in table 6, the Nagelkerke  $R^2 = .222$ , which indicates that this model would only account for approximately 22% of the variance in predicting self-injurious behaviors as defined by items 27 and 28 of the YRBS. The Hosmer and Lemeshow test was not significant ( $\chi^2 (7) = 8.281, p = .308+$ ), indicating that the predicted probabilities match the observed probabilities. Wald statistics are significant at  $p < .001$  for the item indicating possible depression and the variable assessing possible aggressive self-injury (engaging in numerous physical fights). Wald statistics for race, age and gender were not significant; therefore, these demographic variables are not making a statistically significant contribution to the prediction of NSSI.

As indicated in tables 6 and 7, of those participants who identified as possibly engaging in non-suicidal self-injurious behaviors, 98.7% of cases were correctly classified by the model. The classification of cases was not changed when the variables of non-suicidal aggression, depression, age, gender and race were included. Calculated  $r$  for non-suicidal aggression was .32, and .22 for the depression variable, indicating that both likely accounted for 54% of the predictive power of the model. The demographic variables could not be calculated due to their low contribution to the predictive model. It is important to note that the lower end of the confidence interval for variables not significantly contributing to the model was less than one.

**Table 6.**

*Regression of Self-Injurious Behavior*

Variables	B	Expected B	$r$
Aggression*	2.422	1.258	.32*
Depression*	2.040	.119	.22*
Age (<15)	.230	7.693	--
Sex (Male)	.063	1.065	--
Ethnicity (Caucasian)	.149	1.161	--

Note: \*Significant at  $p < .001$ , Nagelkerke  $R^2 = .222$ , -2LL = 1409.043

**Table 7.**

*Regression of Non-Suicidal Aggressive Self-Injury*

Variables	Expected B	B
Male*	1.086	2.963
Depression*	.973	2.646

Note: \*Significant at  $p < .001$ ; Nagelkerke  $R^2 = .061$ , Initial -2LL = 6361.219

## Discussion

In completing this analysis, it is evident that further study is needed in the area of self-injury with regard to outward expression in the form of extremely aggressive behaviors, prevalence among differing ethnic groups and prevalence in the male population. Currently, most research is focused on adolescent Caucasian females, indicating that self-injury may be more prevalent among females and those of Caucasian descent (Whitlock, 2010). Data from the current study indicates that perhaps males and other ethnic groups also are engaging in this destructive coping mechanism, perhaps in differing ways than are being focused on by current conceptual and empirical works. Researchers (Whitlock, Eckenrode, & Silverman, 2006; Matsumoto et al., 2005) indicate that males are more likely to injure areas of the body that are more sensitive when compared to females and to use more severe methods to self-injure. Male self-injurers show injuries to the chest, face, or genitals and the injuries sustained often have more long-term repercussions than those of females who tend to self-injure arms and legs. Males also tend to burn themselves and use hitting and punching type behaviors, whereas females tend to cut (Sornberger, Heath, Toste, & McLouth, 2012). The results of this analysis is consistent with the literature that indicates self-hitting or physically aggressive behaviors resulting in injury is a more typical typology of self-injurious behaviors for adolescent males (Izutsu et al., 2006). By studying a variety of populations, the definition of self-injury can be extended in order to clinically expand other, less damaging ways of coping with extreme emotional discord. Future research is needed concerning self-injury in adolescent males as a singular group as well as studying both males and females with ethnicity and cultural identity as variables.

Expanding the definition of self-injury to include frequent aggressive behaviors that result in harm to the self may be prudent. For instance, Harris (1995) evaluated 363 Hispanic and Caucasian university students with regard to endorsement of aggressive behaviors. He found that males, in general, were more likely to endorse fighting, and Hispanic males were more likely to endorse aggressive behaviors. Harris theorized that this endorsement might translate to emotional regulation factors. Nock (2009) also stated that the majority of current studies on self-injury have not addressed culture and gender issues when discussing self-injury and would, at times, exclusively focus on samples of Caucasian women. He indicated that this approach could conceivably lead to issues in fully evaluating the legal and ethical ramifications of self-injury. Nock's criticism of not enough research to evaluate the self-injurious prevalence in different settings, age groups, cultures, and with men underlines the need for more investigation. Limited studies have also examined the differences between race, ethnicity and culture among those that engage in self-injurious behavior (Yates, Tracy, & Luthar, 2008). Gratz et al. (2012) found that reporting rates were higher for Caucasian girls as opposed to Caucasian boys, and higher for African American boys as opposed to African American girls. Such findings provide evidence to support the idea that racial and ethnic backgrounds moderate the gender differences in the rates of self-injury. Results from the YRBS provide further evidence that this is indeed an issue that spans culture and gender domains. Research that expands to fully include gender, racial, cultural and age differences is certainly warranted.

If regular harm-to-self aggressive behaviors were included in the definition of self-injury, assessment practices as well as mental health treatment would benefit. Currently, treatments for self-injury include approaches consistent with dialectical behavioral therapy (DBT) and cognitive-behavioral therapy (CBT), as well as interventions associated with each approach including mindfulness, regulating emotions, distress tolerance, and thought stopping (Trepal & Wester, 2007). However, if intersections of gender and culture are to be considered, it is important that a broader holistic approach to the conceptualization and treatment of self-injury be taken. For example, while CBT can serve to address

immediate behavioral concerns and provide alternative coping mechanisms for clients as they process the meaning of their behaviors, treatment for the underlying issue is suggested in order to ensure long-term success. Therefore, for any clinical treatment to be optimally helpful and globally applicable, having useful, relevant research data is a must.

### **Limitations, Implications and Future Research**

The limitations of this study are noted throughout, including a lack of clear consensus among practitioners on how to diagnose and treat self-injury. There is a lack of understanding of how self-injurious behaviors are connected to suicidal intent. Clinicians will diagnose suicidal intent out of fear that the injury could result in unintentional death, which ignores the intention of the act (McAllister, 2003; Trepal & Wester, 2007). By further examining self-injury and the measures that exist, the differences can be more clearly defined so practitioners clearly assess for self-injury. The reporting rates on self-injury are difficult to clearly identify and define due to confusions, including little information regarding culture, ethnicity and gender differences. Measures like the YRBS are beneficial, yet lump together the behaviors and are conducted often. This study attempted to further examine the YRBS responses in hopes to show the importance of differentiation between self-injury and suicide intent among various ethnicities, cultures and genders.

Previous research has shown that when underlying issues related to trauma, depression or other related stressors are not addressed, self-injurious behaviors are likely to reoccur later in life even after they have ceased for a number of years (Alderman, 1997; Conaghan & Davidson, 2002; Walsh, 2006). If other presenting behaviors, such as self-injurious aggression, are not recognized as a similar coping mechanism or way of emotionally regulating distressing feelings, appropriate diagnosis and treatment might be elusive, time-consuming and expensive. Therapeutic interventions need to match the client's presenting concerns and the underlying purpose driving the behavior. The possible cultural and social context involved in the client's internal perspectives on behavioral choices and subsequent actions might be useful to evaluate. This would allow for space to create a greater sense of self-awareness and thus provide an increased likelihood that the client will be able to regulate or cope with their distressing emotions in a useful and self-empowering way. Feminist, Adlerian, and narrative interventions could be used to help facilitate this process, as they are each grounded in creating awareness of societal influences with regard to one's personal process, purpose, and self-perceptions (McAllister, 2001; Sweeney, 2009; Worell & Remer, 2003). Mental health counselors may want to evaluate how their current theoretical orientation can help them conceptualize self-injury in productive and useful ways to empower the client toward gaining a greater sense of self-awareness and openness to treatment. Interventions from a variety of counseling perspectives offer clinicians more treatment choices, and more treatment choices translate into greater success in addressing a client's problem. Research that includes the whole picture of self-injurious behavior provides the most benefit for successful clinical practice.

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