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Table of Contents

<div align="center">Editorial</div>

When childhood dreams are broken: adolescence and suicide risk

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Together with old age, adolescence is a phase of life at high risk for suicidal behavior. Suicide is the leading or second cause of adolescent death in Europe and South-East Asia (WHO, 2017a) and the second leading cause of death among 15-29-year olds globally (WHO, 2017b).

Adolescence is a bridge between childhood and adulthood characterized by intense developmental changes in the body (hormones, secondary sexual characteristics) and brain (intense brain architecture changes) as well as by the need to face unique developmental and psychological challenges and tasks.

"The fantasy of omnipotence is shattered by the arrival of youth: childhood dreams are broken and this requires that one adjusts to reality…" (Torre, 2013). This is a meaningful change from childhood. As a child, one is protected, taken care of, relieved from responsibilities. The adolescent has to adjust to a totally different situation: he/she has to delink from parents, to create stronger relationships with peers, to face sexuality, to take responsibilities and learn a more adult way to face the inner and the outer world. Carl Gustav Jung wrote: "It seems to me that the basic facts of the psyche undergo a very marked alteration in the course of life, so much so that we could almost speak of a psychology of life's morning and a psychology of its afternoon. As a rule, the life of a young person is characterized by a general expansion and a striving towards concrete ends; and

his neurosis seems mainly to rest on his hesitation or shrinking back from this necessity" (Jung, 1970).
Overall, adolescence is a long and intense stage of transition, and often a stressful period for individuals who are gradually growing adult.
Although psychosocial problems and stresses, such as conflicts with parents, breakup of relationships, isolation, school difficulties are often reported or observed in young people who attempt suicide, these are common features of many adolescents, and cannot therefore be the target for prevention.
Adolescents at higher risk of suicide commonly have a history of depression, a previous suicide attempt, alcohol or substance-related problems, other behavioral problems, crisis about sexual orientation, victimization, a family history of depression or other psychiatric disorders (see Barzilay et al., 2017; Bousoño Serrano et al., 2017; and Wasserman, 2016, for a review of risk factors and health/mental health problems related to suicidal behaviours). Suicidal behavior can be triggered by life events such as poor academic performance, disciplinary crises, relationship disappointments, perceived humiliation, and legal problems (Serafini et al., 2015).

In this issue of SOL, the effects of psychological dimensions as depression, anger, coping, emotion regulation, attitude toward the body, personality, and other at-risk behaviors with regard to adolescent suicidal behavior and non-suicidal self-injury is

dicussed in the Weninger's, Mulay, Fernquist and Reyes' articles.

Seemen et al. focus on gender differences in perception of relevant risk factors for suicide risk in a survey of the general population, including college students.

Kaukiainen & Martin examine the relationships between Internet use, self-injurious behaviours, stigma, help-seeking, perceived social support and self-validation. Suicide communication on facebook is the topic of the Wong et al.'s case report.

A focus on non-suicidal self-injury in the at-risk population of medical students is proposed by Kaur.

Jahn reports about suicidology courses and training in psychology undergraduate and clinically-oriented graduate programs.

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Original research

Depression and Anger as Risk Factors for Suicide with Inpatient Adolescents

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Abstract: Suicide is the third leading cause of death for children ages 10-24 (U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2010). This study examined the direct and indirect effects of depression, anger, and coping with regard to adolescent suicidal behavior. Seventy six participants from an inpatient psychiatric hospital were evaluated for depression, state and trait anger, and coping skills using the Children's Depression Inventory, State-Trait Anger Expression Inventory, and the Coping Response Inventory. The results showed there were statistically significant direct effects of depression and state and trait anger with adolescents who made a suicide attempt compared to those with suicide ideation and no attempt. The results of the Children's Depression Inventory scores indicated that a cutoff score of 68 or higher is a good predictor of an increased risk of suicide. The adolescents at highest risk for suicide were significantly depressed, had elevated state and trait anger, displayed high emotional discharge, and could not identify a solution to their problems.

Keywords: Depression; Anger; CDI; Suicide; Adolescents

Suicide is a national problem with over 1,900 youth under age 20 dying by suicide annually in the United States (Cerel, Jordan & Duberstein, 2008). It is also the third leading cause of death for children ages 10-24 (U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2010). Furthermore, depression and mood disorders are often related to suicide ideation and attempts (Greening & Stoppelbeing, 2002; Horowitz, Hill, & King, 2011; Lewinsohn, Rohde & Seeley, 1994). Childhood depression, specifically, requires study and attention due to the expanded effect it has on not only the child experiencing the depression, but the increased

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hopelessness, family dysfunction, and stress that is often experienced by the families of these children (Hetrick, Parker, Robinson, Hall, & Vance, 2011).

Because of this, it is widely agreed that the presence of a mood disorder is a risk factor for suicide, and therefore understanding specific characteristics that link depression to suicide will greatly help the mental health field understand the progression of depression to suicide ideation and ultimately help prevent suicide ideation in children diagnosed with depression.

The relationship between depression, anger expression, and coping are critical when examining suicide attempts among adolescents. Anger is listed as the most typical emotional experience for depressed young adolescents in clinical settings (Hammen, 1994). Anger and aggression are particularly salient to study in relationship to depression, as depression and anger have been shown to have a strong correlation with suicide

(Jang et al., 2014). Furthermore, depressed youth are known to have longer durations, higher frequency, and greater intensity of anger than non-depressed youth (Sheeber et al., 2009). Anger is conceptualized in terms of state and trait dimensions. State anger is situational and describes the intensity of anger in the moment; whereas, trait anger is a more enduring dimension of anger (Spielberger & Reheiser, 2009).

Anger and self-directedness have some effect on suicide ideation (Giegling et al., 2009). Daniel, Goldston, Erkanli, Franklin and Mayfield (2009) found that trait anger expressed outwardly was related to an increased risk for suicide attempts among adolescent boys. Claes, Muehlenkamp, Vandereyckin, Hamelinck, Martens and Claes, (2010) noted that psychiatric inpatients with non suicidal self-injury and a history of a suicide attempt had significantly higher scores on suppressing anger inwardly. Recently Hawkins and Cougle (2013) found that both anger expression, and the experience of anger, contributed to suicidal thoughts, as well as suicide attempts. Additionally, the expression of anger through aggressive acts has been found to correlate with suicide attempts as well (Evren, Cinar, Evren, & Celik, 2011).

Coping is defined as the behavioral and cognitive attempts to manage stress, as well as the emotions that are generated (Lazarus & Folkman, 1984). Maladaptive coping strategies correlate with depressive symptoms and suicide ideation. Conversely, adaptive coping strategies that are commonly used by youth can be effective in reducing suicidal ideation (Khurana & Romer, 2012). Avoidant coping styles such as behavioral disengagement are related to increased levels of depression and suicide ideation (Horowitz, Hill, & King, 2011); however, it was noted that problem-focused coping did not independently predict lower depression or suicidal ideation. McMahon et al., (2013) found that problem oriented coping styles were associated with better mental health, and emotion focused coping styles were associated with poorer mental health. Poor problem solving coping skills were indicative of elevated suicidal ideation and a greater risk of making a nonfatal suicide attempt (Grover, Green, Pettit, Monteith, Garza & Venta, 2009).

There is evidence that higher levels of depression and poor task oriented coping is related to multiple suicide attempts (Nrugham, Holen, & Sund, 2012). Those who are depressed are more likely to use maladaptive coping styles, and to view their coping strategies as ineffective (Zong et al., 2010). Maladaptive coping styles, and rumination, are believed to predict depressive symptoms

(Thompson et al., 2010). It is believed that it is beneficial in terms of reducing suicide ideation to focus on eliminating maladaptive coping behaviors and introducing positive coping behaviors (Horwitz, Hill, & King, 2011), in particular utilization of social support as a coping mechanism (Spirito, Francis, Overholser & Frank, 1996).

Research has shown that there is a correlation between adolescent depression and suicide (Hetrick et al., 2012), trait anger and suicide (Daniel, Goldston, Erkanli, Franklin & Mayfield, 2009), and that there is a need for adapative coping skills to reduce suicide risk (Horwitz et al., 2011; Nrugham, Holen, & Sund, 2012). This study will contribute to the existing literature by providing detailed information regarding the relationships among these variables. In this study, we hypothesized that more intense anger expression, avoidant coping skills, and higher levels of depression will increase the likelihood of suicide with adolescents in an inpatient setting. This study examined whether coping skills, depression, and anger expression styles have independent explanatory abilities in differentiating inpatients that have, or do not have, a history of suicide behaviors, as well as the level of intensity of these behaviors. An in depth exploration of avoidant and approach coping skills as well as state and trait anger, and depression are examined in relationship to the number of suicide attempts.

Method

Participants

Institutional Review Board (IRB) approval was obtained certification #5120041 to recruit adolescents from an inpatient psychiatric hospital located in Southern California. Informed consent was obtained from the adolescent's parents as well as assent from the youth. Inclusion criteria included a primary diagnosis of major depression (by a psychiatrist) with no comorbid diagnoses, and an ability to read and write English at a 6th grade level. As seen in Table 1 the sample included 76 adolescents from age 13 to 17: M=15.25 years. There were 61 females and 15 males. Approximately 41% of the adolescents were White, 33% were Latino, and 26% were other ethnicities (Asian, Pacific Islander, or declined to report their ethnicity). 53% of participants had at least one suicide attempt, and 19% had more than one suicide attempt. The average number of suicide attempts was 1.5.

Procedure

This study investigated the role of coping and anger expression in regard to depression, and suicide attempts with adolescents on an inpatient

unit. Data was collected during a one-year period, from a sample at a psychiatric hospital located in Southern California. Information was obtained from the patient's medical record regarding diagnosis, length of stay, number and type of suicide attempts, substance abuse, and medications. Information was also gathered about the participant's age, ethnicity, education, parent's marital status, parent's education, self-harm behaviors, substance abuse, and the frequency and types of suicide attempts. The adolescents then completed a series of three measures, which included the Children's Depression Inventory (CDI-2); the Coping Response Inventory for Youth (CRI-Youth); and the State Trait Anger Expression Inventory-2 (STAXI-2).

Table 1. Demographic Summary and Comparison of Measures

		f (%)		M(SD)
Gender			**Age**	15.25(1.1)
	Females	61(79.2)		
	Males	15(19.5)	**Number of Suicide attempts**	1.53(3.6)
Family Type				
	Married	24(31.6)		
	Divorced	33(43.4)		
	Never married	19(25.0)		
Education (Father)				
	High School or less	19(24.7)		
	College or greater	24(31.2)		
Education (Mother)				
	High School or less	33(24.7)		
	College or greater	36(31.2)		
Ethnicity				
	White	31(40.8)		
	Hispanic	25(32.9)		
	Other	20(26.3)		
	TOTAL	76		

Measures

The Children's Depression Inventory 2 (CDI-2) (Kovacs, 2011) is a self-report measure of depression in children and adolescents. It is used for the early identification of depression, the diagnosis of depression, and to monitor treatment effectiveness. It asks the individual to report feelings related to depression for the past two weeks. There are two scales of emotional and functional problems, and subscales of negative mood, negative self-esteem, ineffectiveness and interpersonal problems. The administration age for males and females is 13-17 years old. The Cronbach's alpha is r=.84. (Kovacs, 2011).

The State-Trait Anger Expression Inventory-2 (STAXI-2) (Brunner and Spielberger, 2009) is a self-report measure that assesses state anger, trait anger and anger expression. The state anger scale refers to the intensity of the individual's angry feelings at the time of testing. The state anger-feelings angry scale reflects the intensity of annoyance and anger experienced by the respondent during the testing. The state anger-expression scale reflects a strong desire for the respondent to express anger through words or physical actions. The trait anger scale evaluates the respondent's predisposition to becoming angry. The trait anger-temperament refers to anger that is experienced quick and with little provocation. The trait anger-reaction scale measures the tendency to become angry when the respondent is criticized, sensitivity to criticism, or when receives negative feedback. The anger expression-out scale describes the respondent's propensity to express anger outwardly in a negative and uncontrolled manner such as by assaults, hitting, or slamming doors. The anger expression-in refers to the amount in which the respondent suppresses anger inside. The anger control-out refers to the respondent spending a great deal of energy on trying to reduce anger and calm down as quickly as possible. The internal consistency alpha coefficients for the STAXI-2

subscales range from .70 to .87 for ages 9-18 (Brunner and Spielberger, 2009).

The Coping Response Inventory-Youth (CRI-Y) (Moos, 1992) is a self-report measure that assesses coping skills of youth between the ages of 12-18 years old. The Coping Response Inventory (CRI-Y) is a self-report measure that assesses coping skills. It is divided into two scales of approach or avoidant coping styles. Approach coping styles include logical analysis, positive reappraisal, seeking guidance and support, and problem solving. Logical analysis is defined as cognitive attempts to understand and prepare mentally for a stressful situation. Positive reappraisal means cognitive attempts to restructure a problem in a positive way while still accepting the reality of it. Seeking guidance are attempts to seek out support, information, and guidance. Problem solving means attempts to take action to directly address the problem. Avoidant coping styles consist of cognitive avoidance, acceptance or resignation, seeking alternative rewards, and emotional discharge. Cognitive avoidance is defined as attempts to avoid thinking realistically about the problem. Acceptance or resignation is cognitive attempts to accept the problem. Seeking alternative rewards means getting involved in substitute activities to create a new source of satisfaction. Emotional discharge is behavioral attempts to reduce tension by expressing negative feelings. The internal consistency alpha coefficients for the CRI-Y subscales range from .55 to .72 for boys and .59 to .79 for girls (Moos, 1992).

Analytic Strategy

Statistical analysis was conducted using the SPSS 22.0. Prior to analysis, all items were screened for univariate assumptions (Tabachnick & Fidell, 2013). Through this process, one case was determined to be an outlier on multiple subscales from the Coping Response Inventory, the outlier scores on these scales were recoded into the normal range prior to analysis. The data was then evaluated in three distinct approaches. First, we used t-tests to determine if there were statistically significant differences between the means of patient with and without a history of a suicide attempt on the depression, coping, and anger expression measures. Then we used the binary outcome variable of suicide attempts (yes = 1; no = 0). The adolescent who endorsed a prior suicide attempt was placed in the "yes" category. Methods for suicide attempts included overdose, cutting/stabbing self with the intent of suicide, hanging, suffocation, huffing, drowning, jumping, and starvation. The suicide attempt category included a range of one attempt to multiple

attempts. The adolescent who reported a history of suicide ideation with no actual attempt, was placed in the "no" attempt category. The "no" attempt category also included adolescents who endorsed non-suicidal self-injury. The patient's suicide attempt history was evaluated with hierarchical logistic regression. This modeling determined whether the depression, coping, or anger expression measures could accurately differentiate patients with and without suicide behavior histories. Finally the analysis employed EQS 6.2 (Bentler, 2006) and a Full Information Maximum Likelihood estimation method to determine at a multivariate level whether depression offered both direct and indirect effects on suicide behaviors. The indirect effects being the effect depression offers through anger expression and coping. In this analysis the outcome/endogenous variable was a scale variable measuring the number of previous suicide attempts by the patient.

Results

Table 2 and Figure 1 below illustrate the differences between adolescents with a history of suicide attempt and no history of suicide attempt amongst the measures used in this study. Specifically, what was found was that adolescents with a history of suicide attempts have a statistically significant higher levels of depression (M = 72.4, SD = 12.7, Very Elevated) than adolescents with no history of suicide attempts (M=64.2, SD = 15.0, High Average), t (74) = -2.55, p < 0.01.

Further analysis determined that there was a statistically significant difference between anger expression for adolescents who have and do not have a history of suicide attempts. The history of suicide attempt group scored slightly higher on the State Anger scale (M=53.1, SD= 13.6) than the no history of suicide attempt (M= 47.8, SD= 11.4), t (74) = -1.76, p < 0.1, although this finding is not statistically significant it does suggest a trend towards significance. Therefore we might hypothesize that adolescents with a history of suicide behaviors show an increased intensity of angry feelings. Similarly, adolescents with a history of suicide behavior (M= 53.5, SD= 13.3) scored slightly higher than the no history of suicide behavior (M= 46.4, SD = 9.68), t (74) = -2.52, p < 0.01 on the State Anger/Feeling subscale.

In addition, the two groups varied on the Trait Anger scale, which indicated that adolescents with a history of suicide attempts (M=55.8, SD = 12.8) scored higher than those with no history of suicide attempts (M= 49.3, SD = 11.60), t (74) = -2.11, p< 0.05. There were also differences on Trait Anger

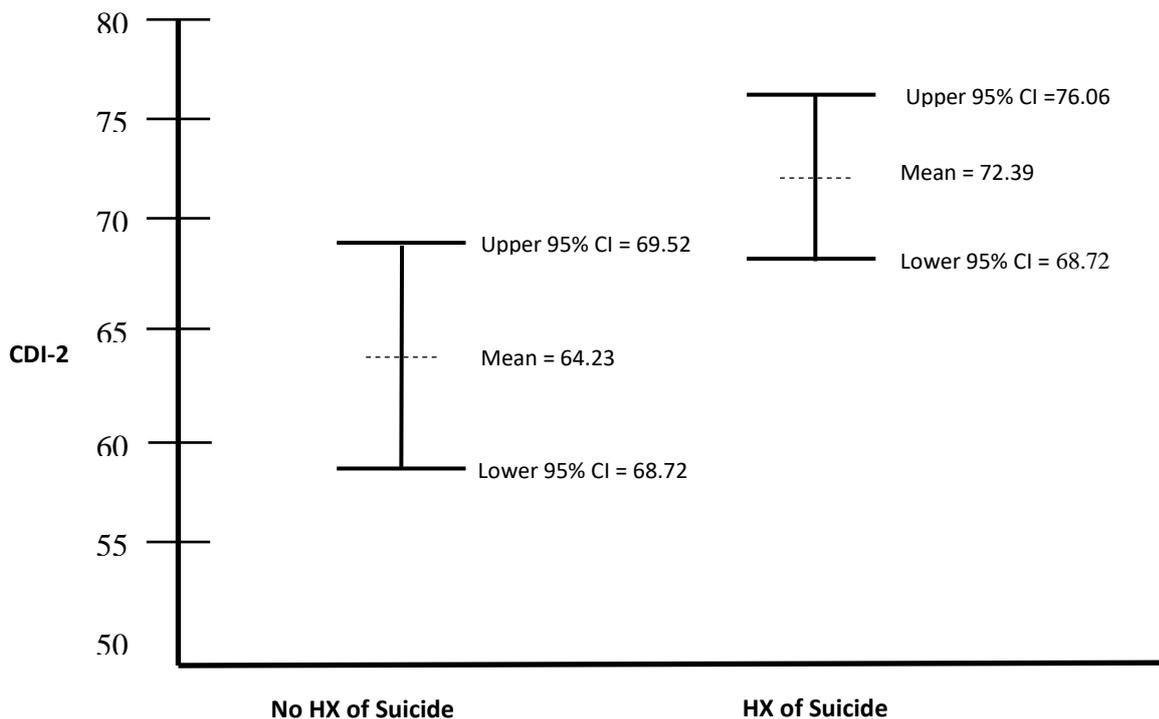subscales. Trait Anger Temperament for adolescents with a history of suicide attempts (M=55.5, SD = 12.8) was higher than those with no history of suicide attempts (M = 50.3, SD = 12.7), t (73) = -1.73, p < 0.1.

Table 2 Comparison of Depression, Coping and Anger Expression between Patients with and without a History of Suicide Attempts

	Suicide History M(SD)	No History M(SD)	T(df)
Children's Depression Inventory	**72.39(12.65)**	**64.23(15.01)**	**-2.55(74)****
Coping Response Inventory			
Logical Analysis	49.67(11.72)	51.03(9.73)	.53(74)
Positive Appraisal	47.64(13.05)	47.63(9.44)	-.00(73)
Seeking Guidance	51.30(14.66)	54.70(13.58)	1.02(74)
Problem Solving	49.56(10.90)	53.00(8.83)	1.44(73)
Cognitive Avoidance	59.00(10.80)	59.67(8.26)	.29(74)
Acceptance or Recognition	59.98(11.76)	59.70(8.02)	-.11(74)
Seeking Alternative Reward	50.74(11.86)	50.73(7.81)	-.00(74)
Emotional Discharge	59.30(11.11)	57.23(5.92)	-.94(74)
State-Trait Anger Inventory			
State Anger	**53.13(13.64)**	**47.83(11.40)**	**-1.76(74)†**
State Anger-feelings	**53.54(13.34)**	**46.43(9.68)**	**-2.52(74)****
State Anger V/P Expression	52.29(12.34)	49.70(11.60)	-.91(74)
Trait Anger	**55.82(12.78)**	**49.27(11.60)**	**-2.11(74)***
Trait Anger Temperament	**55.49(12.83)**	**50.27(12.72)**	**-1.73(73)†**
Trait Anger Reaction	**53.64(11.24)**	**46.87(13.23)**	**-2.38(74)***
Anger Expression-Out	50.61(12.78)	49.70(14.43)	-.29(74)
Anger Expression-In	57.70(13.06)	58.77(12.18)	.36(74)
Anger Control	49.41(10.99)	50.43(12.21)	.38(74)

† p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Figure 1. Comparison of Depression Scores and Suicide Behavior.

Suicidology Online 2017; VOL.8 (2): 1-10.

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On another subscale of Trait Anger, Trait Anger Reaction, the two groups varied. Those with a history of suicide attempts (M=53.6, SD = 11.24) scored higher than those with no history of suicide attempts (M=46.9, SD = 13.2), t (74) = -2.38, p < 0.05.

Next, we evaluated all three concepts together (Depression, State-Trait Anger, and Coping Skills), including demographic variables (gender, age, parent's marital status, history of substance use) in a hierarchical logistic regression model, to estimate how these factors impact suicide attempts (1 = suicide attempt, 0 = no history of suicide attempt). Given that the sample size was small, as well as a tendency for the associates subscales within each measure to be correlated (and produce multiple colinearity) we choose to use an enter method between blocks, and a backward likelihood ratio method within blocks (Mertler & Vannatta, 2010). Table 3 below reports the final model with only significant predictors included. This stepwise model fit four blocks. The first being the demographic control variables. This block did not have any significant predictors estimated and therefore correctly classified only 55.4% of the cases and accounted for 0.0% of the total variance in the dependent variable (-2 Log Likelihood = 101.72, Cox & Snell R^2 = 0.00, Nagelkerke R^2 = 0.00%). The second block included the CDI variable and was a moderately well-fitting model with 62.2% correct classification and explained approximately 6-9% of the variance. (-2 Log Likelihood = 96.81, Cox & Snell R^2 = 0.06, Nagelkerke R^2 = 0.09%). In this model Higher scores on the CDI increased the odds of being classified into the suicide attempt group (B = .038, se = .018, Wald = 4.61, Exp(B) = 1.039, p < 0.03).

The third block added the Coping Response variables. This block offered a significant improvement in fit with a correct classification of 71.6% and explained 21-28% of the variance (-2 Log Likelihood = 84.49, Cox & Snell R^2 = 0.21, Nagelkerke R^2 = 0.28%). This model retained three coping response variables. In this case increases of Problem solving (B = -.079, se = .036, Wald = 4.92, Exp(B) = 0.92, p < 0.03) and Cognitive Avoidance (B = -.080, se = .036, Wald = 4.97, Exp(B) = 0.92, p < 0.04) decreased the odds of being grouped into the suicide group. Higher levels of emotional discharge increased the odds of being grouped into the suicide attempt group (B = .070, se = .035, Wald = 4.04, Exp(B) = 1.07, p < 0.04).

The fourth, and final block included the State-Trait Anger variables. The resulting model fit the data well (-2 Log Likelihood = 65.72, Nagelkerke R^2 = .50, Cox & Snell R^2 = .37). The final model also correctly classified the participants into the previous history of suicide behavior group with 79.5% accuracy. The significant variables from blocks 1-3 where retained in the model and five additional State and Trait variables were added as significant predictors. Increased depression increases the odds of being classified into the suicide attempt group. Additionally coping responses associated with problem solving and cognitive avoidance decreased the odds of being grouped in the suicide attempt group whereas as emotional discharge increased the odds. Specific to this four block, patients with higher State Anger and Trait Anger tended to be in the suicide attempt group (see Table 3).

Discussion

In all the analyses, depression predicted the suicide behavior history. A comparison between the CDI-2 scores of the group with no history of a suicide attempt, versus the group with a history of a suicide attempt, demonstrates that a cut off score of 68 or higher puts the adolescent at greater risk for a future attempt. When the coping styles were evaluated individually (as in the first t-test comparison), they do not seem to vary between those with and without a history of a suicide attempt. Rather it is the state and trait anger concepts that vary. Specifically those with higher State and Trait anger scores were seen for the suicidal attempt group. Therefore, depression and state and trait anger can be helpful concepts to consider in light of patients who are at risk for suicide behaviors.

In the second analysis, we evaluated each concept in relationship to the other. In this case, when controlling for depression and state and trait anger, certain coping styles do seem to offer predictive abilities for suicide attempts. Specifically, the coping styles of emotional discharge, problem solving, and cognitive avoidance. Patients with higher levels of emotional discharge and lower levels of problem solving and cognitive avoidance have an increased risk of suicide attempts. This means that the patient at greatest risk for suicide has a score of 68 or higher on the CDI-2, has elevated state and trait anger scores on the STAXI-2, high emotional discharge, and is actively thinking about the problem, but is unable to find a solution to the problem.

As can be seen in Table 3 when we include all three concepts, as well as demographic variables, we find in both the simplistic t-test evaluation and the more robust logistic regression evaluation that depression plays a significant and negative role in predicting suicide behaviors. In this case, patients

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with higher levels of depression were more likely to have a history of suicide attempts. Also similar to the previous analysis, those with higher State Anger/ Feeling and Trait Anger Reactions are statistically significantly more likely to have a suicide attempt history.

Table 3 Predicting Suicide Attempts: Hierarchical Logistic Regression with Backwards Likelihood Ratio Method.

Outcome Variable is 1 = Suicide Attempt, 0 = No History of Suicide Attempt

Predictor	B(se)	Wald Statistic	Exp(B)	95% CI
Age	ns	-	-	-
Gender (male = 1, female = 0)	ns	-	-	-
Parent's married (married =1 not married = 0)	ns	-	-	-
History of Substance Use (yes = 1, no = 0)	ns	-	-	-
Children's Depression Inventory	.06(.03)	3.68*	1.06	1.00-1.14
Coping Response Inventory				
Logical Analysis	ns	-	-	-
Positive Appraisal	ns	-	-	-
Seeking Guidance	ns	-	-	-
Problem Solving	-.09(.05)	4.39*	.91	.83-.99
Cognitive Avoidance	-.07(.04)	3.00†	.94	.87-1.0
Acceptance or Recognition	ns	-	-	-
Seeking Alternative Reward	ns	-	-	-
Emotional Discharge	.09(.05)	3.52*	1.09	1.00-1.19
State-Trait Anger Expression Inventory				
State Anger/feeling	.18(.07)	6.25**	1.20	1.04-1.37
State Anger-verbal or Physical expression	-.16(.06)	6.18**	.85	.75-.97
Trait Anger Reaction	.06(.03)	3.33*	1.06	1.00-1.13
Trait Angry Temperament	ns	ns	-	-
Anger Expression-Out	-.08(.04)	4.60*	.93	.87-.99
Anger Expression-In	-.08(.04)	4.54*	.92	.86-.99
Anger Control-Out	ns	-	-	-
Percent Correct Total	77.0%			
Percent Correct in Yes	79.5%			
Percent Correct in No	73.3%			
Cox & Snell R^2	.37			
Nagelkerke R^2	.50			
-2 Log Likelihood	65.72			

† $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

ns = not significant ($p > 0.05$) and removed from final model due to Backwards Likelihood Ratio method.

Step methods was used with separate blocks for the Demographic variables (Age, Gender, Marital Status, Substance Use), Children's Depression, Coping Response Inventory and State-Trait Anger Expression Inventory.

Although the three variables (Depression, State Anger Feelings and Trait Anger Reaction) are consistently showing predictive relationships to suicide attempt history, this analysis identified additional predictive variables, when these three variables were controlled for. In this case, this analysis showed a significant increase in the probability of suicide attempt when the patient also had lower scores on the State Anger-Verbal or Physical Expression, Anger Expression-Out, and Anger Expression-In measures. Indicating that after controlling for depression, State Anger Feeling and Trait Anger Reaction, those with lower levels of anger expression (State Anger Expression, Anger Expression-Out and Anger Expression-In) were more likely to have a history of a suicide attempt.

This analysis, unlike the previous analysis, also identified significant relationships between suicide attempt history and coping. Therefore, after controlling for Depression, State Anger Feelings and Trait Anger Reaction, certain coping styles are related to suicide attempt history. A higher level of emotional discharge, low problem solving skills, and low cognitive avoidance was seen with adolescents with a history of at least one suicide attempt.

As seen in many other studies, this study continues to demonstrate a strong effect of depression on suicide attempts (Greening & Stoppelbeing, 2002; Horowitz, Hill, & King, 2011; Lewinsohn, Rohde & Seeley, 1994). Nrugham, Holen and Sund (2012) note that depression and hopelessness are

characteristics of adolescents who repeat suicide attempts as young adults. Major Depression is present in approximately 60% of suicide deaths (Cavanagh et al., 2003), and depression is associated with a 20 times higher risk of suicide (Osby et al., 2001). Treating depression is likely to reduce suicide rates in adolescents (Wilkinson, et al., 2011). Because of this significant and consistent finding, we offer some potential clinical guidance for a cut off score on the CDI-2 for depression.

This study found that for those with no history of a suicide attempt, their CDI-2 ranged from 68.72-69.52 (95% CI), whereas for those with a history of suicide attempt, their CDI-2 scores ranged from 68.72-76.06 (95% CI). Therefore, if the CDI-2 is given as part of the intake evaluation process a clinic might apply a cut off score of 68. In this case, any patient with a CDI-2 score of 68 or higher should be screened for potential suicide attempts. Furthermore, the cut off score could be used to identify adolescents in inpatient setting with higher risk for suicide attempts, and therefore warrant more in-depth evaluation, extensive discharge planning, and continued care. We are cautious in providing this cut off score as it must be used with consideration of the limitation of this study. In addition, future studies should attempt to replicate this cut off score before it can be used with greater confidence.

This study provides support for the role of depression, but also the role of anger, with regard to suicide risk. In the first analysis, without controlling for depression or coping, patients with higher levels of State Anger and Trait Anger were more likely to have a history of a suicide attempt. This finding supports Hammen (1994) and Jang et al. (2014) studies, which noted that depression and anger are highly correlated with suicide. This suggests that clinicians should not only evaluate a patient's level of depression but also evaluate a patient's anger expression. This was again seen in the second analysis which controlled for not only depression but coping as well. Increases with state and trait anger correlate with depression, and depression has a direct impact on suicide attempts. The study also provides support for the role of coping behaviors. Specifically when considered without regards to depression and anger (as in the first analysis), coping behaviors do not seem to relate directly to suicide attempts. However, as seen in the second and third analysis, if we first control for depression and anger, increases in emotional discharge (behavioral attempts to reduce tension by expressing emotional negative feelings, Moos, 1992), and decreases in cognitive avoidance (cognitive attempts to avoid thinking

realistically about a problem, Moos, 1992) and poor problem solving (behavioral attempts to take action to deal directly with the problem, Moos, 1992) lead to a higher likelihood of suicide attempts. The adolescents may be thinking about the problem, but are unable to find a solution, and may feel trapped. Future studies could explore the role of problem solving in more depth. In these studies, it will be important to include the findings from this study and therefore explore the role of problem solving with consideration to lowering suicide risk.

Although this study offers important findings for adolescent inpatient care, as well as suicide attempts, there are a number of limitations that should be considered. The first limitation is that this study is a cross-sectional analysis based on a convenience sample of adolescents at an inpatient setting. Therefore, we cannot infer a cause and effect relationship between depression, coping, anger and suicide attempts. However, the literature offers substantial evidence for the co-existence of increased depression and increased probability of suicide. In addition, we know that a strong indicator of future suicides is a history of past suicide attempts. This study was conducted with inpatients, therefore, the role and relationship of depression, anger; coping and suicide may not be replicable with other populations. Future studies should focus on depression, anger, coping and suicide in a longitudinal design, as well as expand this study into other populations.

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Original Research

Negative Body Attitudes as a Risk Factor for Non-Suicidal Self-Injury among College Students

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Abstract: The aim of the current study was to examine the prevalence of non-suicidal self-injury (NSSI), as well as the relationships between emotion dysregulation, negative attitudes towards the body, and NSSI, within a sample of college students. We administered self-report measures to 143 diverse college students. Results revealed an NSSI prevalence rate of approximately 27%. Those who identified as a racial/ethnic minority were no more likely to endorse NSSI than those who identified as White/European American. There were no significant differences in emotion dysregulation between participants who endorsed NSSI and those who did not, yet negative bodily attitudes were significantly related to NSSI. Based upon the results, it is argued that negative attitudes towards the body should be considered an important risk factor in NSSI engagement among diverse college students.

Keywords: non-suicidal self-injury, emotion regulation, body attitudes, college students

Non-suicidal self-injury (NSSI) is most commonly defined as the intentional destruction or alteration of bodily tissue without conscious suicidal intent (American Psychiatric Association, 2013; Favazza, 1989). Differentiated from other self-destructive acts, NSSI does not include behaviors that have unintended negative effects (e.g., lung cancer as a result of smoking) or that are culturally sanctioned (e.g., tattoos or body piercing; Nock, 2009). Non-suicidal self-injury disorder has been included in the Diagnostic and Statistical Manual of Mental Disorders (fifth edition; American Psychiatric Association, 2013) as a condition for further study, and researchers have found support for the presence of the disorder in samples of the general public (e.g., Andover, 2014). Although research suggests that NSSI is an important risk factor for suicide attempts (Klonsky, May, & Glenn, 2013), the majority of individuals who engage in NSSI do not attempt suicide (Wilcox, Arria, Caldeira, Vincent, Pinchevsky, & O'Grady 2012).

While estimates report a prevalence of approximately 3-6% in the general adult population (Klonsky, 2011; Plener, Allroggen, Kapusta, Brähler, Fegert, & Groschwitz, 2016), research suggests that young adults are at a greater risk for NSSI, with an estimated 21.7% prevalence among adolescents seeking outpatient treatment (García-Nieto, Carballo, de Neira Hernando, de León-Martinez, & Baca-García, 2015), and an estimated 17-32% prevalence among college students (Aremiento, Hamza, & Willoughby, 2014; Whitlock, Eckenrode, & Silverman, 2006). Average reported age of NSSI onset ranges from 12.8 (Nock & Prinstein, 2004) to 16 years old (Klonsky, 2011). Common types of NSSI methods include

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cutting, pinching, burning, and head banging (Heath, Toste, Nedecheva, & Charlebois, 2008).

Although there is agreement that NSSI is prevalent in the young adult population, there are inconsistent findings regarding racial/ethnic and gender differences in NSSI. Kuentzel, Arbie, Boutros, Chugani, and Barnett (2012) identified important differences in NSSI behaviors in an ethnically diverse sample of college students; specifically, participants who self-identified as White were at elevated risk for NSSI compared to participants who self-identified as African American. Similarly, in a sample of diverse college students, Chesin, Moster, and Jeglic (2013) found that Asian and White students reported higher rates of NSSI, when compared to Hispanic and African American students. However, Gratz et al. (2012) found that, overall, African American youths reported higher rates of NSSI, when compared to White youths, yet rates of NSSI varied, depending upon participants' reported gender, racial background, and school level. According to the authors, African-American boys in middle school reported the highest rates for most NSSI behaviors, while White girls and African American boys reported the highest rates of cutting behaviors. Due to these inconsistent findings, further examination of the prevalence of NSSI in this population is warranted.

In spite of the racial/ethnic and gender inconsistencies found in NSSI engagement among young adults, research has demonstrated a consistent relationship between NSSI and difficulties in emotion regulation (see Andover & Morris, 2014, for a review). Emotion dysregulation is characterized by the refusal to accept emotions, difficulties managing behaviors during times of distress, and a compromised ability to recognize the informational value of emotions (Gratz & Roemer, 2004). Research suggests that individuals engage in self-injury in response to emotion dysregulation, and following engagement in the behavior, a reduction in overwhelming negative affect commonly occurs (Klonsky, 2007). This relationship has been examined extensively among college students; for example, Gratz and Roemer (2008) reported a positive relationship between emotion dysregulation and frequency of NSSI in a sample of diverse college students, citing limited access to emotional strategies and a lack of emotional clarity as predictive factors of NSSI. In a sample of predominately female East Asian college students, Victor and Klonsky (2014) reported that those who engaged in NSSI were more likely to experience more negative emotions and fewer positive emotions, when compared to those that did not self-injure. Similarly, Anderson and Crowther (2012) found that college students with current or past engagement in NSSI endorsed more intense emotional experiences, greater difficulty identifying

their feelings, and less access to emotion regulation strategies, when compared to those who reported no current or past engagement in NSSI. In sum, there is evidence suggesting that emotion dysregulation, including experience of negative emotions, difficulty identifying emotions, limited resources to regulate emotions, and use of ineffective emotion strategies, plays an important role in the maintenance of NSSI in this emerging adult population.

Research has also turned to the role of negative bodily attitudes in the relationship between emotion dysregulation and NSSI. Negative attitudes towards the body, including a lack of emotional investment in the body, may lead to engagement in NSSI. From this perspective, Orbach (1996) suggested that negative bodily attitudes may cause someone to physically harm themselves, due to feelings of dislike or disrespect towards one's body. It has since been found that, among young adults, negative attitudes towards the body significantly mediated the relationship between negative affect and NSSI (Muehlenkamp & Brausch, 2012). Similarly, within a sample of college students, low body regard was found to moderate the relationship between emotion dysregulation and NSSI (Muehlenkamp, Bagge, Tull, & Gratz, 2013). Negative affect has also been demonstrated to have an indirect effect on the relationship between negative body image and NSSI among young adults (Duggan, Toste, & Heath, 2012). Moreover, research has also suggested NSSI may occur in response to negative affect associated with disordered eating (e.g., Muehlenkamp, Peat, Claes, & Smits, 2012). Despite the apparent relationship between self-destructive behaviors, negative bodily attitudes, and emotion dysregulation, research has not yet examined whether negative attitudes towards the body contribute to the well-established relationship between emotion dysregulation and NSSI in a sample in which racial/ethnic minority students comprise the majority of the student body.

The current study had four specific aims. First, we wished to explore the prevalence of NSSI within a diverse college sample. Second, we hypothesized that there would be significant differences in NSSI endorsement between races, such that those who identify as a member of a racial/ethnic minority group would report higher rates of engagement in NSSI, when compared to those who identify as White/European American. Third, we predicted that there would be a significant positive correlation between emotion dysregulation and frequency of NSSI behaviors, a significant negative correlation between emotion dysregulation and negative attitudes towards the body, and a significant negative correlation between negative attitude towards the body and frequency of NSSI behaviors. Finally, we hypothesized that negative attitudes towards the

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body would mediate the relationship between emotion dysregulation and engagement in NSSI.

Methods

Participants

After approval by the Institutional Review Board, male and female undergraduate students (N = 143) were recruited from an urban university in the northeastern United States. Informed consent was obtained, and participants were asked to complete a number of self-report measures online. In exchange for participation, students received course credit.

Measures

Deliberate Self-Harm Inventory (DSHI; Gratz, 2001). The DSHI is a 17-item self-report questionnaire, designed to assess the type, frequency, and severity of self-harm behaviors. Participants answer "Yes" or "No" to statements such as "Have you ever intentionally (i.e., on purpose) cut your wrist, arms, or other area(s) of your body (without intending to kill yourself)?" If the participant responds "Yes," follow up questions are presented to determine age of engagement in the behavior, frequency of the behavior, the last time the participant engaged in the behavior, how many years the participant has engaged in the behavior, and whether or not the behavior resulted in hospitalization. Gratz (2001) reported high internal consistency (a = .83), adequate test-retest reliability (r = .68, p < .001), and moderate correlations with other measures of self-harm. According to Gratz (2007), engagement in NSSI is considered "clinically meaningful" if a participant endorses 10 or more instances of a self-harm behavior. Since engagement in self-injury was not normally distributed as a frequency variable, self-injury was recoded into a dichotomous (i.e., engaged in self-injury vs. no engagement in self-injury) variable. Consequently, a chi-square goodness-of-fit was conducted to determine if the measure successfully distinguished between those that endorsed NSSI and those that did not. Results supported the efficacy of the measure in the current sample, $X^2(1) = 31.39$, $p < .001$.

Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004). The DERS is a 36 item self-report questionnaire, designed to assess deficits in emotion regulation. Answers are scored on a 5-point scale, ranging from 1 ("almost never 0-10%") to 5 ("almost always 91-100%"). Item ratings are summed to create a total score, with higher scores indicating higher levels of emotion dysregulation. The DERS comprises six subscales: Non-acceptance (e.g., "When I'm upset, I become angry with myself for feeling that way"), Goals (e.g., "When I'm upset, I have trouble getting work done"), Impulse Control Difficulties (e.g., "I

experience my emotions as overwhelming and out of control"), Lack of Emotional Awareness (e.g., "I pay attention to how I feel"), Limited Access to Emotion Regulation Strategies (e.g., "When I'm upset, I believe that I will believe that I will remain that way for a long time"), and Lack of Emotional Clarity (e.g., "I am clear about my feelings"). Gratz and Roemer (2004) reported high overall internal consistency (a = .93) and test-retest reliability (r = .88, p < .01). In terms of construct validity, Gratz and Roemer (2004) also demonstrated that the DERS correlated in the expected positive direction with a measure of emotion regulation (Negative Mood Regulation Scale; Catanzaro & Mearns, 1990). In a sample of female undergraduates who endorsed frequent engagement in self-harm behaviors, Gratz and Roemer (2008) reported an average overall sum of 87.44 (SD = 19.87) on the DERS. In the current study, Cronbach's alpha for the overall scale was .94, with Cronbach's alpha for each subscale as follows: Nonacceptance (.87), Goals (.83), Impulse (.85), Awareness (.73), Strategies (.83), and Clarity (.82).

Body Investment Scale (BIS; Orbach & Mikulincer, 1998). The BIS is a 24-item self-report measure, designed to assess emotional investment in and attitudes towards one's body. Answers range from 1 ("do not agree") to 5 ("strongly agree"). The BIS comprises four subscales: Attitudes/Feelings Towards the Body (e.g., "I am frustrated with my physical appearance"), Comfort with Touch (e.g., "I don't like it when people touch me"), Body Care (e.g., "I believe that caring for my body will improve my well-being"), and Body Protection (e.g., "I look in both directions before crossing the street"). Scores are obtained by averaging item responses within each subscale, with higher scores indicating more positive feelings towards the body. A total score can also be obtained by computing the mean of the four subscales. In a sample of 54 adolescent patients with a history of self-harm, Muehlenkamp and Brausch (2012) reported an overall mean score of 3.46 (SD = 0.54) on the BIS. According to Orbach and Mikulincer (1998), the BIS successfully distinguished between suicidal and nonsuicidal inpatients, and the BIS subscale scores significantly correlated with suicidal behaviors. In the current study, Cronbach's alpha for the overall scale was .81, with Cronbach's alpha for each subscale as follows: Feelings (.84), Touch (.57), Care (.81), and Protection (.62).

Analyses

An analysis using G*Power suggested a total sample size of 107 participants to achieve adequate power (Faul, Erdfelder, Lang, & Buchner, 2007). As previously discussed, analysis of the DSHI indicated that engagement in NSSI was not normally distributed

as a frequency variable, so it was recoded into a dichotomous (i.e., endorsed/not endorsed) variable. Due to the low alphas of some of the BIS subscales (i.e., BIS-Touch and BIS-Protection), they were excluded from analyses in which subscales were examined. The relationships between emotion dysregulation, negative bodily attitudes, and NSSI were investigated using correlational analyses. Independent samples t-tests were also conducted to examine differences in emotion dysregulation and bodily attitudes between those who endorsed NSSI and those who did not. To examine whether body investment functioned as a mediating variable between emotion dysregulation and engagement in NSSI, we utilized Hayes (2013) bootstrapping procedure for examining indirect effects using the SPSS PROCESS macro.

Results

The majority of participants were aged 18-24 (n = 116; 81.12%) and identified as female (n = 99; 69.23%). Participants reported their racial identity as African American/African Caribbean/Black (n = 47; 32.87%), Asian/Pacific Islander (n = 26; 18.19%), Latina/o (n = 20; 13.99%), White/European American (n = 20; 13.99%), and Middle Eastern (n = 13; 9.09%). Eleven participants (7.69%) reported that they identified as more than one racial identity. Most participants indicated that they were single, not living with a partner (n = 123; 86.01%), followed by married/in a domestic partnership (n = 9; 6.29%), divorced/separated (n = 5; 3.50%), and not married but living together as a couple (n = 2; 1.40%). Of the total sample, 38 participants (26.57%) endorsed NSSI. Of those, the majority (n = 24; 63.16%) reported engagement in one method of NSSI, while eight (21.05%) reported engagement in two methods, six (15.79%) reported engagement in three methods, and one (2.63%) reported engagement in six methods. The most commonly reported method of NSSI was cutting (n = 15; 39.47%), followed by severe scratching (n = 8; 21.05%), piercing the skin with sharp objects (n = 8; 21.05%), burning the skin with a lighter or match (n = 6; 15.79%), and biting the skin (n = 5; 13.16%). The mean number of self-harming methods used was 1.53 (SD = .76), with a mean frequency of 8.6 (SD = 10.76) lifetime self-harming behaviors. Of those who endorsed NSSI, a total of 13 (34.21%) participants endorsed a clinically meaningful number (i.e., 10 or more; Gratz, 2007) of NSSI behaviors; however, no participants reported hospitalization as a result of engagement in NSSI.

Most participants indicated that they engaged in NSSI for approximately 1 year (n = 16; 42.11%), while the majority of participants endorsed having engaged in NSSI 6-10 years ago (n = 11; 28.95%). Of those who endorsed engagement in NSSI, a total of 12 participants (31.58%) reported recent (i.e., over the past year) engagement in NSSI.

In regards to our first study aim, a chi-square test of association found no significant differences in NSSI among reported racial/ethnic identities, $X^2(5)$ = .6.84, p = .233. Moreover, although the majority of those who reported NSSI were female (n = 29), there were no significant differences in NSSI between genders, $X^2(1)$ = 1.220, p = .269. Finally, there were no significant difference in NSSI among age groups, $X^2(1)$ = .220, p = .639.

Pearson product-moment correlations among study variables are presented in Table 1. In contrast to our prediction, results revealed no significant association between emotion dysregulation and NSSI. However, there was a significant negative relationship between emotion dysregulation and attitudes towards the body, indicating that higher levels of emotion dysregulation were associated with lower levels of emotional investment in the body. Also consistent with our hypothesis, results revealed a significant negative relationship between emotional investment in the body and engagement in NSSI, suggesting that the endorsement of negative attitudes towards the body was associated with engagement in NSSI.

Independent samples t-tests were then conducted to determine if there were differences between participants who reported engagement in NSSI and those who did not in DERS and BIS total and subscale scores (see Table 2). DERS-Total scores for participants who denied engagement in NSSI were not significantly different from those who reported engagement in NSSI. However, scores on the DERS-Impulse and DERS-Strategies subscales were significantly higher for those who reported engagement in NSSI, suggesting that participants with NSSI experience more difficulties with impulsive behaviors and decreased access to emotion regulation strategies. Additionally, scores on the BIS-Total and BIS-Feelings subscales were significantly lower for participants who endorsed engagement in NSSI; as such, participants who endorsed NSSI also reported more negative attitudes and feelings towards the body.

Table 1
Correlations among study variables

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. DERStotal										
2. DERSnonacc	.788**									
3. DERSgoals	.657**	.398**								
4. DERSimpul	.840**	.691**	.444**							
5. DERSaware	.537**	.214*	.139	-.250**						
6. DERSstrat	.871**	.665**	.599**	.748**	.240**					
7. DERSclarity	.748**	.513**	.293**	.293**	.533**	.512**				
8. BIStotal	-.408**	-.288**	-.129	-.407**	-.399**	-.358**	-.316**			
9. BISfeel	-.373**	-.230**	-.244**	-.314**	-.189*	-.393**	-.274**	.730**		
10. BIScare	-.163	-.137	.072	-.254**	-.200*	-.162	-.044	.663**	.226**	
11. NSSI	.103	.128	-.003	.208*	.050	.186*	-.001	-.221**	-.246**	-.061

Note. *p < .01, **p < .05. N = 143. DERS = Difficulties in Emotion Regulation Scale, Gratz & Roemer, 2004; BIS = Body Investment Scale, Orbach & Mikulincer, 1998); NSSI = non-suicidal self-injury.

Table 2
Independent samples *t*-test results for NSSI

Scales	No NSSI		NSSI		t	df	p
	M	SD	M	SD			
DERStotal	76.63	22.66	82.24	27.57	-1.231	140	.220
DERSnonacc	11.29	4.92	12.78	5.68	-1.524	139	.130
DERSgoals	12.68	4.65	12.65	5.38	0.303	137	.976
DERSimpul	11.50	4.97	14.05	6.20	-2.509	139	.013*
DERSstrat	15.35	5.62	17.92	7.08	-2.220	138	.028*
DERSclarity	10.72	4.22	10.71	4.17	0.013	140	.989
BIStotal	3.76	0.45	3.54	0.44	2.668	138	.009*
BISfeel	3.75	0.74	3.75	0.74	2.970	137	.004*
BIScare	4.05	0.72	3.95	0.75	0.719	138	.474

Note. N = 143. DERS = Difficulties in Emotion Regulation Scale, Gratz & Roemer, 2004; BIS = Body Investment Scale, Orbach & Mikulincer, 1998); NSSI = non-suicidal self-injury.

In the mediation analysis, the standardized regression coefficient between the emotion dysregulation total score and the body investment total score was statistically significant (B = -.01; p = .00), as was the standardized regression coefficient between body investment total score and NSSI (B = -1.1; p = .02). The bootstrapped unstandardized indirect effect was .01, and the 95% confidence interval ranged from .00 to .02. As such, the mediating effect of negative bodily attitudes in the relationship between emotion dysregulation and NSSI was not supported.

Discussion
This study sought to explore the prevalence of NSSI, as well as examine the potential relationships between bodily attitudes, emotion dysregulation, and NSSI, in a diverse sample of college students. Importantly, the prevalence of NSSI (approximately

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27%) was high in the current sample, as compared to previous research conducted in the college population (e.g., Whitlock et al., 2006). One contributing factor may be the racial and ethnic diversity of the study participants. The majority of participants identified as a member of a racial/ethnic minority group, so our findings may be consistent with previous research conducted in the college setting suggesting that minorities are more likely to engage in NSSI (e.g., Gratz et al., 2012). However, inconsistent with our hypothesis, there were no significant differences in NSSI based on race/ethnicity. Given this non-significant finding, other unmeasured factors may have contributed to the elevated prevalence of NSSI (e.g., socioeconomic status, the stressors of living in an urban environment). Additionally, although some studies have reported that women are more likely to report NSSI (e.g., Wilcox et al., 2012), our findings appear consistent with previous research suggesting that there is no gender difference in NSSI engagement (e.g., Heath et al., 2008).

In contrast to our prediction, participants who engaged in NSSI were no more likely to report overall difficulties in the emotional regulation, compared to those who did not endorse NSSI behaviors. This finding is contrary to previous research, which has demonstrated a consistent association between emotion dysregulation and NSSI (e.g., Gratz & Roemer, 2008). However, when the relationship between NSSI and emotion dysregulation was examined at the subtest level of the DERS, results suggested that engagement in NSSI might be related to high scores on some DERS subtests and low scores on others, which may contribute to the null overall relationship. Participants who reported engagement in NSSI endorsed greater difficulties in impulse control and difficulty accessing affect regulatory strategies, when compared to those who denied engagement in NSSI. These results are consistent with previous research, which has demonstrated a relationship between NSSI and both impulsivity (Arens, Gaher, & Simons, 2012) and limited access to emotion regulation strategies (Gratz & Roemer, 2008).

Consistent with our hypothesis, there was a significant negative relationship between emotion dysregulation and negative bodily attitudes. This finding is consistent with previous research, which supports a relationship between difficulties in emotion regulation and body image concerns (e.g., Hughes & Gullone, 2011). Additionally, negative attitudes towards the body significantly differentiated between those who endorsed NSSI and those who denied NSSI, such that those who reported NSSI endorsed more negative attitudes towards the body. These findings are also consistent with previous research, which has found that body shame and low body esteem are associated with NSSI (Nelson & Muehlenkamp, 2012).

In contrast to our prediction, negative bodily attitudes did not function as a mediating variable between emotion dysregulation and NSSI. This is contrary to previous research, which suggests that poor body regard may help to explain why those who endorse emotion dysregulation are at a greater risk for engagement in NSSI (e.g., Muehlenkamp et al., 2013). It is also worth considering that the measure used to assess emotion dysregulation (i.e., the DERS; Gratz & Roemer, 2004) may not have fully captured all facets of the phenomenon. Although the DERS has been examined in a wide variety of contexts (e.g., Fowler, Charak, Elhai, Allen, Frueh, & Oldham, 2014; Kökönyei, Urbán, Reinhardt, Józan, & Demetrovics, 2014; Sarıtaş-Atalar, Gençöz, & Özen, 2014), this is the first study to utilize the measure in a sample where racial/ethnic minority students compose the majority of the student body. In fact, those who identify as a racial/ethnic minority may not regulate their emotions in the same way as those who identify as White/European American. For instance, some research has suggested that racial/ethnic minorities are more likely to suppress their emotions, when compared to their White/European American counterparts (Gross & John, 2003). This study did not capture the suppression of emotions, which has been associated with engagement in NSSI (Najmi, Wegner, & Nock, 2007). Therefore, it is possible that unmeasured aspects of emotion dysregulation may have better explained engagement in NSSI.

There are several important limitations of the current study. First, data were obtained via self-report measures in an online format. Consequently, data are subject to participant memory bias, as the majority of participants reported engaging in NSSI 6 to 10 years ago. It is possible that participants were unable to accurately recall all past instances of past NSSI. Participants may have been hesitant to answer sensitive questions regarding engagement in self-injury in a truthful manner. Although engagement in NSSI was high in the current study, the small sample size may have impacted the ability to detect a significant relationship between NSSI and emotion dysregulation. Furthermore, NSSI was examined as a dichotomous variable; therefore, severity of engagement in NSSI was not examined. Consequently, we were unable to capture the differences between those who endorsed one self-harm behavior versus those who endorsed, for example, 10 self-injurious behaviors. In addition,

research has focused on use of the BIS in clinical samples (e.g., Orbach, Gilboa-Schechtman, Sheffer, Meged, Har-Even, & Stein, 2006), which may limit the generalizability of the construct in a sample of non-clinical college students. Although the internal consistency reliability of BIS-Total scores was acceptable in this sample, reliabilities were lower for some BIS subscales (i.e., BIS-Touch and BIS-Protection).

Due to the small sample size of the current study, our results should be interpreted with caution. However, we argue that these constructs should continue to be empirically examined. Future research should be conducted to determine the presence and possible functions of NSSI in a large multicultural sample, as the current study suggests that NSSI is a prevalent phenomenon among those who identify as a racial/ethnic minority. Since there was no significant relationship between emotion dysregulation (as measured by the DERS) and NSSI, additional studies should continue to explore other difficulties in emotion regulation that may predict engagement in NSSI (e.g., suppression), as well as whether these strategies may predict NSSI through a lack of emotional investment in the body. Greater clarification is also needed to determine whether there are protective factors associated with cultural experience that promote the successful regulation of emotions, yet intensify the presence of negative attitudes towards the body. Finally, the relationship between negative attitudes towards the body and engagement in other forms of self-destructive behaviors should also be examined (e.g., substance use and compulsive sexual behaviors), as evidence suggests that attitudes towards the body play a role in the maintenance of high-risk behaviors.

In conclusion, the results of the current study offer further evidence for the role of attitudes towards the body in the maintenance of self-destructive behaviors; as such, we suggest that mental health care providers should consider negative attitudes towards the body as a risk factor for engagement in NSSI within this population. Furthermore, our findings potentially suggest that treatment strategies might include the fostering of positive attitudes and feelings towards the body, as previous research has suggested that interventions aimed at improving body image have enhanced outcomes among those who engage in other forms of self-destructive behaviors (e.g., Danielsen & Rø, 2012). Due to the nonsignificant relationship between emotion dysregulation and NSSI, our results also suggest that a widely used measure of emotion dysregulation may not fully capture all aspects of the construct, some of which may be more commonly used among ethnic minorities (e.g., emotion suppression).

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Original research

Suicide Risk Factors in U.S. College Students: Perceptions Differ in Men and Women

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Abstract: The objective of this study was to conduct a survey of the general population addressing perceptions of suicide risk and suicide prevention in U.S. college students. We conducted an anonymous online survey and collected random opinions from a total of 3,762 Americans, of whom 1,583 self-identified as college-age students. We asked about factors contributing to suicide in college students, and for suggestions about means of prevention. The perception of relevant risk factors differed significantly between men and women. Males weighed competitive social pressures more heavily than women whereas women were more sensitive to relationship stress. With respect to preventive measures, no one method was significantly preferred to any other. The markedly different perceptions of men and women about suicide risks for college youth suggests that effective interventions need to include a variety of different approaches, some of which may need to be sex-specific.

Keywords: Suicide, College Students, Risk Factors, Gender Differences.

A significant number of students find college years stressful and emotionally difficult. Currently, more than 68% of American high school graduates attend postsecondary education, which results in approximately 20.5 million postsecondary students in the U.S. for 2016 (National Center for Education Statistics, 2016). According to the National College Health Assessment, nearly 10% of students report having been "so depressed it was difficult to function" over the past year and 1.6% admit to a suicide attempt during the year (The American College Health Association, 2008). That makes

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about 2 million students in any given year seriously thinking of suicide and 300,000 making a suicide attempt. A 2009 study of 26,000 college students concluded that approximately 6% of undergraduates a year are seriously suicidal (Drum, Brownson, Denmark et al., 2009). In 2013, Ibrahim et al. conducted a systematic review of all studies of depression among university students (Ibrahim, Kelly, Adams et al., 2013). They found 24 articles that met their criteria and showed a combined prevalence rate for depression ranging from 10% to 85%, with a mean of 30.6%, which is substantially higher than reported rates in the general population.

Despite these worrisome statistics, completed suicide in college students in the U.S. is calculated at between 6.5 and 7.5 per 100,000 (Silverman,

Meyer, Sloane et al., 1997), lower than the national average for suicide (Schwartz, 2011), perhaps because of the inherent resilience of youth and, additionally, because of the relatively accessible and effective mental health care provided on college campuses.

Identifying risk factors for suicide is essential for the initiation and maintenance of suicide prevention measures, such as 24/7 telephone help lines, suicide prevention web sites, anti-bullying digital campaigns, physical and virtual support groups, counseling services (including financial counseling), alcohol and drug rehabilitations programs, social work and chaplaincy access in student residences, specialized outreach to isolated students, sports and activities programs, anti-stigma programs, and family liaison.

Many risk factors for suicide among young people have been identified, namely:

a) male gender (Silverman et al., 1997). This is the case even though women students are more likely than male students to suffer from major depression and anxiety disorders (Eisenberg, Gollust, Golberstein et al., 2007);

b) socioeconomic insecurity (Eisenberg et al., 2007; Hurst, Baranik & Daniel, 2012; Weitzman, 2004);

c) relationship stressors (Hurst et al., 2012, Kisch, Leino, & Silverman, 2005); and,

d) absence of social supports (Hefner & Eisenberg, 2009).

Academic workload, addictions, and minority status have also been mentioned as potentially contributory (Hurst et al., 2012; Weitzman, 2004). Mental health stigma often contributes to delays in help-seeking (Ahmedani, 2011).

We set out to determine which risk factors were considered most important by the general U.S. public and particularly by U.S. students.

Method

The anonymous online survey method we used is based on Random Domain Intercept Technology or RDIT[TM] (Seeman, Ing, & Rizo, 2010; Seeman, Tang, & Brown, 2016), where random typing errors in the URL address bar exposes potential participants to a questionnaire to which they are free (or not) to respond. Respondents are only able to answer once from any one IP address. The suicide perceptions survey was accessible from June 6, 2016 to June 24, 2016 in all 50 US states and the District of Columbia. Exposure for 6 days was decided upon in advance in order to obtain an adequately large sample of respondents and in order to confirm the reproducibility of our findings. The questionnaire consisted of demographic questions (age, gender, student/non-student/field

of study) plus the following more specific questions:

a) Have you ever had suicidal thoughts?

b) Do you know students who have had suicidal thoughts?

c) Do you know anyone who has attempted or committed suicide on campus?

d) In your opinion, suicide of a college student occurs rarely, sometimes, or often?

e) Which factor contributes most to suicide? Academic competition, Family pressure, Financial pressure, Heartbreak, Isolation, Marginalization, Prior Mental Health Difficulties, Substance abuse, Work overload, Other?

f) Does mental health stigma play a role in campus suicide?

g) Which of the following can best help prevent suicide? Organized group discussion, approachable faculty, accessible mental health services, relaxed confidentiality rules (between mental health facilities and families), more financial help, better outreach, other?

The identical questionnaire was exposed to the public on six different days during the specified June 2016 period.

Results

Socio-demographic characteristics of the respondents

Of 3,762 total responses, 2,347 were received from self-identified students, of which 1,583 were postsecondary school age 18 to 44 (51% male, 49% female). The ages of the student respondents were as follows: 12% were of ages 18 to 24; 18% were of ages 25 to 34; 16% were of ages 35 to 44; and 17% were of ages 45 to 54.

Thirty-two percent of the male college students were studying sciences; 18% were in the humanities. Thirty-five percent of women college students were in the sciences and 18% in the humanities (the remainder of the college students endorsed "other").

The non-student respondents included teachers, school and university administrators, healthcare professionals, family members, and individuals sufficiently interested in college student mental health to take the time to respond to the questionnaire.

Personal Experience of College Students

Approximately 36% of the male college student respondents and 28% of the female college student respondents endorsed having had suicidal thoughts. Approximately 33% of the male students and 31% of the female students knew fellow students who had had suicidal thoughts.

Approximately 29% of the male student respondents and 20% of the female student respondents knew fellow students who had attempted or committed suicide.

Mental Health Stigma

Approximately 35% of the male college student respondents and 32% of the female college student respondents endorsed the statement that mental health stigma played a role in the suicides of college students. About 26% of the males and 17% of the females believed it did not, while the remainder stated that they did not know.

Gender Differences in Views of Suicide Determinants

Among the total respondent sample of 3,762, there were significant differences of opinion between males and females as to the determinants of student suicide.

As specified in Table 1, male respondents endorsed the following risk factors more frequently than did female respondents: Academic competition; Financial pressure; Work overload.

In contrast, female respondents more than male respondents endorsed the following risk factors: Family pressure; Heartbreak; Mental health difficulties (Table 1).

Table 1 Risk factor	Endorsed by Men	Endorsed by Women	p
Academic competition	8.7± 0.6%	4.1± 0.3%	<0.00001
Financial pressure	10.5 ± 0.4%	7.8 ± 0.4%	<0.001
Work overload	8.3 ± 0.2%	7.5 ± 0.2%	<0.02
Family pressure	4.2 ± 0.3%	11.5 ± 0.7%	<0.00001
Heartbreak	7.8 ± 0.5%	11 ± 0.7%	<0.005
Mental health difficulty	10.3 ± 0.5%	12.2% ± 0.5%	<0.016

There were no gender differences in opinions about isolation, marginalization, or substance abuse as potential suicide risk factors.

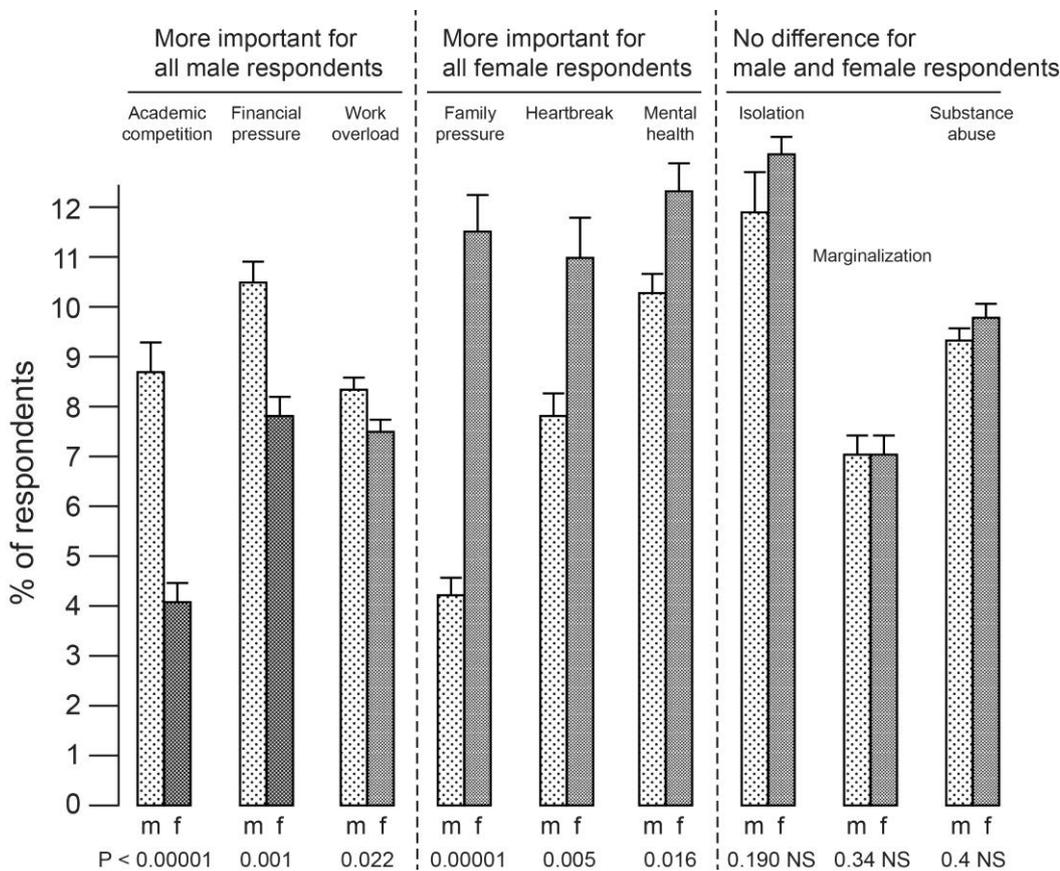The differences between all male respondents and all female respondents are summarized in Figure 1.

Figure 1

Showing the percent of all respondents (students, teachers, administrators, healthcare providers, family members) who provided their opinions on suicide risk factors for college student suicides. As compared to the all-women respondents ('f'), the all-male respondents ('m') considered academic competition, financial pressure, or work overload to be the most relevant. More women respondents, as compared to men, endorsed family pressure, heartbreak or prior mental difficulties. The error markers indicate the standard errors for six iterations of the questionnaire; the statistical p values are listed below. 'NS' indicates no statistical difference between male and female respondents for the factor shown.

When looking to see whether the same gender difference in views about risk factors was reflected among college student-only respondents, we found that it was, with the addition that more male students than the general population of males endorsed heartbreak and isolation as being relevant while more women students than the general population of females endorsed marginalization. These differences are summarized in Figure 1.

Prevention
Opinions about potentially preventive measures were divided more or less equally within the college student group:

- 16% endorsed better outreach to students;
- 14% endorsed organized group discussions;
- 14% endorsed more readily available mental health services;
- 13% endorsed more financial assistance;
- 12% endorsed more flexibility in sharing confidential information;
- 9% recommended that faculty become more approachable.

The student opinion appeared to be that all these suggestions might be somewhat helpful, but none particularly so.

Discussion
The major finding of this large population survey was that male respondents, as compared to female respondents, considered academic competition (8.7 ± 0.6% male vs 4.1 ± 0.3% female; $p<0.00001$), financial pressure (10.5 ± 0.4% male vs 7.8 ± 0.4% female; $p<0.001$), and work overload (8.3 ± 0.2% male vs 7.5 ± 0.2% female; $p<0.02$) to be critical determinants of suicide (Fig. 1) whereas women respondents more than their male counterparts were sensitive to the potential harms of heartbreak, family pressure and prior mental illness. To generalize from the findings, in the context of suicide, **men** seem to weigh competitive social pressures more heavily than women (see Van Vugt, De Cremer, & Janssen, 2007 for the evolutionary roots of this gender difference) whereas women are more sensitive to relationship stress (O'Neill & Gidengil, 2013).
In the college student-only subgroup, males also endorsed heartbreak and isolation as risk factors for suicide, a finding that has age-appropriate and college situation-appropriate surface validity while women students endorsed marginalization (Table

1). This too is college situation-appropriate because it is on campus rather than in everyday life that students, especially female students because compassion is reported to be more of a female trait (Christov-Moore, Simpson, Coudé et al., 2014), are likely to come face to face with the effects of marginalization of students considered as 'other.'
Gender differences in the general population or in student views about perceived suicide risk factors have not previously been reported. Gale, Hawley, Butler et al. (2016) found that female mental health professionals were significantly more cautious when appraising suicide risk from a written vignette attached to a facial image than were male professionals. When studying college students, however, Mitchell (2015) found no gender difference in the ability to identify suicidal risk.
Some differences have been found between men and women of college age in factors that lead to suicide. Chief among these is the well-known increased prevalence of prior depression in women compared to men (Brownson, Drum, Smith et al., 2011; Lamis & Lester, 2013; Stephenson, Pena-Shaff, & Quirk, 2006), which may explain why women respondents endorse prior mental illness more often than men when asked about risk factors for suicide.
Surveys about sensitive topics such as suicide are difficult to conduct (Tourangeau & Yan, 2007), unless they can be done anonymously, as this survey was able to do. The finding that one-third of students acknowledged having had suicidal thoughts confirms previous work (The American Health College Association, 2008; Drum et al., 2009). About one quarter of students knew someone who had attempted, successfully or unsuccessfully, to kill him(her)self. This percentage is likely to increase with the continued expansion of open communication on social network sites.
Interestingly, while a third of students believed that mental health stigma played an important role in student suicides, approximately one fifth did not believe it did. The questionnaire was brief and did not distinguish between self-stigma and the perception of stigmatizing attitudes on the part of others. Self-stigma, the internalization of negative stereotypes, leads to low self-esteem, shame and hopelessness and has been shown to be closely associated with suicidal thoughts (Oexle, Rüsch, & Viering, 2016). Because of perceived stigma, confidentiality is especially strict around mental illness concerns. This can be a problem when mental health information is not shared among those in the best position to assist, family members being the most obvious example.

Most university mental health services withhold mental health information from families but usually will make exceptions for imminently dangerous situations.

The causes of suicidal behavior are not well understood; the evidence in the literature points to complex interactions of different factors. Gender differences in perspectives and the failure of any suicide prevention solutions being endorsed over others suggest that suicide on campus can only be addressed by multi-pronged intervention strategies tailored to diverse needs. The results of this research suggest that the suicide risk status of male students rises in proportion to academic competition, financial pressure, and work overload while, for female students, it is especially high for those with a history of mental illness and for those experiencing family pressure, and social isolation. Both male and female students are at high risk during periods of relational turmoil and heartbreak. Counselors need to be attuned to these gender differences because risk formulation forms the basis of all preventive measures.

Although there is substantial variation among U.S. campuses, according to the 2009 survey of the American College Counseling Association (Gallagher, 2009), the overall ratio of students to psychological counselors is about 1,527:1, with higher ratios at larger institutions. Effective suicide prevention requires more well-trained personnel and innovative methods of reaching students in need. All students and faculty need to be aware of mental health issues and need training in how to proceed under various circumstances. The QPR (Question, Persuade, Refer) program educates faculty and staff on becoming more effective "gatekeepers" (See: http://www.qprinstitute.com for further information). Because some students will disclose problems only to other students, gatekeeper peers may be especially important (Hennig, Crabtree, & Baum, 1998). Some campuses have developed phone triage programs set up to offer prompt evaluations (Rockland-Miller & Eells, 2006). Combining academic mentoring and mental health support is a realistic idea designed to overcome barriers to accessing mental health services (Bilodeau & Meissner, 2016; Robinson, Jubenville, Renny et al., 2016).

Limitations

One drawback to this study is that it was limited to English speakers. There are many new non-English speaking college students in the United States who feel marginalized and, as a consequence, may be especially vulnerable to suicide but may not participate in an English-only survey. Another limitation is that, in the general population, more

men than women have access to the Internet, but this gender difference would, of course, not apply to college students. There were no questions in this survey about race or religion or sexual orientation, the answers to which would have been informative and helpful; this is for future study. There were no questions about the effect on campus suicide of the Werther and Papageno effects – the boosting or lowering of the local prevalence of suicide depending on how the media reports student suicides (Niederkrotenthaler, Voracek, Herberth et al., 2010). The survey was brief and far from exhaustive in terms of listing potential determinants of suicide and potentially effective preventive measures. The addition of more choices would have potentially contributed further information.

Conclusion

Given the many risk factors associated with campus suicide and the diverse views (as exemplified by male/female differences) as to which ones are the most important, it is difficult for college administrators to agree on the constituents of effective suicide prevention programs. Administrators need to focus on both stigma reduction and on facilitating access to quality treatment for mental illness (Thornicroft, Mehta, & Clement, 2016), while, at the same time, promoting positive mental health (Drum & Denmark, 2012). The Jed Foundation and Education Development Center, Inc. have developed a useful framework (The Jed Foundation, 2016) to help colleges and universities support students in emotional need and to promote mental health on campus for everyone.

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Original Research

Personality Traits and Suicide Behavior of Selected Filipino Adolescents

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Abstract: Suicide and suicide behavior are major health concerns in our society today. Suicide has always been a sensitive topic, being considered taboo in many cultures and religions. Studies have shown that suicide and suicide behavior are linked to personality traits. The study aims to observe the relationship of the Five Factor Model personality traits with suicide behavior among Filipino adolescents, in order to determine the degree to which personality may correlate with suicide behavior. Participants were gathered from various universities in Metro Manila with ages ranging from 17-21. Results revealed that Neuroticism, Antagonism, Introversion, and Disinhibition (Low Conscientiousness) are correlated with suicide behavior. Moreover, forward stepwise regression indicated that Neuroticism, Antagonism, and Introversion were predictors of suicide behavior, with Neuroticism being the strongest predictor among the 5 domains. Results likewise showed that Depressivity (N3), which is a sub-factor of Neuroticism, is the strongest predictor of suicide behavior among the Five Factor Model facets.

Keywords: Suicide, suicide behavior, personality traits, adolescents

According to the World Health Organization (WHO), over 800,000 people die by suicide every year, with one person dying every 40 seconds. It is the second leading cause of death among 15 to 29-year-olds; most of whom are adolescents (Suicide, 2015). Reports of suicide have been increasing in the Philippines and have become an alarming issue in the country. In a study conducted by Redaniel, Lebanan-Dalida, & Gunnel (2011), the incidence of suicide had increased in the Philippines for both males and females between 1984 and 2005. Suicide rates went from 0.23 to 3.59 per 100,000 males, and from 0.12 to 1.09 per 100,000 females between 1984 and 2005.

Suicide and suicide behavior are issues that the Philippine government and various organizations are seeking to address, so much so that numerous prevention programs have been established. Senator Miriam Defensor-Santiago introduced Senate Bill No. 1946, the "Student Suicide Prevention Act of 2005", which mandates that school organizations such as the Commission on Higher Education (CHED) and the Technical Education and Skills Development Authority (TESDA) provide proper programs to reduce suicide attempts and completed suicides. Foundations were also created to raise awareness within the Filipino society. Created by Jean Goulbourn, the Natasha Goulbourn Foundation is a non-profit organization that promotes awareness and understanding of depression, in the hopes of preventing suicide.

There are different views on suicide and how people should understand it. In the past, suicide has mostly

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been viewed as a topic of taboo (Pompili, 2010). Viewed as a sin or crime, it was too shameful to discuss openly in most cultures and religions. Since the rise of science and medicine, however, society has become more inclined to view suicide as a result of mental illness. In the 19th century, a milestone was achieved for understanding suicide from a biopsychological point of view: There are forces or causes inside the person that cannot be consciously known or considered, but nevertheless influence suicide risk (Pompili, 2010).

One must keep in mind that suicide and suicide behavior are not one and the same. While suicide is defined as the act of intentionally taking one's own life, suicide behaviors also include nonfatal thoughts and behaviors (Nock et al., 2008). According to Nock et al. (2008), suicide behavior can be classified into three categories: suicide ideation, suicide plan, and suicide attempt. Suicide ideation refers to ideas, thoughts, and contemplation in regard to suicide; suicide plan refers to formulations of how to take one's life; lastly, suicide attempt is defined as engaging with to self-injurious behavior accompanied by intent to actually die (Nock et al., 2008).

The categories under suicide behavior should be seen in a continuum of severity, leading from ideation to the formulation of a plan, then to a suicide attempt. Consistent with this hierarchical model, individuals who experience persistent and severe suicide ideation are at a higher risk of attempting suicide (Scanlan & Purcell, 2009). While not all suicide ideation results in a suicide attempt (Reynolds, 1991), ideation is nevertheless strongly associated with depression, and with depressive feelings and cognitions. As such, sadness, loss, grief, guilt, fatigue, pessimism, poor concentration, anhedonia, and nihilism may be viewed as an immediate cause of suicide attempts, some of which will become completed suicides (Scanlan & Purcell, 2009).

As defined by Pompili (2010), suicidology is the study of suicide and suicide prevention. In suicidology, many interacting factors are associated with suicide but there is no single factor is causally sufficient, thus making suicide a complex concept (Pompili, 2010). Epidemiologists study suicide through associated risk factors, which are used to predict the likelihood of suicide behavior. Past research has identified demographic, psychiatric, psychological, biological, and stressful life events as the strongest major risk factors in predicting suicide behavior (Nock et al., 2008). Other risk factors associated with suicide behaviors include family disturbances, mental health problems, and previous suicide attempts (Scanlan & Purcell, 2009). Such risk factors may be considered "distal causes," in that they influence the development of the specific emotions and cognitions that precipitate suicide behavior, but cannot be

considered the direct cause of a suicide attempt. Hopelessness and helplessness, both associated with depression, are considered to be among the strong predictors of suicide behavior (Hewitt, Caelian, Chen, Flett, 2014). These may be considered "proximal causes," in that they saturate the conscious awareness of the desperate person, thereby preceding and producing suicide behavior and suicide attempts. Factors that help decrease a person's probability of attempting suicide are called protective factors. Research studies have found religiosity to be one of the strongest among them. Moral objections and social support also seem to protect people against suicide attempts (Nock et al., 2008).

Interest between the relationship of personality traits and suicide behavior has been increasing for the past few years (Brezo, Paris, & Turcki, 2005). According to Brezo, Paris, & Turecki (2005), personality traits are linked to suicide behavior because traits contribute to a diathesis for suicide behavior. In the diathesis model, pathological behavior is seen as the product of internal characteristics and external events. Internal characteristics constitute a vulnerability that can, in conjunction with precipitating external events, create a window of opportunity for the emergence of pathological behavior. Personality traits reflect a propensity or disposition toward those cognitions, emotions, and behaviors which are consistent with the trait. Since situations are also important, traits do not determine behavior, but instead influence its baseline probability. The connection between personality traits and any actual, concrete behavior is therefore indirect and probabilistic. Personality traits are determined by genes, environment, and the interaction between genes and environment (Brezo, Paris, & Turecki, 2005).

One of the most used models of personality traits in relation to suicide behavior is McCrae and Costa's Five Factor Model of Personality (FFM; 1992). The FFM is a hierarchical model consisting of five broad dimensions, each of which is composed of six narrower trait facets. Among the FFM factors, one pole is considered to be adaptive and the other maladaptive. Emotional Stability, Extraversion (E), Agreeableness (A), Conscientiousness (C), and Openness to Experience (OTE) are the adaptive poles. Neuroticism (N), Introversion, Antagonism, Disinhibition, and Rigidity are the maladaptive poles. As such, we would expect that positive associations with suicide behavior would be found for the maladaptive poles. These can also be considered negative associations with the positive pole, depending on how the researcher wishes to phrase the findings. The maladaptive poles may thus be considered risk factors, while the positive poles can be considered protective factors.

Since the FFM is believed to be comprehensive, and since personality traits are, by definition, predispositions that influence the baseline probability of behavior, the FFM should relate broadly to many forms of psychopathology.

A literature search revealed a total of nine studies using either the FFM or its lexical antecedent, the Big Five Model. Interest in the relationship between FFM and suicide behavior can be traced back at least to Velting (1999), who studied the relationship between the FFM and suicidal ideation in a convenience sample of 185 undergraduates. As shown in Table 1, Neuroticism is by far the most common factor found

to be related to suicide behavior. Because Neuroticism is defined as a propensity to experience negative emotions, its association with suicide behavior would appear to be universal: There is no suicide without the experience of pain. As such, Neuroticism creates an enduring vulnerability to painful emotional states, and therefore, to suicidal ideation and behavior. Moreover, in the NEO-PI-R, which operationalizes the FFM, depressivity is considered a facet trait. The association between depressive states and suicide behavior is well known.

Table 1

Relationships Between FFM or Big Five Factors and Suicide Behavior Identified in the Literature

	N	A	E	C	OTE
Blüml et al. (2013), n = 2555	+ (A)	- (A)	- (A)	- (A)	- (A)
Mousavi et al. (2015), n = 200	+ (B)	- (B)	- (B)	- (B)	- (B)
Kerby (2003), n = 299	+ (C)	- (C)	- (C)	- (C)	
Soltaninejad et al. (2013), n = 1659	+ (D)	- (D)	- (D)		
DeShong et al. (2014), n = 348	+ (E)		- (E)		
Velting (1999), n = 185	+ (F)			- (F)	
Heisel et al. (2005), n = 134	+ (G)				+ (G)
Topić et al. (2012), n = 179	+ (H)	- (H)			
Chioqueta & Stiles (2004), n = 219	+ (I)				

A. Suicidal Behaviors Questionnaire-Revised
B. Suicide attempters
C. Suicide Probability Scale
D. Beck Scale for Suicidal Ideation
E. Hopelessness Depression Symptom Questionnaire-Suicidality Subscale
F. Adult Suicidal Ideation Questionnaire
G. Scale for Suicide Ideation
H. Autodestructiveness Scale, Suicidal Depression subscale
I. Hopkins Symptom Check List

Interestingly, only two of the nine studies found an association between suicide behavior and all five factors. After Neuroticism, associations between other factors and suicide behavior are well documented, but by no means universal. Low Agreeableness (high Antagonism) and low Extraversion (high Introversion) were well documented, but by no means universal, both being found in five studies. Conscientiousness was negatively related to suicide behavior in four studies, whereas Openness was negatively related in two studies and positively related in one study. With this single study on Openness being the only exception, the expected pattern of relationships universally supports the premise of the FFM, whereby negative factor poles relate to psychopathology and that positive factor poles are protective against psychopathology. Because the

sample sizes were adequate to generate substantial statistical power, we can conclude that the association between certain factors and suicide ideation is likely to be sample specific, or could be due to measure of suicide behavior used in that particular study. Thus far, no two studies have used the same measure of suicide ideation.

Suicide and suicide behavior in adolescents have become great concerns in Filipino society (Reynolds & Mazza, 1999). According to Shain (2007), suicide is the third leading cause of death among adolescents from ages 15-19. Since suicidal behavior is becoming much more frequent in the Philippines, we decided to explore the role of personality traits as predisposing and protecting against suicidal behavior. Our goal is to replicate existing studies that have examined the relationship between broad personality factors and

suicide behavior, and then to explore the predictive power of more specific personality traits.

Given the widespread use of the FFM, it is further hoped that its factors and facet traits can be of assistance to guidance counselors and other professionals who routinely conduct personality assessment in school- and college-based settings. Since community-based programs have not generally been supported in influencing suicide rates (Brent & Brown, 2015), school- and college-based programs become the logical point of identification and intervention. In the Saving and Empowering Young Lives in Europe study (Wasserman, Hoven, Wasserman, et. al., 2015), the authors examined three such programs, namely Question, Persuade, and Refer (QPR), the Youth Aware of Mental Health Programme (YAM), and ProfScreen, across 10 European countries, 168 schools, and over 11,000 youth. Only YAM was effective at decreasing suicide attempts and suicidal ideation. Identification of personality variables that mediate suicidal ideation and suicide attempts is an important complement to these efforts, and could influence their effectiveness.

Methods

Research Design
The study used a correlational design to determine which domains of the Five Factor Model (FFM) predict suicide behavior in a sample of Filipino adolescents. The FFM was the independent variable and suicide behavior was the dependent variable. The researchers hypothesized that each of the five traits would significantly correlate with suicide behavior, with Neuroticism being the most significant predictor of suicide probability.

Participants
The participants were 604 Filipino adolescents from various universities and colleges in the Metro Manila area. The sample was 73% female (n = 439) and 27% male (n = 161). Ages ranged from 17-21 (M = 18.53, SD = 1.05). The students belonged to various disciplines, including Psychology (75.33%), Early Childhood Education (4.30%), Accountancy (3.97%), Information Technology (2.98%), Hotel and Restaurant Institution Management (3.31%), Nutrition (2.48%), Tourism (1.66%), Interior Design (1.66%), Business Administration (1.16%), Fine Arts and Architecture (1.16%), Communication Arts (0.99%), Export Management (0.50%), and Multimedia Arts (0.50%)

Procedure
With the use of non-probability convenience sampling the researchers sent letters to various universities and colleges within Metro Manila. An IRB /HSRB approval was not required prior to conducting the survey, which consisted of only questionnaires. As such, once the requests had been approved by the institutions, an informed consent was obtained from each of the participants. The battery of tests that included the Suicide Probability Scale (SPS) and NEO Personality Inventory Revised (NEO PI-R) was then administered to participants in their respective classrooms. The testing time for the pencil & paper based administration was completed within 45 minutes to an hour. Respondents were informed that they would be receiving extra credits for voluntarily participating in the research study.

Measures
Neuroticism Extraversion Openness Personality Inventory Revised. The Neuroticism Extraversion Openness Personality Inventory Revised (NEO PI-R) is a 240-item self-administered instrument developed by Paul Costa Jr. and Robert McCrae (Costa & McCrae, 1992) which gives a concise measure of five major domains of personality, namely: Neuroticism (N), Extraversion (E), Openness to experience (O), Agreeableness (A), and Conscientiousness (C). Each domain is comprised of 6 facet scales which constitute personality traits. Together, the 5 domains and the 30 facet scales give a comprehensive assessment of personality. Internal consistency coefficients range from .86 to .93 for factor scores and .56 to .87 for facet scores (Johnsson, 2009). In this study, the Cronbach alpha reliability coefficient of the factors ranged from .83 to .91, specifically .89 for Neuroticism, .88 for Extraversion, .83 for Openness to Experience, .84 for Agreeableness, and .91 for Conscientiousness. Moreover, internal consistency coefficients for the facet scores range from .39 to .79.

Suicide Probability Scale. The Suicide Probability Scale (SPS) is a 36-item self-report measure that assesses suicide risk in adults and adolescents. SPS items use a four-point Likert-type scale ranging from "none or a little of the time" to "most or all of the time." The SPS includes four subscales, namely Hopelessness (e.g., "I think I have too much responsibility"), Suicide Ideation (e.g., "I think of things too bad to share with others"), Evaluation (e.g. "I feel many people care for me deeply"), and Hostility ("When I get mad, I throw things"). Individuals are asked to rate the frequency of their subjective experiences and past behavior. The subscales evolved from various theories proposed to explain and predict suicide. The internal consistency of the subscales ranges from 0.62 to 0.98. Validity of the instrument is considered to be

good (Eltz et al., 2006). Cronbach's alpha reliability in the present study for the total SPS score was .89.

Data Analysis

Data analysis proceeded from more general to more specific. First, factor scores on the NEO-PI-R were correlated with total scores on the Suicide Probability Test (SPS), in order to test for significant relationships at the most abstract or broadband level supported by these instruments. Second, the NEO-PI-R factor scores were used in a forward stepwise multiple regression in order to predict total SPS scores. Forward regression was used because it generally results in a parsimonious model. Third, facets from each factor of the FFM were entered into a forward stepwise regression in order to predict SPS total score. As expected, Depressivity emerged as the most significant predictor, thereby validating mood as the most important proximal variable predicting suicide behavior (as a personality trait, depressivity suggests a disposition to recurrent depressive states). Accordingly, forward stepwise regression was again used to predict SPS total scores, with depressivity excluded from the analysis. The purpose here was to determine which personality traits might create the hopeless and helpless mood states that eventuate in suicidal behavior. These are captured by depressivity, but precede depressivity as internal characteristics predisposing the individual toward suicide behavior.

Results

The sample of Filipino adolescents consisted of 73% female (n = 439) and 27% male (n = 161) with ages ranging from 17-21 (M = 18.53, SD = 1.05). The students belonged to various disciplines, including Psychology (75.33%), Early Childhood Education (4.30%), Accountancy (3.97%), Information Technology (2.98%), Hotel and Restaurant Institution Management (3.31%), Nutrition (2.48%), Tourism (1.66%), Interior Design (1.66%), Business Administration (1.16%), Fine Arts and Architecture (1.16%), Communication Arts (0.99%), Export Management (0.50%), and Multimedia Arts (0.50%)

As shown in Table 2, Neuroticism was mostly strongly correlated with SPS total score at .41. According to Cohen (1992), Pearson correlations greater than .30 are considered to be moderately-sized effects. Extraversion, Agreeableness, and Conscientiousness were also negatively correlated with SPS total score at -.18, -.19, -.16, respectively. These are considered to be small effects in Cohen's framework. As such, high Neuroticism should be considered a moderate risk factor for suicidal behavior, while Extraversion, Agreeableness, and Conscientiousness can be considered to be weak protective factors.

Table 2 *Pearson-R Correlation Between Personality Traits and Suicide Behaviour*

	M	SD	N	E	O	A	C	SPS
N	106.63	20.72	1					
E	111.93	20.37	-.22	1				
O	118.20	16.71	.08	.22	1			
A	110.67	17.13	-.11	.16	.00	1		
C	110.61	21.38	-.34	.14	-.04	.11	1	
SPS	64.87	17.21	.41*	-.18*	.01	-.19*	-.16*	1

Table 3
Stepwise Regression Analysis of the Five Factor Model Domains

	Model 1			Model 2			Model 3		
Variable	N			N + A			N + A + E		
Suicide Behavior	R^2	SE	F	R^2	SE	F	R^2	SE	F
	.17	15.71	121.53	.19	15.53	69.88	.19	.19	48.11

Based on preceding correlation matrix, Neuroticism, Extraversion, Agreeableness, and Conscientiousness were subjected to a forward stepwise regression. As shown in Table 3, Agreeableness and Extraversion significantly improved the predictive power of the model over Neuroticism alone, but the increment in R^2 from .17 to .19 was small. The .02 increase in R^2 was significant due to the large sample size, which creates enough statistical power to find small effects significant.

Next, the 30 facets of the NEO-PI-R were subjected to a forward regression in order to predict suicide

behavior. As shown in Table 4, results indicate that the facets of the FFM that are high predictors of suicide behavior, as measured by the SPS, are high Depressivity (N3), low Trust (A1), and low Straightforwardness (A2). Consistent with previous findings that hopelessness and helplessness may be viewed as proximal causes of suicidal behavior (Hewitt, Caelian, Chen, Flett, 2014), Depressivity was by far the strongest predictor, as expected. At R2 = .21, the predictive power of Depressivity exceeded that of Neuroticism, Agreeableness, and Extraversion combined.

Table 4

Stepwise Regression Analysis of the Five Factor Model (FFM) Facets

Variable	Model 1 N3			Model 2 N3 + A1			Model 3 N3 + A1 + A2		
Suicide Behavior	R^2	SE	F	R^2	SE	F	R^2	SE	F
	.21	15.27	164.14	.26	14.85	104.49	.26	14.81	71.51

Table 5

Stepwise Regression Analysis of the Five Factor Model Facets – Excluding N3

Variable	Model 1 N6			Model 2 N6 + A1		
Suicide Behavior	R^2	SE	F	R^2	SE	F
	.09	16.42	60.73	.16	15.81	56.78
	Model 3 N6 + A1 + E2			Model 4 N6 + A1 + E2 + N2		
	R^2	SE	F	R^2	SE	F
	.17	15.73	40.64	.18	15.67	32.09

Table 6

Profile of the Participants in the Study with Reference to the Four Suicide Probability Scale (SPS) Categories

	Subclinical	Mild	Moderate	Severe
Male (n = 161)	156 (25.83%)	4 (0.66%)	0 (0.00%)	1 (0.17%)
Female (n = 443)	427 (70.70%)	13 (2.15%)	2 (0.33%)	1 (0.17%)
Total N = 604	583 (96.52%)	17 (2.81%)	2 (0.33%)	2 (0.33%)

Table 7

Frequency of the Participants in each of the Suicide Probability Scale (SPS) Categories Who Possess the NAI Model

	Subclinical	Mild	Moderate	Severe
Male	5 (3.20%) out of 156	0 (0.00%) out of 4	0 (0.00%)	1 (100%) out of 1
Female	25 (5.85%) out of 427	1 (7.69%) out of 13	0 (0.00%) out of 2	0 (0.00%) out of 1
Total	30 (5.15%) our of 583	1 (5.88%) out of 17	0 (0.00%) out of 2	1 (50%) out of 2

Because this outcome was expected, forward stepwise regression on the FFM facets was conducted without Depressivity (N3) in order to allow more distally-related facets of personality to emerge as predictors. These results, shown in Table 5, suggest that Vulnerability (N6), Trust (A1), Gregariousness (E2), Angry Hostility (N2) should also be viewed as important in understanding the genesis of suicidal behavior.

As shown in Table 6, of the 604 participants in the study, the vast majority (96.52%) fell into the subclinical (normal) category. Another 2.81% of the participants were considered to be in the mild risk category, two participants (0.33%) were considered moderate, and 2 participants (0.33%) were considered severe.

Discussion

In the current study, Neuroticism emerged as the strongest predictor of suicide behavior among the five factors. High Neuroticism is associated with a tendency to be quickly and easily aroused by external stressors, along with a slowness to return to baseline (Costa & McCrae, 1992). Neuroticism is associated with feelings of envy, anxiety, loneliness, and guilt, as well as a tendency to magnify problems and cope with them poorly. These results are consistent with Ormel et al. (2013), who argued that Neuroticism is one of the strongest predictors of common mental disorders. Likewise, Shirazi, Khan, and Ansari (2012) found that Neuroticism is a strong predictor of mental health among college students. Huang, Hu, Han, Lu, and Liu (2014) indicate that the presence of a mental disorder is a major risk factor for suicide and suicide behavior, a mental disorder being in 90% of such cases. Bowen, Baetz, Leuschen, and Kalynchuk (2011) showed that Neuroticism is a predictor of depression, which is likely to accompany suicidal ideation. Finally, Duberstein et al. (2000) and DeShong, Tucker, O'Keefee, Mullins-Sweatt, and Wingate (2014) found that those who have suicide ideation have higher levels of Neuroticism.

High Antagonism was also found to predict suicide behavior. Antagonists are predominantly suspicious, unfriendly, and hostile. In addition to lacking the capacity to feel genuine concern for the well-being of others, they may find it difficult to function socially as a result of their automatic pessimism and distrust of the intentions of others. Stemming from their Antagonistic nature, they may often choose to compete than to cooperate. This may eventually lead to social isolation and possibly increase the risk for suicidal ideation. These findings converge with Kerby (2003), Topić, Kovačević, & Mlačić (2012), and Soltaninejad et al.

(2013), all of which found that high Antagonism increases suicide ideation.

Our findings also indicate that Introversion is a significant predictor of suicide behavior. Individuals who are introverted may be described as quiet, passive, and unsociable. Because they are not extroverted, they keep to themselves, which deprives them of social interaction and support needed to preempt suicide behavior. The combination of Neuroticism and Introversion suggests a socially isolated and brooding pessimist, someone who chronically worries and feels vulnerable, leading to the hopelessness and helplessness which accompanies suicidal behavior. These hypotheses are supported by Chioqueta and Stiles (2004), Tucker et al. (2014), and Janowsky (2001), all of whom found Introversion to be significantly correlated with depression. The lack of social support results to the use of irrational, socially-avoidant problem-solving strategies (Duberstein et. al., 2000). Introverted individuals are more likely to undergo crises solely on their own. They are less likely to seek help from others, and given that introversion is positively correlated with hopelessness, introverts assume that social support will not be helpful during a crisis (Duberstein et. al., 2000). Similarly, Ferrer & Kirchner (2015) discussed higher levels of Extraversion serve as protective factors against suicidal tendencies among adolescents with adjustment disorders.

In sum, suicide behavior in Filipino adolescents may be described at the most abstract level as a combination of three personality trait domains, namely Neuroticism, Antagonism, and Introversion, a "Neuroticism Antagonism Introversion model." This largely replicates the findings summarized in Table 1, which show associations with these same factors to be most replicated. Nevertheless, we would also remark on the theoretical importance of Conscientiousness. Since Conscientiousness provides a brake on impulsivity and disinhibition, high Conscientiousness could prevent the progression through the hierarchy of suicide behaviors from suicide plan to suicide attempt. Since the current study was based on normal subjects, few of whom had suicide behaviors, the inhibitory effects of high Conscientiousness may not have been discoverable in the current sample. Although Conscientiousness was associated with total SPS score, it did not uniquely predict enough of the variance in total the SPS score to enter into a forward regression with the other FFM factors. Among the 604 participants, only 32 possessed all three predictors of suicide behavior, namely high Neuroticism, high

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Antagonism, and high Introversion (see Table 7). Only two participants were assessed by SPS total score as being at the level of severe suicide risk. These findings converge with those of previously mentioned studies predicting suicidal ideation from the FFM (Velting, 1999; Chioqueta & Stiles, 2004; Soltaninejad et al., 2013; DeShong, Tucker, O'Keefee, Mullins-Sweatt, & Wingate, 2014), thereby supporting the cross-cultural generality of these associations.

In addition to the factors of the FFM, the current study also used a multiple regression to explore which facets might most strongly predict suicide behavior. As expected, Depressivity was found to be the strongest predictor. As a personality trait and facet of Neuroticism, depressivity is simply the tendency to experience depressive states. Scanlan & Purcell (2009), for example, found that suicide ideation is often related to depression, and depressive feelings and cognitions such as sadness, loss, grief, guilt, fatigue, pessimism, poor concentration, anhedonia, and nihilism. Beyond this obvious association, stepwise forward regression found that vulnerability (N6), low trust (A1), low gregariousness (E2), and high angry hostility (N2) form a parsimonious model that predicts suicide behavior. With an R^2 = .18, the predictive power of this model compares favorably to that of the NAI model, which was R^2 = .19 in the current study.

As such, these findings argue that it is important to go beyond the generality of the NAI model when understanding the vulnerability to suicide behavior created by personality traits. In particular, our results suggest that very little predictive power is lost in advancing hypotheses that are considerably more specific than those advanced by the NAI model alone. Consulting the construct definitions for these traits as given in the NEO-PI-R manual creates an image of someone who is chronically susceptible to and copes poorly with stress (high vulnerability), and who is too mistrustful and angry with others to seek out social support and other external resources (high mistrust, low gregariousness, and high angry hostility). Such a person may enter a vicious cycle that amplifies vulnerability by magnifying insignificant issues, becoming skeptical of the intentions of others toward him or her, and then acting angrily and cynically towards them. He or she is predisposed to anger, or to become angered by the intolerable situations that must be endured. Finding the intentions of others to be insincere and questionable, there is a preference to alone, rather than to be in the company of others. The preference for being alone (low gregariousness), along with suspiciousness (low trust) and anger at others (high angry hostility), insulate the individual from external influence that might short-circuit the vicious cycle that amplifies their hopelessness and helplessness (high depressivity), thereby leading to the formation of a suicidal plan. If high Disinhibition (low Conscientiousness) is also present, then there is nothing to inhibit the progression from suicidal thoughts and feelings to a suicide attempt, and perhaps a completed suicide (low Conscientiousness entails high impulsivity).

Although the picture created by the NEO facet traits appears clean and coherent, it must nevertheless be admitted that in terms of effect size, the amount of variance explained by the regression models was small. This indicates that internal factors alone cannot explain suicide behavior. The current situation also plays a major role in how the individual responds (Cherry, 2015).

Conclusion

Personality traits predispose individuals toward a collection of behaviors which are consistent with those traits. As such, personality traits may be regarded as internal risk factors for various pathological outcomes, suicide behavior being one such example. In the study, the major personality traits that had the strongest relationship with suicide were Neuroticism, Antagonism, and Introversion, all of which are considered pathological poles of the FFM. Since personality factors and personality traits are reliable indicators of suicidal ideation, it is important that guidance counselors and other professionals be made aware the role these traits play in increasing suicide behavior. Screening for these traits could improve the effectiveness of school- and college-based programs.

Limitations of the current study include the age of the respondents, who were 17- to 21-year-old college students in Metro Manila universities only. As such, the study was unable to explore contributions to suicide behavior that might accompany life challenges experienced by older subjects, for example, situational vulnerability to suicide produced by the onset of major health challenges. Additionally, the study included only traits from the FFM. Other comprehensive factor models of personality, such as the Hexaco (Lee & Ashton, 2004) are composed of other traits that may also figure prominently in the development of mood states and vicious cycles that eventuate in suicide behavior. Finally, the sample consisted largely of normal adolescent students, rather than, for example, students referred for psychological counseling. This limited the range of the variables involved, which could have prevented additional

traits from emerging as significant predictors of suicide behavior in a multiple regression. Nevertheless, the findings do support the cross-cultural generality of the NAI model, and the specific traits identified as predicting suicide behavior suggest important themes that counselors should explore with students judged to be at risk for suicide behavior.

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Original research

Non-Suicidal Self-injury in Medical Students

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Abstract: Given medical students have been shown to be prone to high levels of stress and resulting mental health problems, we sought to explore whether they were also more prone to non-suicidal self-injury and, if so, whether this was related to high levels of perfectionism, reported in the literature to be implicated in poor mental health. A total 260 first year graduate medical students (mean age 23.1 years) from the University of Queensland completed a questionnaire on non-suicidal self-injury, the 28-item General Health Questionnaire, the Frost Multidimensional Personality Scale, a 14-item Resilience Scale, and The Multidimensional Scale of Perceived Social Support. Forty-five medical students (17.3%) admitted having ever deliberately self-injured, 36 (13.8%) in the past, and 9 (3.5%) current self-injurers. Female students were more likely to have self-injured than males. Of those reporting either current or past self-injury, 6 (13.3%) reported undertaking this with suicidal intent. There were highly significant correlations between total perfectionism scores, social supports and resilience. Both Depression (p < .001, d 0.82) and Anxiety (p < .001, d 0.65) were significantly higher in self-injurers. In logistic regression a one-unit increase in overall Psychological Symptoms was associated with a 4.6% increase in chance of self-injury, and a one-unit increase in Perfectionism was associated with a 2.6% increase in chance of self-injury. Medical students are a vulnerable population, suffering mental health problems at higher rates than the general population. High rates of self-injury may be an expression of this vulnerability.

Keywords: Non-suicidal Self-Injury, NSSI, Self-harm, University Students, Medical Students

Non-suicidal Self-injury ('lifetime' NSSI) is surprisingly common at an overall 8.1% in national community samples (Martin et al., 2010), with international pooled prevalence estimates of 17.2% among adolescents, 13.4% among young adults, and 5.5% among adults (Swannell et al., 2014). NSSI in surveys of university or college students, overlapping the adolescent/young adult groups, has been reported at between 15.3% (Whitlock et al., 2011) and 39.5% (Hamza et al., 2013).

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Prevalence figures from studies on university students may be meaningful only in the context of universities given they focus on high achievers and samples of convenience, for instance psychology students (Rotolone & Martin, 2012; Horgan & Martin, 2015). Prevalence may be skewed because students have a particular interest in psychological problems, and may be more likely to respond to promotion of a study online actively seeking self-injurers. Nevertheless, university and college counselors report major concerns at increasing prevalence of NSSI in their students, in the context of a perceived lack of therapeutic skill to manage such problems, or the paucity of relevant and specific therapy programs for the problem (Whitlock et al., 2009), and longitudinal research

suggesting persistence over time (Zivin et al., 2009).

Within universities, medical students are a vulnerable population, experiencing higher levels of mental health problems, with risk escalating over the course of their training. From a systematic review of 40 research articles, Dyrbye et al., (2006), concluded: 'studies suggest a high prevalence of depression and anxiety among medical students, with levels of overall psychological distress consistently higher than in the general population and age-matched peers, by later years of training.' The authors suggested problems were more common amongst women medical students, but this contradicted earlier studies - for instance Guthrie et al. (1998) who, in a longitudinal study, noted levels of 'burnout' were similar. Medical students are less likely than the general population to receive appropriate management, despite their training and access to services. Potential reasons for this include stigma, guilt, shame, and concerns about impact on vocational and future employment options (Givens & Tjia, 2002). Dyrbye et al., (2008) reported high levels of suicidality (11.2%) in medical students from seven US universities, correlated with levels of burnout, and this has been confirmed more recently (Dyrbye et al., 2014, Rotenstein et al., 2016). In a model of stress in medical students, Dyrbye et al., (2005) suggested personality style, depression, and burnout as a reaction to stress may be implicated in becoming suicidal; this also appears to be so in physicians (Tyssen et al., 2001; Tyssen et al., 2004).

Different studies have used different or multiple constructs to describe personality style as a predictor of burnout or suicidality. These include 'Neuroticism' (Dahlin & Runeson, 2007; Dyrbye et al., 2005; McManus et al., 2004), 'Conscientiousness' (Dahlin & Runeson, 2007; Lue et al., 2010; Tyssen et al., 2007) and 'Introversion' (Henning et al., 2009; Tyssen 2004). Part of the complexity is that students may be chosen for a course like medicine on factors like conscientiousness which can be argued to make for more successful students and better or more ethical doctors (Enns et al., 2001; Lievens et al., 2002).

Only one previous study has reported non-suicidal self-injury in medical students (Allroggen et al., 2014). This estimated a lifetime prevalence of NSSI (14.3%) and suicide attempts (1.5%) in 714 German medical students (mean age 23.1 years); at least similar to population levels for the age group. Allroggen et al., (2014) used the NEO Five-Factor Inventory to explore personality, which showed higher levels of neuroticism and openness to

experience but lower levels of conscientiousness and extraversion.

Having researched non-suicidal self-injury in other undergraduate student samples (Caltabiano & Martin, 2016); Horgan & Martin, 2015; Rotolone & Martin, 2012), we sought to investigate a sample of Australian medical students to discern whether they are indeed 'a highly vulnerable population', whether self-injury occurs, and what factors might be associated with self-injury. We were particularly interested in perfectionism as a personality trait, general mental health concerns, resilience, social supports and perceived social connectedness.

Self-injury was defined in this study as 'the direct, deliberate destruction of body tissue in the absence of conscious, lethal intent' (Nock & Favazza, 2009). Several theoretical frameworks support our understanding of the aetiological basis of self-injury, the most common being affect regulation (Chapman et al., 2006). Self-injury is preceded by negative feelings or thoughts such as depression, anxiety, tension, anger, generalised distress, guilt or self-criticism. The act of self-injury causes relief from these negative feelings inducing a positive feeling state, which may be based in release of brain opiates, or result from the subsequent self-soothing and care of the wound.

Perfectionism is a personality trait with potentially negative consequences. Flett & Hewitt (2006) suggest a perfectionist holds highly rigid standards, places irrational importance on attainment of these, and this has personal and interpersonal consequences. They distinguish conscientiousness from perfectionism. Perfectionistic individuals may experience increased frequency of mental health problems, including depression and suicide. Although there is evidence supporting a higher rate of perfectionism as a factor in elevated rates of suicide among some professional groups (Hewitt et al., 2006), little is known about its association with self-injury in young adults, though studies do exist in adolescence (Hasking et al., 2010; O'Connor et al, 2010).

We used the Frost Multidimensional Perfectionism Scale (Stöber, 1998), with four subscales (concern over mistakes, parental expectations, personal standards and organisation). There has been recent criticism of factor analyses of the FMPS, but agreement it contains valence - that is maladaptive and adaptive perfectionism (Stallman & Hurst, 2011). Maladaptive perfectionism indicates an inordinate fear of mistakes, a tendency to second-guess decisions and procrastination, while adaptive perfectionism is thought to act as a motivating, rather than inhibiting, factor in the drive to achievement. There is some evidence suggesting parental criticism and alienation (one of the

subscales in the Frost Multidimensional Perfectionism Scale) may have a role in predicting NSSI (Baetens et al., 2013).

We hypothesized self-injury would be reported by medical students, and that self-injurers would have lower scores on Resilience and Social Supports, but higher scores on Psychological symptoms. We hypothesized that overall medical students would have high scores on Perfectionism, but that those with high scores on Maladaptive Perfectionism would be the ones more likely to self-injure.

Method

Participants

All participants were full-time graduate students in the first of four years medical training. With ethics approval from the University of Queensland, a potential 306 participants were encouraged to complete a pencil and paper questionnaire during a two-hour first-year lecture on 'Suicide and its prevention'. The purpose of the study was explained at the beginning of the lecture, as well as in written form attached to the front of each questionnaire. All students gave signed agreement, having been informed that participation was voluntary, and anonymity preserved. Students were advised that, if the questionnaire caused distress they should discuss with one of five support staff at the end of the lecture or later by telephone, or speak to someone at the University counselling centre, or use one of the standard suicide telephone support lines (numbers provided).

Measures

The *Frost Multidimensional personality scale* (FMPS-35) (Frost et al., 1990) is a widely used 35-item questionnaire assessing multiple aspects of perfectionism. Stallman & Hurst (2011) have supported the exclusion of six items (4,5,16,17,18 and 28), without the stability of the scale being compromised. Although there is evidence to indicate the factor structure of the FMPS-29 is robust for a university student population without the need for subgroup analyses, results of the scale were divided into 5 sub-subscales (concern over mistakes, doubts about actions, parenting standards/criticism, organisation and personal standards). Subscales were then grouped into either 'adaptive' or 'maladaptive' perfectionism (Stallman & Hurst, 2011).

Resilience. We sought responses to four probe statements drawn from the 14-item Resilience scale (RS-14) (Wagnild & Young, 1993), each with high correlation to the core construct. 'I usually take things in stride', 'I am determined', 'I can get through difficult times because I've experienced

difficulty before' and 'My belief in myself gets me through hard times'. Responses were scored on a 5-point Likert scale from Strongly Disagree to Strongly Agree with a neutral mid point.

General Health Questionnaire (GHQ28) (Goldberg & Hillier, 1979) has 28 items (4 point scales), relating to the last 12 months, measuring overall general mental health problems (Cronbach α .92), with subscales for somatic complaints (α .77), anxiety and insomnia (α .85), social dysfunction (α .81) and depression (α .80).

Deliberate Self-Injury Questionnaire (Rotolone & Martin, 2012). This begins with a definition: "For the purpose of this study, self-injury is defined as the deliberate and direct destruction or alteration of body tissue without suicidal intent. Such behaviours are likely to induce pain, bleeding and bruising and can include (but are not limited to): cutting, wound picking, hitting parts of your body, needle use, burning and skin carving. If you consider an act that you have engaged in to be deliberate self-injury, then (for the purpose of this study) it is!" This was followed by the question: "*Have you ever engaged in deliberate self-injury? If only once, please still select yes*", and then: "*If you have self-injured in the past but are not currently self-injuring, how long has it been since you stopped?*" Further questions asked about frequency, purpose, types of self-injurious behaviour, intervention received, and suicidality during self-injury. A final question related to confidence in those who had ceased self-injury: "*If you have stopped self-injury, how confident are you that you will never self-injure again?*" (scored on a five point scale).

The Multidimensional Scale of Perceived Social Support (MSPSS) (12-item scale) (Zimet et al., 1988) was used to measure perceived social supports on three subscales – 'family', 'friends' and 'significant other'. Reliability, validity and factor structure of the MPSS have been examined for university students. Overall, the Cronbach alpha coefficient for the current sample was α .94.

Statistical Analysis

All analyses were completed in SPSS version 21. Chi Square was used to clarify demographic differences between non-self-injurers and self-injurers, and then between current self-injurers and past self-injurers. The small group of current self-injurers precluded meaningful comparison on our main measures. One-way Analysis of Variance was used to compare all self-injurers (current plus past) with non-self-injurers. Further One-way

Analysis of Variance compared Self-injurers with suicidal intent with those self-injuring without suicidal intent. Application of Cohen's d provided effect sizes, calculated using the maximum likelihood estimator weighted for unequal sample sizes.

Logistic regression was used to determine the joint effect, as well as relative importance, of social support, resilience, psychological symptoms, and perfectionism in predicting 'self-injury' group membership. Despite the small numbers, a further logistic regression was used to examine the effect of these variables on the outcomes of 'current versus past self-injury' and 'self-injury with or without suicidal intent'.

Results

Descriptive Data. We excluded 46 incomplete questionnaires from further study, given they were missing more than 50% of responses. A total 260 questionnaires (139 males and 121 females) were completed (response rate 85%) and used in our analysis. Participants were aged between 19 and 36 years (mean age 23.1 years). More than half identified as Australian born (57.5%). English was predominantly the language spoken at home (82.3%). Half (49.8%) our participants were single, 13% were in a casual relationship, 29.9% in a committed relationship, and 5.7% married.

A total 45 students (17.3%) admitted having ever deliberately self-injured, 36 (13.8%) in the past, with 9 (3.5%) claiming to be 'current' self-injurers. Of those reporting either current or past self-injury, 6 (13.3%) reported undertaking this with suicidal intent whereas 36 (80%) denied suicidal intent. Three participants did not answer this question.

Participants in the three self-injury categories (no history of self-injury, history of past self-injury, current self-injury) did not differ in age (F (2, 256) = 0.90, p = .407), gender (χ2 (df 2, N 260) 5.39, p = .067), nationality (χ2 (df 2, N 260) 1.50, p = .473),

or marital status (χ2 (df 8, N 260) 9.40, p = .907). However, the small number of current self-injurers resulted in low expected frequencies, and our results should be interpreted with caution. When analyses were re-run with self-injury categories combined (current with past history of self-injury, n = 45), female medical students were 1.6 times more likely to have self-injured compared to males (χ2 (df 1, N 260) = 3.96, p = .046).

Among current self-injurers, 4 had self-injured once in the past year, 2 every few months and 2 weekly. For all self-injurers (n = 45), cutting (33.9%) was the most common method, followed by self-punching (29.0%), purging (14.5%), and skin carving (12.9%). Finally, 6.5% of respondents reported other forms of self-injury with a small number (3.2%) admitting burning.

Attempts to self-regulate negative emotion were the most endorsed reasons ("stress relief"), with efforts to replace emotional pain with physical pain ("to feel pain physically rather than emotionally") and "boredom". Self-punishment was also common ("for bad habits" and "Failing at what I should have/have not been doing"). Other responses included "because friends did it" and "to get out of work".

Commonly cited reasons for ceasing self-injury included receiving support ("support from family and my psychologist" and "better support") and personal growth and maturity ("I have matured" and "I grew up") or formal treatment from health professionals ("Therapy", "Antidepressants"). Just over one third (37.7%) of current/past self-injurers had sought medical treatment with 17.7% accessing counselling or psychotherapy, 8.8% requiring treatment at an emergency department and 11.1% had been admitted to hospital for their self-injury.

Group Comparisons. Descriptive statistics as well as the inter-correlation matrix for focal outcome variables are displayed in Table 1.

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Table 1. Descriptive Information for Continuous Variables

	M	SD	Per	PEx	Con	Dou	PerS	Org	MP	AP	Res	PsyS	Som	Anx	Soc	Dep
Social Support	67.18	14.36	-.15*	-.13*	-.25***	-.11	.02	.09	-.23***	07	27***	-.22***	06	-.13*	.22***	-.33***
Perfectionism Total	90.65	14.69		.66***	.80***	.44***	.62***	.44***	.90***	.61***	-.18**	.31***	21**	.34***	-.09	.27***
Parental Expectations	12.66	6.79			.35***	.18**	.13*	-.06	.80***	.03	-.25***	.25***	21**	.32***	-.17**	.35***
Concern	21.20	6.58				.38***	.41***	.15*	.82***	.31***	-.27***	.34***	01	.00	.02	-.12
Doubts	5.43	2.12					.14*	.04	.49***	.10	-.23***	.34***	08	.15*	07	.01
Personal Standards	19.39	3.39						.43***	.32***	.80***	21**	.04	16**	.25***	-.09	.21**
Organization	12.98	4.35							.06	.88***	14*	-.05	20***	.33***	.00	.30***
Maladaptive Perfectionism	48.29	11.87								.21**	-.33***	.39***	25***	38***	-.14*	.37***
Adaptive Perfectionism	42.37	6.56									20**	-.01	03	08	05	-.07
Resilience	3.90	0.70										-.37***	16*	-.31***	19**	-.34***
Psychiatric Symptoms	51.34	9.92											82***	87***	-.25***	77***
Somatic Symptoms	13.01	3.70												67***	-.10	.45***
Anxiety Insomnia	14.08	4.47													-.07	.53***
Social Dysfunction	14.70	2.69														-.18**
Severe Depression	9.54	3.65														

$^*p < .05$, $^{**}p < .01$, $^{***}p < .001$ (2-tailed).

Perceived good Social Supports were highly correlated with Resilience (.27, p< .001, 2-tailed). Conversely, there were significant negative correlations between a lack of Social Supports and Concern over mistakes (-.25, p < .001, 2-tailed), Maladaptive Perfectionism (-.23, p< .001, 2-tailed) Psychiatric Symptoms overall (-.22, p< .001, 2-tailed) and GHQ subscales Somatic Symptoms (-.22, p< .001, 2-tailed) and Depression (-.33, p< .001, 2-tailed). Parental Expectations were highly correlated with Perfectionism overall (.66, p< .001, 2-tailed) and with Maladaptive Perfectionism (.88, p< .001, 2-tailed) in particular, as well as Concerns (.35, p< .001, 2-tailed), Depression (.35, p< .001, 2-

tailed) and Anxiety (.32, p< .001, 2-tailed). Adaptive Perfectionism correlated highly with Organisation (.88, p< .001, 2-tailed) and Personal Standards (.80, p< .001, 2-tailed). Finally, Resilience was negatively correlated with Maladaptive Perfectionism (-.33, p< .001, 2-tailed) as well as Concern (-.27, p< .001, 2-tailed) and Doubts (-.23, p< .001, 2-tailed).

With only 9 participants reporting current self-injury, meaningful statistical comparison with past self-injurers was not possible. All self-injurers were compared with non self-injurers, using one-way ANOVAs (please see Table 2).

Table 2.
Differences Between Participants With and Without a History of NSSI

	SI (n = 45)	No SI (n = 215)	ANOVA	EFFECT SIZE
	M (SD)	M (SD)	$F(1, 258)^a$	$d^b (\eta^2)$
Social Support	62.00 (15.32)	68.27 (13.94)	7.26**	-0.44 (.05)
Resilience	3.72 (0.72)	3.94 (0.68)	3.97*	-0.33 (.03)
Psychological Symptoms Total	61.22 (14.11)	52.46 (10.67)	15.52***	0.78 (.13)
Somatic symptoms	14.60 (4.52)	12.67 (3.42)	7.29**	0.53(.06)
Anxiety symptoms	16.40 (4.83)	13.60 (4.24)	15.42***	0.65 (.09)
Social Dysfunction	14.44 (2.43)	14.76 (2.74)	0.51	0.12 (.00)
Severe Depression	11.89 (4.92)	9.05 (3.12)	13.82***	0.82 (.14)
Perfectionism Total	97.89 (18.35)	89.14 (13.36)	9.21**	0.61 (.09)
Parental Expectations	26.20 (5.32)	24.53 (4.17)	3.92**	0.38 (.04)
Concern	24.31(7.87)	20.54 (6.11)	9.16**	0.59 (.08)
Doubts	6.07 (2.43)	5.30 (2.03)	4.96*	0.37 (.03)
Personal Standards	20.27 (3.39)	19.21 (3.37)	3.65	0.32 (.03)
Organization	22.42 (4.19)	23.09 (4.39)	0.88	-0.16 (.01)
Maladaptive Perfectionism	55.20 (14.88)	46.84 (10.62)	12.85**	0.76 (.13)
Adaptive Perfectionism	42.69 (6.76)	42.30 (6.53)	0.13	-0.06 (.00)

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

Note. [a]Degrees of Freedom for analysis which satisfied the assumption of homogeneity of variance. The analysis of perfectionism (and subscales personal expectation, concern, and maladaptive perfectionism) and psychological symptoms violated this assumption (Levene's test was significant at α = .05) and thus Welch's correction has been performed.
[b]Cohen's d calculated using the maximum likelihood estimator weighted for unequal sample sizes.

Mean differences for most between groups comparisons reached statistical significance in the expected direction, with the exception of adaptive perfectionism, and its components – personal standards and organisation. Overall, lower social support was reported by self-injuring participants (F (1, 258) 7.26, p < .01, d 0.44), a medium effect size explaining 5% of variance of self-injury. Self-injurers reported higher levels of maladaptive perfectionism compared to those denying self-injury (F (1, 258) 12.85, p < .001, d 0.76), accounting for 13% of total variance. A large group difference in overall psychological symptoms existed, with self-injurers scoring higher than those not self-injuring (F (1, 258) 15.52, p < .001, d 0.78) accounting for 13% of variance in self-injury. More specifically, scores on both the 'Severe Depression'

subscale of the General Health Questionnaire (F (1, 258) 13.82, p < .001, d 0.82) and the 'Anxiety' subscale (F (1, 258) 15.42, p < .001, d 0.65) were significantly higher in self-injurers.

Compared with non self-injurers, participants who self-injured reported higher scores on Perfectionism overall, as well as on each of the five subscales (see Table 2), with differences being least on 'personal standards' and 'organisation' (the two components of 'adaptive perfectionism'). Within Perfectionism, the largest effect was for 'Concerns' (F (1, 258) 9.16, p < .01, d 0.59). 'Maladaptive Perfectionism' was significantly higher in self-injurers (F (1, 258) 12.85, p < .01, d 0.76).

Table 3.
Differences Between Those Reporting Self-injury With and Without Suicidal Intent

	Self-injury with Suicidal Intent (6)	Self-injury without Suicidal Intent (36)	ANOVA	EFFECT SIZE
	M (SD)	M (SD)	F(1, 40)	d^a (η^2)
Social Support	51.83 (21.10)	63.81 (13.73)	3.34†	-0.83 (.15)
Resilience	3.96 (1.19)	3.70 (0.66)	0.61	0.35 (.03)
Psychological Symptoms	61.83 (19.52)	62.44 (13.11)	0.01	-0.04 (.00)
Somatic symptoms	13.17 (4.62)	15.36 (4.27)	0.32	0.52 (.06)
Anxiety symptoms	17.67 (4.89)	16.42 (4.96)	0.85	0.26 (.02)
Social Dysfunction	14.67 (3.44)	14.17 (2.18)	0.01	0.22 (.01)
Severe Depression	13.67 (7.66)	11.83 (4.55)	0.14	0.37 (.03)
Perfectionism Total	103.00 (23.41)	97.06 (17.82)	0.52	0.33 (.03)
Parental Expectations	26.50 (7.77)	26.31 (5.04)	0.01	0.04 (.00)
Concern	30.00 (8.15)	23.42 (7.37)	4.00†	0.90 (.17)
Doubts	5.33 (2.66)	6.28 (2.25)	0.86	0.42 (.04)
Personal Standards	21.50 (3.39)	19.89 (3.44)	1.13	0.48 (.05)
Organization	24.33 (2.58)	22.06 (4.34)	1.54	0.56 (.07)
Maladaptive Perfectionism	57.17 (18.45)	55.11 (14.74)	0.09	0.12 (.00)
Adaptive Perfectionism	45.83 (5.19)	41.94 (6.94)	1.71	0.59 (.08)

†$p < .1$, *$p < .05$, **$p < .01$, ***$p < .001$
Note. ^{a}Cohen's *d* calculated using the maximum likelihood estimator weighted for unequal sample sizes.

Self-injurers with suicidal intent appeared to differ from those without suicidal intent, but inadequate cell sizes hampered analyses (see Table 3). As expected with small numbers, all one-way ANOVA results for these comparisons were non-significant (at α = .05), though lower social support for self-injurers with suicidal intent appeared to have a large effect size (F (1, 40) 3.34, p = .075, d 0.86). While total perfectionism did not differ significantly between the groups, self-injurers admitting suicidal intent reported higher 'personal concern' than those with no suicidal intent, with a large apparent effect size not reaching significance (F (1, 40) 4.00, p < .1, d 0.9).

Logistic Regression. Logistic regression was used to determine the joint effect, as well as relative importance, of social support, resilience, psychological symptoms, and perfectionism in predicting 'self-injury' group membership. The omnibus test of model fit was significant (χ2 (df = 14, N = 260) = 26.74, p < .001). Overall, the model accounted for between 10% (Cox & Snell R2 = .10) and 16% (Nagelkerke R2 = 16) of total variance in-group membership and correctly classified 83.8% of self-injurers.

Table 4 contains parameter estimates representing the unique effect of each variable controlling for all other variables in the model. Two of the four theoretical predictors exerted a unique influence on participant group membership. Perfectionism and Psychological Symptoms both positively predicted group membership (greater chance of having engaged in self-injury). A one-unit increase

in perfectionism was associated with a 2.6% increase in chance of self-injury. Similarly, a one-unit increase in overall Psychological Symptoms was associated with a 4.6% increase in chance of self-injury.

Similar logistic regression models were applied to determine the effect of these variables on the other two self-injury binary outcomes: 'current versus past self-injury' and 'self-injury with or without suicidal intent'. The omnibus test of fit was not significant for either model (current or non-current SI: χ2 (df = 14, N = 46) = 2.82, p < .589; SI with or without suicidal intent: χ2 (df = 14, N = 42) = 6.67, p < .155). However, for current versus past self-injury, the model did appear to account for between 6% (Cox & Snell R2 = .06) and 10% (Nagelkerke R2 = 10) of total variance and correctly classified 80% of self-injurers. For, self-injury with or without suicidal intent, the model did appear to account for between 15% (Cox & Snell R2 = .15) and 26% (Nagelkerke R2 = 26) of total variance and correctly classified 85.7% of cases.

Table 4 also contains the parameter estimates representing the unique effect of each variable controlling for all other variables in the model. No predictor exerted a unique influence on current or past self-injury. However, high social support predicted group membership (lesser chance of self-injuring with suicidal intent). A one-unit increase in overall perfectionism was associated with a 7.2% decrease in the chance of engaging in SI with suicidal intent.

Table 4.

Logistic Regression Estimates for Full Model Predicting Self-Injury Group Membership

	B	SE	Wald	df	P	[a]exp B
Criterion: Self-injury vs non-Self-injury Group						
Social Support	-0.02	0.01	1.32	1.00	.251	0.99
Maladaptive Perfectionism	0.04	0.02	5.69	1.00	.017	1.04
Adaptive Perfectionism	-0.01	0.03	0.07	1.00	.791	0.99
Resilience	0.12	0.29	0.16	1.00	.689	1.12
Somatic Symptoms	0.05	0.06	0.60	1.00	.440	1.05
Anxiety Insomnia	0.03	0.06	0.21	1.00	.648	1.03
Social Dysfunction	0.04	0.07	0.29	1.00	.593	1.04
Severe Depression	0.09	0.05	2.92	1.00	.088	1.10
Constant	-5.36	2.08	6.65	1.00	.010	0.01
Criterion: Current Self-injury vs Prior Self-injury Group						
Social Support	0.03	0.04	0.73	1	.393	1.03
Maladaptive Perfectionism	0.07	0.04	3.15	1	.076	1.08
Adaptive Perfectionism	-0.03	0.08	0.12	1	.724	0.97
Resilience	0.70	0.73	0.93	1	.335	2.01
Somatic Symptoms	-0.12	0.15	0.61	1	.437	0.89
Anxiety Insomnia	-0.11	0.12	0.84	1	.358	0.89
Social Dysfunction	-0.12	0.19	0.36	1	.548	0.89
Severe Depression	0.06	0.13	0.21	1	.650	1.06
Constant	-4.55	5.44	0.70	1	.403	0.01
Criterion: Self-injury with or without suicidal intent						
Social Support	-0.13	0.08	2.81	1	.094	0.88
Maladaptive Perfectionism	-0.01	0.06	0.01	1	.941	1.00
Adaptive Perfectionism	0.46	0.27	2.81	1	.094	1.58
Resilience	0.33	1.04	0.10	1	.752	1.39
Somatic Symptoms	-1.06	0.52	4.09	1	.043	0.35
Anxiety Insomnia	-0.05	0.20	0.06	1	.812	0.95
Social Dysfunction	-0.36	0.33	1.19	1	.276	0.70
Severe Depression	0.36	0.30	1.37	1	.242	1.43
Constant	-0.01	8.42	0.00	1	.999	0.99

[a]Odds ratios for the predictors (the exponentiation of the coefficients)

Discussion

It has long been recognised that medical students may be a highly vulnerable population, under stress, and suffering mental health problems at higher rates than the general population or age-matched peers (Firth, 1986; Guthrie et al., 1998; Pitts et al., 1961; Saslow, 1956). More recent North American research confirms this (Dyrbye et al., 2005; Dyrbye et al., 2008) and is supported by a comprehensive review (Dyrbye et al., 2014) and a recent large systematic review and meta-analysis (Rotenstein et al., 2016). Studies from many countries confirm medical student ill health as an international problem (Aktekin et al., 2001; Allroggen et al., 2014; Casey et al., 2016; Henning et al., 2009; Lue et al., 2010; Shaikh et al., 2004; Tyssen et al., 2001). The issues explored relate to whether a certain type of personality is drawn to medicine (Lievens et al., 2002), how much influence early negative experiences may have, whether course-related and examination stress are the central problems (Tyssen et al., 2007), the psychiatric morbidity that emerges (Dahlin & Runeson, 2007), reluctance to seek help on the grounds it may cause problems in later selection for jobs (Givens & Tjia, 2002), and significant and pervasive risk and safety issues (Dyrbye et al., 2014), including suicidality (Rotenstein et al., 2016). Longer-term issues reported are persistence of problems after graduation including the impact on later performance as a physician and the higher rate of suicide in physicians (Tyssen et al., 2001; Tyssen et al., 2004). Recent work has suggested medical students have higher 'Conscientiousness' scores than the general population (Dahlin & Runeson, 2007; Lue et al., 2010), though a study from Germany disputes this (Allroggen et al., 2014).

The current study was based on our belief that a percentage of graduate medical students in their first year would admit to non-suicidal self-injury, and the hypothesis that rates of self-injury would be consistent with rates from our population studies (Martin et al., 2010; Swannell et al., 2014), and a series of studies with psychology students at The University of Queensland (Caltabiano & Martin, 2016; Horgan & Martin, 2015; Rotolone & Martin, 2012).

Forty-five students of our 260 students admitted to self-injury at some time, and nine of these claimed to be 'current' self-injurers. Overall, six had self-injured with suicidal intent. These numbers, and the pattern of self-injury and suicidal intent are consistent with our other studies on this young adult age group. Our study is also consistent with the literature in demonstrating an association between self-injury, high levels of perfectionism (in particular maladaptive perfectionism) and psychological symptoms (in particular depressive symptomology), accompanied by low levels of resilience and social support, suggesting this is a group at considerable risk.

Our logistic regression showed that Perfectionism and Psychological Symptoms both positively predicted group membership (greater chance of having engaged in self-injury), and also appeared to influence whether a self-injurer was current and had some suicidal intent. However, these results are based on tiny numbers, did not reach statistical significance, and we can have only limited confidence in them. They do, however, point the way to further study to unravel the complexities in this at risk group of medical students on their way to becoming future doctors.

While perfectionism has been a highly valued attribute in high-achieving populations, there is evidence it may be detrimental. Consistent with current evidence, our results suggest maladaptive perfectionism is more likely to be associated with self-harm. Maladaptive perfectionism centres around a fear of making mistakes, a tendency to second-guess and doubt. Frost et al. (1990) postulated that maladaptive perfectionism reflects a tendency to feel that projects or work are never completed to satisfaction and there is always a lingering doubt about the quality of one's performance. As such, it is easy to understand how these traits may contribute to a dysphoric state, which may precipitate self-harm.

Conversely, our results suggest that social support may act as a significant protective factor over maladaptive perfectionism and psychiatric symptoms, suggesting that optimising supports may be a useful part of an effective intervention plan.

The major limitation of our study is that we sampled a single population of postgraduate medical students on one occasion. The relatively small sample clearly impacted on the power and significance of our results, which may not be applicable to other university populations. In addition, and given the nature of the sample (future doctors) we believe there may have been some reporting bias, despite the questionnaire itself being de-identified. Students, even those assured of anonymity, may have been reluctant to admit problems, given the possible implications of reporting self-harm and mental health problems.

In conclusion, our study of a population of medical students (of Australian and mixed cultural background) indicates they have concerning rates of self-injury, which appear to be associated with maladaptive perfectionism, depressive symptoms and perceived poor social supports. We believe this preliminary study highlights an urgent need for further investigation. In addition, it has implications for intervention to optimise the health of this particular population, considering that risks for poor mental health may impact on the individual, but also the community at large.

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Original research

Who engages with self-injury related Internet sites, and what do they gain?

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Abstract: Many social media pages, discussion boards and information pages have sections dedicated to self-injury. However, mental health professionals report concerns that some content may be detrimental to self-injury recovery. This hypothesis driven cross-sectional research examined who accesses such sites, and what they believe they gain. An online questionnaire was completed by 199 participants (78.4% female; 55% university students, 45% from social media). We examined relationships between Internet use, self-injurious behaviours, stigma, help-seeking, perceived social support and self-validation. Of 107 self-injurers (53.8%), 17 had attempted suicide. Attempters self-injured more frequently, had lower self-validation, perceived more stigma, and claimed less social support. Despite this, we initially excluded them to gain our non-suicidal self-injury (NSSI) sample, of whom 63 of 90 (70%) reported accessing Internet self-injury sites. Those accessing sites self-injured significantly more frequently ($p< .001$) than those not accessing sites, were more likely to have self-injured in the past 12 months, had someone aware of their self-injury, had received help and sought medical attention, yet reported they gained self-validation and support from the Internet. Compared to passive users, those actively commenting within self-injury sites had fewer perceived other social supports, and self-injured significantly more frequently ($p = .010$). Of all those visiting sites 51 (47.6%) had become upset by online material, and 19 (17.8%) claimed online content had triggered a self-injurious episode.
The study suggests associations between having more serious self-injury, being more troubled, and seeking access to Internet self-injury sites. Unfortunately the cross-sectional design precludes conclusions on causality of Nonsuicidal self-injury.

Keywords: Nonsuicidal self-injury, NSSI, Self-injurious behaviour, Internet self-injury forums, Internet self injury sites.

Self-injury is also known as self-mutilation, self-injurious behaviour, non-suicidal self-injury (NSSI), and self-harm (Klonsky, Oltmanns, & Turkheimer, 2003). 'Self-harm' by definition includes suicide attempts, and sometimes other behaviours such as poor eating habits (Claes & Vandereycken, 2007).

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Samples of non-suicidal self-injury do sometimes include suicide attempters, but self-injury with suicidal intent versus without is different despite the apparently similar nature of the behaviour (Muehlenkamp & Gutierrez, 2007). Self-injury as a behaviour usually begins in adolescence, and the most common method is consistently found to be 'cutting' (Klonsky & Muehlenkamp, 2007; Andrews et al., 2014; Swannell et al., 2014). While anti-dissociation, anti-suicide, interpersonal boundaries, interpersonal-influence, self-

punishment and sensation seeking may be implicated in the behaviour, the most commonly reported driver is affect regulation (Klonsky, 2007; Martin, Swannell, Hazell, Harrison, & Taylor, 2010). Negative affect may result from both internal psychological distress and external factors like family discord or childhood abuse (Fliege, Lee, Grimm, & Klapp, 2009; Tatnell et al., 2013; Baetens et al., 2013).

Self-injury is surprisingly common, with lifetime prevalence rates estimated between 16.5-21.5% across several countries (Møhl & Skandsen, 2012; Muehlenkamp, Williams, Gutierrez, & Claes, 2009; Nixon, Cloutier, & Jansson, 2008). The Australian estimated lifetime community prevalence is lower at 8.1% (Martin, Swannell, Hazell, et al., 2010).

Many young self-injurers do not receive professional help (Michelmore & Hindley, 2012; Rowe et al., 2014), commonly preferring informal sources like family members or friends (Fortune, Sinclair, & Hawton, 2008). Barriers to help-seeking include practical factors such as not knowing who to ask, or living in a rural location (Klineberg, Kelly, Stansfeld, & Bhui, 2013), but attitudinal factors are important (Pumpa & Martin, 2015), especially fear of stigmatisation or fear that nobody can help (Vogel, Wester, & Larson, 2007).

Researchers have acknowledged the Internet as a source of help for self-injurers (Rowe et al., 2014), with its anonymity when compared with face-to-face methods of help-seeking (Jones et al., 2011). With the Internet an everyday part of life, it is not surprising that self-injury content appears online. Many social media pages, discussion boards and information pages have sections dedicated to discussion of self-injury. It is a complex domain as some websites promote recovery and identify helpful resources, while others encourage engagement between self-injurers without monitoring by mental health professionals (Lewis, Heath, Michal, & Duggan, 2012). This may have a negative effect on self-injury recovery by normalising and maintaining the behaviour (Whitlock, Powers, & Eckenrode, 2006; Lewis & Baker, 2011).

It is difficult for researchers to determine the success or failure of the Internet in helping stop self-injurious behaviours, and recent research suggests the Internet may be used predominantly for self-injury disclosure rather than an avenue for seeking help (Rowe et al., 2014). As a result, users are likely to experience support and validation, normalising the behaviour rather than sourcing helpful recovery methods (Lewis & Baker, 2011; Whitlock, Powers, et al., 2006).

Adolescents and young adults are known to engage in more online social networking, including picture and video sharing, than any other age group. Encouraged by widespread access to smart phones, over 90% young people go online via a mobile phone at least once per day, with 24% reporting being online almost constantly, and 76% using at least one form of social media with 17% of adolescents reading or commenting on discussion boards. (Lenhart et al., 2015). It is therefore not surprising that many use online services to solve everyday problems, including mental health issues and self-injury.

Self-injurers have been shown to have a higher rate of Internet use than non self-injurers (Mitchell & Ybarra, 2007) and the number of Internet discussion boards dedicated to self-injury continues to increase (Murray & Fox, 2006; Whitlock, Powers, et al., 2006). A crucial factor is thought to be the supposed anonymity, allowing users to reveal parts of themselves they fear may be condemned in day-to-day relationships offline (Adams, Rodham, & Gavin, 2005). This parallels the suggestion that people admit to suicidal ideation anonymously, but may not if they are identifiable (Safer, 1997). Combining these ideas, it could be argued the Internet enables a more authentic expression of self than is possible in daily life (Bargh, McKenna, & Fitzsimons, 2002).

Explaining why self-injurers might initially go online does not establish possible consequences of doing so, and recent research has explored self-injury Internet content, with the International Society for the Study of Self-Injury (ISSI) recognising the area as important (Lewis et al., 2012). It is complex to draw definitive conclusions given the broad range of websites with seemingly different motives. Information websites run by organisations such as 'beyondblue' or 'ReachOut' act as positive sources of information for those who self-injure (Lewis et al., 2012). However, social media pages and discussion boards allow communication and video and picture sharing between users and may have negative consequences (Lewis et al., 2012). Despite some disagreement, most researchers conclude that use of the Internet as a resource for self-injury often results in reinforcement of self-injurious behaviours (Lewis et al., 2012).

Lewis and Baker (2011) studied 71 websites identified as personally constructed (ie non-professional) and relating to self-injury. Most had both pro and anti self-injury aspects, with statements such as 'NSSI is addictive and cannot be stopped' countered with 'NSSI can be stopped but should not be started'. An interesting avenue of research included analysis of posts discussing both concealment of self-injury and how to properly administer necessary first aid. This seemed to reinforce that help-seeking or even

informing others of one's self-injury should be avoided, implying self-injury is acceptable but should be self-managed carefully (Lewis & Baker, 2011). A weakness was that researchers coded website responses, making assumptions and drawing conclusions as outsiders, without personal contact with users. Prior research, using almost identical methodology (Whitlock, Powers et al., 2006) had concluded that discussion boards mimic the search for informal support, but having access to a virtual subculture may reinforce the behaviour. Of note, subjects were only those actively posting comments, yet more than half the board members had never posted a comment (passive members or 'readers only'), and outcomes for this group are potentially different.

Two theories attempt to explain how the Internet might maintain self-injury. First, an individual develops responses to certain environments that manifest as an internal 'script' (Abelson, 1976). Scripts are reinforced by observation and storylines (Whitlock, Purington, & Gershkovich, 2009). Reading narratives of other's self-injurious behaviour may enhance a self-injury script as a way of responding to subsequent negative emotions or stressors in the environment.

Alternatively, 'cultivation theory' considers potential consequences of exposure to a message over time. Originally concerned with television, this theory suggests that when a message is repeated and common, its content becomes normalised (Gerbner, Gross, Morgan, Signorielli, & Shanahan, 2002). Those who watch larger amounts of television are more likely to perceive the real world through opinions, images and attitudes reflecting common, recurring messages of the television world (Shanahan & Morgan, 1999). Cultivation theory might suggest that when individuals read repetitive stories from other self-injurers, it normalises the behaviour, especially if they can relate to the story, viewing both the protagonist and self-injurious behaviour favourably (Whitlock et al., 2009). Combining the ideas of script and cultivation theory, self-validation could well be an outcome of using websites dedicated to self-injurious behaviour.

Adams et al. (2005) define self-validation as, "…. the desire to maintain a sense of self that is legitimate, defensible and acceptable, both internally (to themselves) and externally (to others)". Communication triggering primarily positive thoughts increases a sense of validity for your own thoughts, and confidence the thought must be correct (Petty, Briñol, & Tormala, 2002) . Posts that defend self-injury such as "given the situation, it's no wonder you relapsed!" may validate the self-injury (Adams et al., 2005).

The current research attempted to address limitations of previous studies examining the relationship between the use of self-injury related websites and potential outcomes. We aimed to determine what self-injurers believe is gained from such websites, and why use is maintained despite common opinion that this may be detrimental to recovery.

Further to research on personal disclosure (Jones et al., 2011; Rodham, Gavin, & Miles, 2007), we hypothesised self-injurers turning to the Internet are less likely to have sought help elsewhere compared with self-injurers who have not gone online (*Hypothesis 1*).

Having no experience with a mental health professional may lead to greater levels of perceived stigma about professionals and mental illness, compared to those who have received help (Komiti, Judd, & Jackson, 2006). We hypothesised self-injurers seeking help online would have a greater level of perceived stigma associated with mental illness and mental health professionals than those who have not been online (*Hypothesis 2*).

Social support appears to be one purpose of self-injury websites (Lewis & Baker, 2011; Rodham et al., 2007). Whitlock, Powers, et al. (2006) suggested posts between users do what most people who trust each other do in day to day conversation. That is they exchange support, share stories, and voice opinions and ideas. The researchers acknowledged differences may exist between users who post comments (active) compared with users who only read pages (passive). We hypothesised that use of self-injury related websites would be positively associated with perceived social support where increased levels of use will result in increased social support, especially for active users (*Hypothesis 3*).

Self-validation is an underlying theme of many posts between users (Rodham et al., 2007; Whitlock, Powers, et al., 2006). We hypothesised that self-injury Internet use would be positively associated with self-validation where increased Internet use leads to increased levels of self-validation (*Hypothesis 4*).

The relationship between self-validation and social support has not been compared in the context of self-injury. However, there is a relationship between the two, as most exchanges between users on self-injurious websites are passive, reflect understanding, and defend or excuse episodes of self-injurious behaviours (Adams et al., 2005). 'Posters' are most likely attempting to provide support, but the way they do this may normalise and validate the behaviour (Lewis et al., 2012; Rodham et al., 2007). We hypothesized self-

validation would have a positive correlation to perceived social support where higher levels of self-validation indicate higher levels of perceived social support (*Hypothesis 4a).*

Finally, we hypothesised an indirect path via self-validation would mediate the relationship between self-injury Internet use and perceived social support (*Hypothesis 4b).*

Method

Participants

Ethics approval for the study was gained from the University of Queensland School of Psychology and Behavioural and Social Sciences Ethical Review Committee. The online questionnaire used Qualtrics software which directed participants to a debrief sheet on completion. After discarding 66 incomplete surveys, 199 participants completed the study (20.6% male; 78.4% female), one participant not reporting gender. Participants were UQ students (55%) receiving course credit for involvement, or others (45%) accessed through on-campus flyers or the Internet. Study details were posted on social media (Facebook and Twitter), as well as discussion boards dedicated to self-injury (eg. crazyboards.org). The express purpose was to increase the numbers of participants with experience of accessing or using such Internet sites. Participation was voluntary and anonymous. Ages ranged from 12-58yrs (*M* = 24.11, *SD* = 9.89). English was the first language (90.5%) with 123 born in Australia (61.8%), including five identifying as Aboriginal or Torres Strait Islander (2.5%*).* Other countries of birth included New Zealand, United States of America, China and Canada.

Measures

Self-Injury Questionnaire (Rotolone & Martin, 2012). Participants read a definition of self-injury before answering the question: '*Have you ever deliberately hurt yourself? If even once, please select yes*.' Participants answering '*no*' were forwarded automatically to the next scale. Those answering '*yes*' completed questions assessing frequency, type, and whether anyone was aware of the self-injury, if medical attention was required, whether they had accessed other help (and the source), and whether self-injury was ever an attempt at suicide (and frequency of this). One question was added relevant to specific aims of the study: '*Do you consider the Internet a valid resource for self-injury help?*'

Internet use dedicated to self-injury

Items on activity type, frequency, and functional assessment were adapted from Lewis et al., 2012. '*Have you ever used the Internet in relation to self-injury?*' (Yes/No). If 'Yes', '*Have you ever actively*

engaged with message boards, by posting/replying? If even once please select yes.' (Yes/No). Those indicating they had posted formed the group '*active posters'*. Other items were descriptive, and consisted of checklist, multiple choice and free response items primarily to understand the function of visiting such sites. An example is the free response question: '*If such websites have caused upset and/or triggered you, why do you continue to use them as a resource for self-injury?*' (questionnaire available from authors).

Perceived Stigma

We used the 'stigma tolerance' (5-item) and 'confidence in mental health professionals' (9-item) subscales of the Attitudes Toward Seeking Professional Help Scale (ATSPHS) (Fischer & Turner, 1970). These are from a factor analysis of the ATSPHS. Items were measured on a 5-point Likert scale ranging from 1 (*strongly disagree)* to 5 (*strongly agree).* Of fourteen items, six reflect stigma. For example: '*Having been mentally ill carries with it a burden of shame'*. The other eight reflect positive attitudes toward help (reverse scored for analysis). For example: '*If I thought I needed psychiatric help, I would get it no matter who knew about it'.* Overall higher scores represent higher perceived stigma towards mental health professionals and mental health illnesses. Scores ranged from 21-57 (mean 35.43). Internal reliability for our shortened scale was adequate (α = .75).

Perceived Social Support

We used the Medical Outcomes Study (MOS) Social Support Survey (Sherbourne & Stewart, 1991). Participants read an introduction, slightly adapted from Sherbourne and Stewart's original guide to account for the Internet medium. For example, '*People sometimes look externally (to resources other than themselves) for companionship, assistance or other types of support. How much does going online make you feel the following kinds of support are available to you if you need it?*' The scale consists of nineteen items on 5-point Likert scales ranging from 1 (*none of the time)* to 5 (a*ll of the time).* All items were combined to form a perceived social support scale, higher scores indicating higher levels of perceived social support. The four subscales are 'emotional/informational support', 'tangible support', 'positive interaction' and 'affection'. Overall scores ranged from 18-89 (mean 52.02). Internal reliability for the scale in this study was high (α = .95).

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Self-Validation

The self-validation subscale 'Friend's Functions' from the McGill Friendship Questionnaire (Mendelson & Aboud, 1999) was used. Participants first read an introduction adapted to account for the Internet medium: '*Think about how engaging with your favourite self-injury Internet site makes you feel. With your favourite self-injury website in mind, respond how often each statement applies. My favourite internet site… .*' Nine items measured responses on a 5-point Likert scale ranging from 1 (*never*) to 5 (*always*). Eight items were part of the original scale. One was added in the same format: '*Defends me when I've done something bad*', to more obviously target the defensive nature of many discussion board posts. All items were combined to determine the participant's level of self-validation, where higher scores indicate higher levels of self-validation. Scores ranged from 9-44 (mean 24.34). Internal reliability for the adapted scale was high (α = .93).

Statistical Analysis

All analyses were completed in SPSS version 21. Of 199 participants, 24 failed to answer at least 1 question. However, no single variable was missing more than 5% of data, and Missing Value Analysis indicated no systematic variation between missing data points. Little's MCAR confirmed data was randomly missing across the entire data set (χ^2 (1676, N = 199) = 762.69, *p* > .999).

Two variables, stigma and age (*z* = .435 and 10.9 respectively) were found to have significant positive skew, falling outside a range of +/- 2.9. Age was not transformed as not being an arbitrary value (Norris & Aroian, 2004). Stigma was transformed using a square root transformation. No univariate outliers were present in the data set. For all analyses, our threshold for significance was *p*-values <.05 (Field, 2013).

Chi-square was used to clarify demographic differences between non-self-injurers and self-injurers, and then differences between self-injurers visiting self-injury online sites compared with self-injurers who had not. Independent samples t-tests were used to clarify differences between self-injurers attempting suicide, and self-injurers without suicidal intent. Welch-Satterthwaite adjustments were made for analyses of pooled variance, given Levene's test for equality of variances was violated.

Process macro was used for moderation analysis given the advantage of being able to enter a dichotomous moderator (Hayes, 2013). This examined the relationship between Internet use and 'perceived social support', focused on Internet users with a history of self-injury.

Bootstrapping mediation was used to determine if self-validation mediated the relationship between Internet use and perceived social support. This estimates both direct and indirect effects and has more power to find an indirect effect compared to the causal steps approach (Preacher & Hayes, 2008).

Results

Self-Injury

A history of self-injury was reported by 54% of the sample (n = 107), 24 'only once' (22.4%), 25 less than once a month (23.4%), 8 'once a month' (7.5%), 14 '2-3 times per month' (13.1%), 10 'weekly' (9.3%), 12 '2-3 times per week' (11.2%) and 14 'daily' (13.1%). Overall, 64 (60%) admitted to self-injury 'within the last 12 months'. 'Cutting' was the most common method (n = 78), followed by 'hitting self' (n = 52), ' burning' (n = 32), 'wound picking' (n = 43), 'substance abuse' (n = 19) and 'scratching' (n = 10). Sixty self-injurers (56%) had received help for their self-injury, usually from multiple sources, including professional (n = 49), friends (n = 30), Internet discussion boards (n = 31) and Internet information websites (n = 26). The majority of self-injurers (n = 72, 67.3%) believed the 'Internet was a useful resource for self-injurers'. Gender did not appear to influence the likelihood of self-injury (χ^2 (1, N = 197) = 1.342, p = .181, phi = -.097).

Suicidality

Of 107 self-injurers, 16% (n = 17) had attempted suicide. Independent samples t-tests suggested they self injured more frequently, had lower self-validation, perceived more stigma, and claimed less social support (see Table 1). Given the focus of this study on self-injury without suicidal intent (ie NSSI), these participants were excluded from further analysis, leaving 182 participants (90 self-injurers) of whom 103 were Internet users.

Table 1

Independent Samples T-tests Comparing Self-injurers who had and had not attempted Suicide

Variable	Suicide Attempt	Mean	*T*	df	*p* (*2 tailed*)	η^2
SI frequency	Yes	5.06	3.468	105	.001	.103
	No	3.20				
Stigma	Yes	6.61	3.325	105	.001	.095
	No	6.10				
Self-validation	Yes	18.46	-2.792	89	.006	.081
	No	24.75				
Perceived social support	Yes	43.06	-1.874	96	.064	.035
	No	51.46				

Note. SI equals self-injury.

Internet use

Overall 103 of 182 participants (56%) had visited websites with self-injurious content, and completed all questionnaires. Of these, 63 (61%) reported a history of self-injury, with 40 denying this but still visiting such websites, and 27 (30%) of self-injurers not using Internet sites. Most common sites were social media pages (eg Facebook, n=60), information-based pages (eg 'beyondblue', n = 58), discussion boards (eg 'crazyboards.org', n = 42) and video or picture sharing (eg Instagram, n = 30). Participants indicated they sought information (n = 102, 99% of visitors), understanding (n = 94, 91.3%) or support (n = 64, 62.1%). Few participants indicated they desired 'defence' (n = 3) or conversely 'to trigger others' (n = 2).

Similarly, nearly half of those visiting self-injury sites (n = 47, 45.6%) indicated posting comments online. Half the sample (n = 51, 49.5%) claimed they had become upset by viewing material online, 19 (30.2%) of self-injurers indicating that online content had triggered a self-injurious episode.

As expected there were differences between self-injurers who had visited sites online compared with self-injurers who had not. Chi square revealed 'visitors' were significantly more likely to have self-injured in the past 12 months, have someone aware of their self-injury, have received help, have sought medical attention and consider the Internet useful. There was no association between going online and gender. (See Table 2).

Table 2

Comparison of non-suicidal self-injurers online (63, 70%) with those not online (27, 30%).

Variable	X^2	df	p (2 tailed)	Phi
SI in last 12 months	5.151	1	.023	.241
Someone Aware	6.190	1	.013	.262
Received Help	7.067	1	.008	.280
Medical attention	6.667	1	.010	.272

Note: Suicide attempters excluded.

An independent samples t-test suggested participants visiting sites self-injured significantly more frequently (m = 3.64) compared to those not visiting (m = 1.91) (t (88) = 5.246, p < .001, η^2 = .238). However, contrary to prediction, stigma was not associated with online habits (t (88) = .864, p = .490, η^2 = .008). Appropriate Welch-Satterthwaite adjustments were made for these analyses given Levene's test for equality of variances was violated (F (1, 88) = 25.858, p < .001 and F (1, 88) = 8.644, p = .004 respectively).

As expected there were differences between active users (those who commented) (n = 47, 45.6%) compared with passive users (reading only)

(n = 56, 4%). Welch-Satterthwaite adjustments were used in the present analysis given Levene's test of equal variances was violated, (F (1,101) = 17.511, p < .001). An independent samples t-test not assuming homogeneity of variances suggested active users were significantly older (m = 25.13yrs) compared to passive users (m = 20.13yrs) (t (101) = 3.15, p = .002, η^2 = .090). A series of chi square tests also suggested active users were more likely to self-injure (χ^2 (1, N = 103) = 4.54, p = .033, phi = .210). Self-injurers who were also 'active' Internet site users were more likely to have self-injured within the past 12 months, have someone aware of their self-injury, have received help, have sought

medical attention and consider the Internet useful. Males and females were equally likely to be active or passive users (See Table 3).

Table 3

Comparison of active versus passive users.

Variable	X^2	df	p (2 tailed)	phi
12 Months	6.645	1	.010	.325
Someone Aware	11.401	1	.001	.426
Received Help	19.168	1	<.001	.552
Medical attention	8.605	1	.003	.370
Internet useful	5.652	1	.017	.300
Gender	.838	1	.360	-.116

Note. N = 63 for all comparisons (The 61% of the sample reporting a history of self-injury).

A second independent samples t-test determined active users were self-injuring significantly more frequently (m = 4.18) than passive users (m = 2.12) (t (61) = 2.64, p = .010, η^2 = .103).

Moderation Analysis

This focused on Internet users with a history of self-injury. Internet use was entered as the predictor variable, 'perceived social support' was entered as the outcome variable and 'active or passive engagement' was entered as the moderating variable. Contrary to hypotheses, moderation analysis did not show a significant association between Internet use and perceived social support (n = 76), (R^2 = .068, p = .166) for those with a history of self-injury. The analysis was repeated, focussing on discussion board users, discarding users of information or social media based websites only (n = 37). This model showed a significant association (R^2 = .218, p = .042). While the main effect of Internet use was non-significant (b = -1.524, p = .259), the main effect of engagement (active vs. passive) was significant (b =-22.090, p = .013). The interaction term was also significant ($R^{2\ change}$ = .108, p = .041). Using simple slopes analysis, conditional effects for both active and passive users were non significant as 0 fell within both confidence intervals. Active confidence intervals were 'lower bound' = -1.754, 'upper bound' = 4.361 and passive confidence intervals were, 'lower bound' = -8.801, 'upper bound' = .098.

When self-injurers with suicidality were added back into the discussion board model, (n = 49) the model remained significant (R^2 = .220, p = .010). The main effect of engagement was significant (b =-22.647, p = .002). The main effect of Internet use was non-significant (b = -1.686, p = .094). The interaction term was also significant ($R^{2\ change}$ = .150, p = .005). An analysis using simple slopes suggested a conditional effect of Internet use on perceived social support, significant for passive users (b = -2.717, p = .009) as 0 did not fall within the confidence intervals ('lower bound' = -7.976 and 'upper bound' = -1.185). However, the conditional effect of Internet use on perceived social support for active users was non-significant (b = 1.181, p = .244), as 0 fell within the confidence intervals, 'lower bound' = -.852, 'upper bound' = 3.271. (See Figure 1).

Figure 1

Simple slopes of Internet use for active and passive users.

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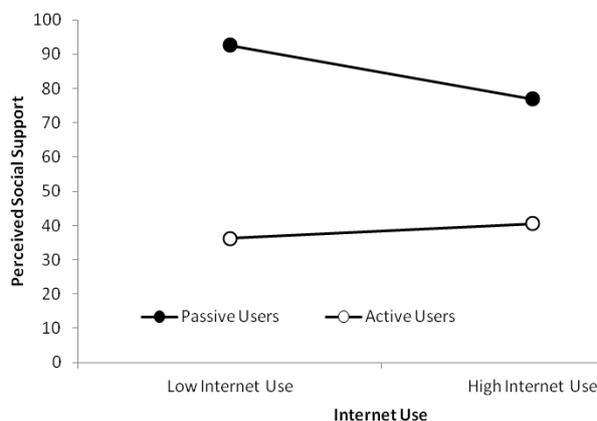
Mediation Analysis

Those who indicated no history of self-injury were excluded from mediation analysis. Bootstrapping mediation was used to determine if self-validation mediated the relationship between Internet use and perceived social support. This estimates both direct and indirect effects and has more power to find an indirect effect compared to the causal steps approach (Preacher & Hayes, 2008). The model was tested using 1000 bootstrap samples with replacement to adequately provide power to detect the indirect effect of the mediator. Internet use was the predictor variable, perceived social support was the outcome variable and self-validation was the proposed mediator.

Contrary to hypotheses, the indirect effect via self-validation for self-injuring Internet users (n = 61) was non-significant as 0 fell within the confidence intervals (lower bound = -.024, upper bound = .433). Despite this, the model still accounted for 19% of the variance in perceived social support (R^2 = .19, F (2, 58) = 7.33, p = .002). The same analyses were run for discussion board users, discarding those who only used information or social media pages (n = 37). The indirect path via self-validation in this model was also non-significant (lower bound = -4.328, upper bound = 2.977). The model still accounted for 21% of the variance in perceived social support, R^2 = .21, F(2, 34) = 4.97, p = .013.

Putting participants with suicidal intent back into the original model (n = 76), the indirect effect via self-validation was non-significant (lower bound = -.2967, upper bound = 1.222). Despite the indirect path being 0, the model still accounted for 24% of the variance in perceived social support, R^2 = .24, F(2, 73) = 11.64, p < .001. Despite non-significant mediation, Pearson's correlation suggests a strong overall association between perceived social support and self-validation (r (61) = .445, p < .001). When those with suicidal intent were included in correlation analysis, the association strengthened (r (76) = .506, p < .001).

Discussion

The primary conclusion from this research is that self-injurers believe they gain both perceived social support and self-validation from visiting online self-injury sites, and the two are positively inter-related. Self-injurers using the Internet as a resource were a distinct subgroup of self-injurers, and there was preliminary evidence that those commenting on sites (active users compared to passive users) are likely to be more frequent self-injurers, and more likely to have had suicidal intent.

That over half our sample indicated a history of self-injury reflects a skewed sample, a direct result of our active online search for self-injurers. Our sample is not a random community sample, even though mean age was similar to that found in other University and college based samples (Whitlock, Eckenrode & Silverman, 2006). Beyond prevalence, the study did replicate previous research regarding community self-injurious samples. Cutting was the most common type of self-injury and emotion regulation was the most common motive (Martin et al., 2010). There were equal prevalence rates for males and females (Rowe et al., 2014) and many participants had not sought help for self-injury (Klonsky & Muehlenkamp, 2007; Rowe et al., 2014).

Over half our sample had gone online to look at websites even though many denied a history of self-injury. This is likely due to the high proportion of psychology undergraduate students who, even if they did not self-injure, could have had emerging professional interest in clinical areas such as self-injury. Conversely, of those with a self-injury history, three-quarters had gone online. Our research differs from previous research, because of our active online search for self-injurers, and access to an anonymous questionnaire placed on several websites. Previous literature suggested a large proportion of website members were female (Whitlock, Powers, et al., 2006) but the current study found no association between gender and either the likelihood of going online, or commenting on such webpages.

In line with hypotheses one and two, self-injurers going to online self-injury sites were different to self-injurers who did not. They were more likely to have self-injured within the past 12 months, to have received help including medical attention, and more likely to believe the Internet useful. This reflects recent research (Frost & Casey, 2016) suggesting self-injurers will seek help from wherever they can get it - those going online also have greater intentions to seek help from mental health professionals compared with those not going online. This research also noted those going online self-injured more frequently than those who refrained. However, that active contributors to online self-injury sites are likely to self-injure more than passive users, is a novel finding from the current study.

Self-injurers prefer help from informal sources like family and friends (Fortune et al., 2008; Pumpa & Martin, 2015), and fear of stigmatisation has been suggested as the reason for avoiding professionals and medical or psychological services, and seeking help online. Unfortunately a recent thematic analysis of research work suggests even online help-seeking may hold a risk of stigmatisation (Lewis and Seko, 2016). In our current study

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perceived stigma levels were relatively high for all self-injurers regardless of online activity. The complex nature of this area was highlighted in results for the third hypothesis. With all types of webpages included, no meaningful associations were found, implying that Internet use per se, or those sites providing information only, have little specific impact on self-injurers. In contrast, for discussion board users, Internet use appeared to increase perceived social support.

Our moderation analysis results support the idea that Internet use differs for active and passive users, though not in the way expected. We anticipated the relationship between Internet use and overall perceived social support to be stronger for active users. However, passive users reported higher levels of perceived social support, although as Internet use increased perceived social support decreased. This is hard to explain, and further work is necessary to replicate this finding, and clarify its meaning.

Whilst mediation (hypothesis 4b) was not apparent from our mediation analysis, preliminary support for the positive association between perceived social support and self-validation was strong. Increased social support has been found to successfully increase coping and decrease stress and depression levels (Dumont & Provost, 1999). However, self-validation is complex. While validation of the self is important, validation of self-injurious behaviours has been linked to justifying self-injurious behaviour as acceptable (Adams et al., 2005). The majority of Internet site users may have good intentions to provide others with support, but inadvertently through improving others' self-validation may maintain the behaviour. The current research was unable to clarify this further.

While our main focus was on non-suicidal self-injury, the presence of suicide attempters in our sample resulted in an unpredicted finding concerned the difference between self-injurers with and without suicidal intent. Those with suicidal intent were more likely to go to sites online, self-injured more frequently, and reported greater perceived stigma towards mental health professionals and mental health illnesses. Despite their online engagement, they reported lower levels of perceived social support and self-validation. This result raises a research question that needs to be answered: *'Are suicidal self-injurers more likely to go online or do those who go online become more suicidal?'*

Strengths and Limitations
Our study used only validated scales and well tried questions within the questionnaire, high reliabilities were retained, and we believe our results can be interpreted with confidence. Participants were assured of anonymity, likely to ensure truthful and accurate information (Muehlenkamp, Claes et al., 2012). Despite this, there were limitations. A major one relates to self-report of Internet use. Given it is unlikely direct monitoring of individual usage could be deemed ethical, future research could enhance accuracy of the Internet use measure, through questions on time spent on self-injury related websites, connections made online, and perceived dependence on websites as a mechanism of support. A further limitation was the cross-sectional design, which does not allow us to draw conclusions about causality. Finally, our participants were recruited from a random mix of discussion boards, social media pages and university students. Despite recruiting a broad range of users, results from this sample may not generalise to all Internet users.

Practical Implications and Future Directions
Despite limitations, the research addressed two key gaps in the literature. Previously, the majority of research discussing self-injury and the Internet has focused on the content of such webpages. The current study asked why self-injurers visit particular sites, and what they believe they gain. Similarly, it has been suggested differences may exist between active and passive users of self-injury sites, but the current study is the first to show a quantitative difference, suggesting Internet sites have different outcomes for various subsets of users.

Despite mental health professionals' apparent agreement that access to online self-injury sites has a negative impact, users told us they gained both social support and self-validation. Lewis et al. (2012) created a website aimed at self-injurers with a culture of help-seeking, presenting key resources, but blocking direct interaction. Our current research suggests this could have reduced social support and interaction, which appears to be what users desire. In addition, it reduces opportunities for developing self-validation, even if this could have the downside of maintaining the self-injurious behaviour. Perhaps a novel program to solve this dilemma would be a planned, online and live group chat moderated by a mental health professional. This might increase self-validation and perceived social support, but allow for active intervention by the professional, if necessary, to block the validation of self-injury.

Overall, the study, even with its limitations, has wide implications for development of practical

interventions as well as expanding the limited literature on self-injurers and Internet use.

Declaration of Conflicting Interest.
The Authors declare that there is no conflict of interest. There was no funding to support this study, and neither author received remuneration.

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Original research

Trends in Attempted Suicide Among Ten Demographic Groups Of U.S. High School Students, 1991-2013

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Abstract: Our knowledge of factors that predict suicide attempts among high school students of different gender/race/ethnic categories is still limited. Methods: This research examines how factors such as binge drinking and being forced to have sex impact attempted suicide among high school students in the U.S. during 1991-2013. Results: The average age of the students was 16.2 and there were 773 Native American females, 20,696 Hispanic females. 3,005 Asian females, 17,847 Black females, 33,027 White females, 915 Native American males, 19,374 Hispanic males, 3,122 Asian males, 15,044 Black males, and 33,377 White males. Regression and difference of means analyses find that factors such as that binge drinking and being forced to have sex, as well as a combination of factors, significantly increase the risk of attempting suicide. Discussion: Results of this research may benefit teachers, school nurses, high school counselors, and peer-support groups as they counsel with high school students who may be suicidal.
Keywords: Attempted Suicide, Race, Ethnicity, Gender, High School Students

One of the many strengths of sociological research on the topic of youth suicide over the years has been the ability to identify factors that impact suicidal risk. For example, researchers have identified factors that increase suicide risk for Native American youth (Tingey, Cwick, Goklish, Larzelere-Hinton, Lee, Suttle, Walkup, and Barlow, 2014), Black youth (Hooper, Tomek, Bolland, Church II, Wilcox, and Bolland, 2015), samples of mostly White youth (Klomek, Kleinman, Altschuler, Marrocco, Amakawa, and Gould 2013), and male

and female youth (Mueller, James, Abrutyn, and Levin (2015). However, research on large samples of youth according to race/ethnicity and sex in one dataset is lacking.

Further, whereas risk factors such as bullying (Klomek and Gould 2014), substance use (Ballard, Musci, Tingey, Goklish, Larzelere-Hinton, Barlow, and Cwik 2015), sadness (Fiegelman, Joiner, Rosen, Silva, and Mueller 2016), academic performance (Whaley and Noel 2013), body image (Brausch and Muehlenkamp 2007), and rape (Tomasula, Anderson, Littleton, and Riley-Tillman 2012) are known to increase suicide risk among youth, it is still unclear how these factors impact specific groups of youth according to sex and race/ethnicity. In order to learn more about the manner in which these factors impact suicidal

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behaviors among youth, a statistical analysis is performed to examine attempted suicide among 10 different demographic groups of public high school students in the United States from 1991-2013. It is hoped that individuals who have significant influence in the lives of high school students, such as school nurses, teachers, school counselors, and peer support groups can benefit from this research as they are in a position to guide teenagers through their high school years.

Literature Review

When we read published research on the topic of youth suicide, the introductory remarks on this topic often center around one of two issues: Suicide is one of the leading causes of death among teenagers, and suicidal behavior among teenagers is a serious problem. Since this research focuses on the latter issue, studies relevant to suicidal behaviors, not completed suicide, will be the focus of this literature review. Researchers have made important strides in identifying the prevalence of suicidal behavior among adolescents. For example, McKinnon, Gariepy, Sentenac, and Elgar (2016) report that suicide accounts for about 6% of all deaths worldwide for young people; Tomek, Hooper Church II, Bolland, Bolland, and Wilcox (2015) find that suicide is the third leading cause of death for teenagers in America; and Brausch and Gutierrez (2009) argue that suicidal ideation and behavior pose very serious problems among adolescents. Researchers have also done well in identifying effective preventative measures of adolescent suicide (Berman, Jobes, & Silverman, 2006; Gutierrez, 2006). While there is excellent research on identifying factors that increase suicide risk among specific male and female youth ethnic/racial groups (Tomek, Hooper, Church, Bolland, Bolland, and Wilcox, 2015; Wexler, Chandler, Gone, Cwik, Kirmayer, LaFramboise, Brockie, O'Keefe, Walkup, and Allen, 2015; Whaley and Noel, 2013), a review of the literature on adolescent suicidal behaviors reveals a small amount of information on suicidal behavior among adolescents according to sex AND race/ethnicity simultaneously. Knowing what factors impact suicidal behaviors for different groups of adolescents can greatly aid individuals in more effectively counseling suicidal youth. While sexual orientation is a strong predictor of suicidal behavior among adolescents (Jiang, Perry, & Hesser, 2010; Mueller, James, Abrutyn, and Levin, 2015), data on sexual orientation were not available in the current data set. This research examines attempted suicide among male and female White, Black, Asian, Hispanic, and Native American high school students from 1991-2013 in

relation to the following variables: depression, academic performance, rape, being bullied, binge drinking, and body image.

Depression

Depression (and similar mental states) is regularly found to be linked with suicidal behaviors. Kuo, Tran, Shah, and Matorin (2015) explain that depressed persons often consider taking their own lives because they feel so worthless and hopeless. Wong, Zhou, Goebert, and Hishinuma (2013) find that depression consistently has the strongest impact on suicidality among high school students relative to any other variable they examined. Similar findings are reported elsewhere (Dearden, De La Cruz, Crookston, Novilla, and Clark, 2005; Roberts & Chen, 1995; Sofronoff, Dalgliesh, & Kosky, 2004), although Jiang et al. (2010) find this to be more true for females than males. McManama O'Brien, Becker, Spirito, Simon, and Prinstein (2014) conclude that the combination of depression and alcohol consumption is likely to result in a suicide attempt. Such a statement suggests the need to examine predictors of suicidal behavior in combination with each other, not just individually.

Academic Performance

Whaley and Noel (2013) report that poor academic performance increases the risk of suicide for both Asian-American and African-American students, although the effect is stronger for Asian-American students. Dearden et al. (2005) show that poor academic performance strongly increases the risk of suicidal behavior among female, but not male, high school students. Specifically, they find that females who do not do well in school are much more likely than females who are doing well to have attempted suicide. Whetstone, Morrissey, & Cummings (2007) find similar results, whereas Richardson, Bergen, Martin, Roeger, and Allison (2005) find that both male and female adolescents are at an increased risk of attempting suicide when they do not do well in school. However, Jiang et al.'s (2010) research shows that students with poor grades were not significantly more likely to attempt suicide than were students with good grades.

Rape

Jiang et al. (2010) explain that both male and female high school students who were forced to have sexual intercourse were more likely to have made a suicide attempt versus those who were not forced to have sex. Similarly, Borges, Benjet, Medina-Mora, Orozco, Molnar, and Nock (2008) explain that being raped increased the risk of

attempting suicide among adolescents four-fold while Tomasula et al. (2012) find it increases the risk of suicidal attempts by about 10 times for males and five times for females. Ackard and Neumark-Sztainer (2002) report that, controlling for age and race, both male and female adolescents who have experienced date rape are about four times more likely to have attempted suicide compared to adolescents who have not experienced date rape or dating violence. However, Olshen, McVeigh, Wunsch-Hitzig, and Rickert (2007) find that a lifetime history of sexual assault is related to an increased risk of suicide attempts for male, but not female, urban teenagers.

Being Bullied
Klomek, Sourander, and Elonheimo (2015) report that youth who are bullied are at an increased risk for suicidality. Klomek, Marrocco, and Kleinman (2008) further explain that victimization at the hands of high school peers, including physical abuse and being teased, increases the risk of both depression and thinking about committing suicide for both male and female high school students. Klomek Sourander, Niemela, Kumpulainen, Piha, Tamminen, Almqvist, and Gould (2009) report that boys and girls who were frequently bullied at age eight were significantly more likely to exhibit suicidal behavior later in life (either attempts or completions) compared to youth who were not bullied. Overall, the literature clearly indicates that bullying is commonly found to increase suicide risk in both male and female adolescents (Bhatta, Shakya, & Jefferis, 2014; Cooper, Clements, & Holt, 2012; Kim, Leventhal, Koh, and Boyce, 2009).

Alcohol Use
Alcohol use increases the risk of suicide (Spencer-Thomas, 2011) because alcohol use not only impairs cognitive ability, but it may also be the 'courage pill' that an individual needs to go through with the act of attempting suicide (Brent, Perper, & Allman, 1987). Cwik, Barlow, Tingey, Goklish, Lazelere-Hinton, Craig, and Walkup (2015) show that 91% of American Indian youth who recently attempted suicide had a high lifetime use of alcohol. Barlow, Tingey, Cwik, Goklish, Lazelere-Hinton, Lee, Suttle, Mullany, and Walkup (2012) report that about 2/3 of American Indian youth they surveyed were drunk (or high) during their suicide attempts. Tomek et al. (2015) also find that frequent alcohol use increases suicide attempts among Black American adolescents. In short, alcohol use is commonly found to increase suicide risk in adolescents (Dearden et al., 2005; Nishimura, Goebert, Ramisetty-Mikler, and

Caetano, 2005; Pompili, Serafini, Innamorati, Biondi, Siracusano, Giannantonio, Giupponi, Amore, Lester, Girardi, and Moller-Leimkuhler, 2012; Wong et al., 2013), although Dunn, Givens, and Austin (2008) report that alcohol use increases the risk of suicide attempts in female, but not male, students.

Body Image
Brausch and Muehlenkamp (2007) assert that a poor body image significantly increases suicidal ideation in both male and female adolescents. Other research also finds that perceptions of being overweight increase the risk of suicide attempts in adolescents (Swahn, Reynolds, Tice, Miranda-Pierangeli, Jones, and Jones, 2009; Whetstone et al., 2007). Brausch and Muehlenkamp (2007) further argue that because youth are less invested in their bodies they are more likely to consider harming their bodies. However, Braush and Decker (2014) report that body satisfaction has no significant impact in any of their analyses on suicidal ideation in adolescents. Brausch and Gutierrez (2009) hypothesize that a poor body image has both direct and indirect effects on suicidal ideation. In their examination of high school students, they find that a negative body image increased the risk of being depressed, which in turn increased suicidal ideation. They did not find, however, a direct association between body image and suicidal ideation. Jiang et al. (2010) conclude that high school students who perceive themselves as overweight were no more likely to have attempted suicide compared to students with no such body image.

Race/Ethnicity
Cwik et al. (2015), Tingey et al. (2014), and Gidner (2006) report that the suicide rate among Native American teens and young adults is over two times greater than the nationwide rate. One proposed theory for the higher incidence of suicidal ideation among Native Americans is that they have a higher rate of poverty and alcoholism than the general population and this yields a much higher rate of hopelessness in the Native American population (Echohawk, 1997).
Frank and Lester (2001) find that, compared to both White and Black youth, Hispanic/Latino youth are more likely to have attempted suicide. This is true for both males and females. Gutierrez, Muehlenkamp, Konick, and Osman (2005) report that depressive symptoms increase suicidal ideation for both White and Black adolescents, although White adolescents reported higher levels of suicidal ideation than Black adolescents. Conversely, Kim, Moon, and Kim (2011), Waldrop,

Hanson, Resnick, Kilpatrick, Naugle, and Saunders (2007), and Muehlenkamp and Gutierrez (2004) find no significant differences in suicidal behaviors across race/ethnicity among adolescents. Gutierrez and Osman (2008), in their review of suicidality among minority youth, report that Hispanic youth are more likely to think about and attempt suicide relative to African-American and Asian-American youth. Conversely, African-American youth tend to be less likely to attempt suicide than other racial/ethnic groups.

Gender

One of the most consistent findings about suicidal behavior among adolescents, aside from the strong influence depression has on suicidal behaviors, is that females attempt suicide more than males (Brausch & Gutierrez, 2009; Hooper et al., 2015; Kim et al., 2011; Frank & Lester, 2001; Lobach, 2008; Martin, Richardson, Bergen, Roeger, and Allison, 2005; Muehlenkamp & Gutierrez, 2004; Waldrop et al., 2007; Whetstone et al., 2007) although there are exceptions which find no significant gender differences (Roberts & Chen, 1995).

While many of the articles cited above include gender and/or race as independent variables in statistical analyses, rarely do we see separate, distinct groups of adolescents studied according to race and gender combined (e.g., Asian-American males versus Native American females). One goal of this research is to increase knowledge on how risk factors impact suicidal behaviors among specific groups of adolescents, which is important to know because there have not been many studies that have compared Whites to minorities regarding risk factors of suicidal behaviors (Gutierrez et al. 2005). This research aims to determine how risk factors for attempted suicide differ by demographic group so that those persons who are likely to encounter depressed adolescents, including school nurses, teachers, school counselors, and peer support groups can provide appropriate guidance and support for suicidal high school students. In order more fully understand how risk factors impact suicidality for adolescents, the independent variables in this analysis will be studied (1) individually and (2) in combinations with each other because it is common for suicidal adolescents to be beset by a combination of problems (Berman et al., 2006; Klomek, Sourander, and Elonheimo, 2015).

Data analyses will examine how academic performance, rape, bullying, alcohol use, sadness, and perceived body image impact attempted suicide among high school students.

Method

All data are from the Youth Risk Behavior Surveillance System (YRBSS), a data set that was established by the Centers for Disease Control and Prevention (http://www.cdc.gov/HealthyYouth/yrbs/index.htm). This survey has been given every two years to a random sample of public high school students beginning in 1991. Students in most of the 50 states, including Washington, DC have been included in this survey. The time period for this analysis is 1991-2013 (12 different survey periods) and the overall response rate for the 1991-2013 period is 67% (Centers for Disease Control and Prevention, 2013, 2014a). For each survey, the overall response rate was calculated as follows, using 2007 as an example: 157 out of 195 sampled schools participated in the survey (81%) and 14,103 out of 16,662 sampled students submitted questionnaires (84%), yielding an overall response rate of 68% (81% * 84%). Research finds that the data collected in these surveys are valid (Centers for Disease Control and Prevention, 2013; Perez, 2005).

Because suicidal behaviors are not common events, researchers would need time series data of youth over a period of many years to properly analyze and better understand attempted suicide among youth (Gutierrez 2006). Since the current data cover 22 years, they allow a detailed analysis of attempted suicide among youth (sample sizes are presented in the Results section). Analyses of attempted suicide are broken down by race/ethnicity and sex. There are five racial/ethnic groups: (1) White (classified as White, non-Hispanic from 1991-1997 and White from 1999-2013); (2) Black (classified as Black from 1991-1997 and Black or African American from 1999-2013 [both Whites and Blacks, notwithstanding the categorical name change, are still White and Black non-Hispanics for the entire 1991-2013 period]); (3) Hispanic or Latino (classified as Hispanic or Latino from 1991-2013); (4) Asian or Pacific Islander (classified as Asian or Pacific Islander from 1991-1997 and both [a] Asian and [b] Native Hawaiian and Other Pacific Islander from 1999-2013); (5) American Indian and Alaska Native (classified as Native American or Alaska Native from 1991-1997 and American Indian and Alaska Native from 1999-2013). There are 10 different groups being examined (five racial/ethnic groups for males and female separately).

Dependent Variable

Attempting suicide was measured by asking, "During the past 12 months, how many times did

you actually attempt suicide?" Response categories are listed as follows: '0', '1', '2-3', '4-5', and '6 or more times'. This variable was measured for the entire 1991-2013 time period.

Independent Variables

Sadness is measured by the following question: "During the past 12 months, did you ever feel so sad or hopeless almost every day for two weeks or more in a row that you stopped doing some usual activities?" This question was asked from 1999-2013. Students who said yes were coded as 1 and students who said no were coded as 0.

Being forced to have sex was measured from 1999-2013 and the questions asked students were, 'Have you ever been forced to have sexual intercourse when you did not want to?' (1999) and 'Have you ever been physically forced to have sexual intercourse when you did not want to?' (2001-2013). Students who said yes were coded as 1 and students who said no were coded as 0.

Academic performance was measured for 2001, 2003, and 2009. Although there were questions asked in 1991 and 1993 regarding academic performance, the response categories ('one of the best students', 'far above the middle', etc.) were qualitatively different from the response categories used for 2001, 2003, and 2009 and were, therefore, omitted. In 2001, 2003, and 2009, students were asked, "During the past 12 months, how would you describe your grades in school?" Response categories ranged from 'mostly A's' (coded as 1) to 'mostly F's' (coded as 5).

Bullying was measured from 2009-2013 and the question students were asked was, 'During the past 12 months, have you ever been bullied on school property?' Students who answered yes were coded as 1 and those who answered no were coded as 0.

Alcohol consumption was measured during the entire 1991-2013 time period and the question which students answered was, 'During the past 30 days, on how many days did you have 5 or more drinks of alcohol in a row, that is, within a couple of hours?'. Response categories are '0 days', '1 day', '2 days', '3 to 5 days', '6 to 9 days', '10-19 days', and '20 more days'. Because this question measures binge drinking, this variable is labeled as binge drinking in this analysis.

Perceived body image was also measured throughout the entire 1991-2013 time period and the questions to which students responded were, 'Which of the following are you trying to do?' (1991-1993) and 'Which of the following are you

trying go to about your weight?' (1995-2013). Students who said they were trying to lose weight were coded as 1 and students who said they were either trying to gain weight or stay the same weight were coded as 0. Although losing weight is not necessarily an indicator of dissatisfaction with body image, it is the only question on body image that was asked in the questionnaire.

This analysis of adolescent suicidal behaviors employs 12 different datasets (the 1991 dataset, the 1993 dataset, etc., up to and including the 2013 dataset); proper procedures about combining these datasets (Centers for Disease Control and Prevention, 2014b) were strictly followed. Detailed information on the study procedure is provided by the Centers for Disease Control and Prevention (2013). Since the study procedure is explained in detail by the Centers for Disease Control and Prevention, it is not repeated here.

Because of the different variables and years involved herein, sample sizes differ for various data analyses. For example, while there are 33,377 white males students who responded to survey questions from 1991-2013 (see table 2), there are 21,508 white males included in regression analysis (see table 3a) because not all of these 33,377 students answered questions related to being forced to have sex, binge drinking, sadness, and attempted suicide. Further, sample sizes for each group differ for the difference of means analysis (see table 4) because each panel in the table examines a different combination of variables.

When regression analysis was performed for each of the 10 demographic groups, results revealed a very weak association between losing weight and attempted suicide (table not shown). To test if losing weight truly needed to be in the regression model, notwithstanding results from previous research, regressions were run both with and without losing weight and the resultant F-Test changes in each of the 10 R^2 values were examined (see table 1). In half of the models, no significant increase in explained variance is obtained by including losing weight (for Native American females, R^2 was actually higher by .001 without losing weight in the model). For four of the five other models, including losing weight in the regression model only increased R^2 by .001. In the model for Native American males, R^2 increased by .004. Even though statistical analyses reveal these are significant changes in explained variance, they are substantively miniscule changes. Losing weight, therefore, will not be included in regression analyses herein.

Table 1
Impact of Losing Weight on Explained Variance in Regression Models

	Adjusted R^2 With Losing Weight	Adjusted R^2 Without Losing Weight	F-Test Change in R^2
Asian/Pacific Islander Males	.220	.220	.235
Asian/Pacific Islander Females	.163	.163	.703
Black Males	.138	.138	.130
Black Females	.096	.095	.029
Hispanic Males	.144	.144	.340
Hispanic Females	.139	.138	.000
White Males	.150	.149	.000
White Females	.124	.123	.000
Native American Males	.271	.267	.025
Native American Females	.112	.113	.994

After discussing descriptive results of the data, analysis will turn to Ordinary Least Squares (OLS) regression. Instead of running one OLS model with dummy variables for sex and race/ethnicity, models for each demographic group separately are examined as this method yields information for each group separately, an aspect missing from most sociological analyses of youth suicide. When bullying and academic performance are included in data analysis, only 2009 data are used because that is the only year where data are available for all five independent variables. Therefore, regression analyses will include (1) three independent variables (e.g., binge drinking, sadness, and forced sex) for the time period 1999-2013 (data on sadness are only available since 1999) and (2) all five independent variables for 2009 only.

To check for harmful collinearity, a common problem in regression analysis, Allison's (1999) guidance that any Variance Inflation Factor (VIF) 2.5 or over indicates problematic collinearity among the predictors was employed. There were no indications of harmful collinearity in any of the models for the periods 1999-2013 and 2009. All VIFs in tables 3a and 3b are below 2.2, suggesting that collinearity will not bias regression results. In regression analyses dealing with data over time, attention must be paid to autocorrelated error terms. If these error terms exhibit significant correlations, regression results will not be accurate. In each regression model shown in table 3a, all the Durbin-Watson test statistics show that there is no problematic autocorrelation as all values are close to 2.0 (Durbin & Watson, 1951). Because table 3b only examines 2009, Durbin-Watson statistics were not examined.

Interaction terms of independent variables are calculated by adding one variable to another. For example, the interaction between forced sex and binge drinking is obtained by adding the values of forced sex and binge drinking together. Difference of means tests were employed to analyze interaction effects.

Only the three independent variables used in table 3a will be used in the difference of means analysis because if all five independent variables are used (e.g., only 2009 data), the number of cases significantly declines. For example, in 2009 there are only a total of 17 males and 18 females across all racial and ethnic groups who reported being forced to have sex and binge drink and being sad and having bad grades and being bullied. Using Levene's test (1960) to determine equality of variances between the two groups being compared in the difference of means tests, all difference of means results in table 4 indicate that equality of variances can be assumed.

Results

Table 2 shows the percentages and frequencies of students who attempted suicide at least once during 1991-2013. There are noticeable differences between the demographic groups; for example, whereas about one in five Native American females reported attempting suicide at least once, only about five percent of White and Black males reported that they did. Further, with the exception of Native American males, females consistently reported attempting suicide more than males. Chi-square test statistics reveal a significant difference in the distribution of suicide attempts in table 2 (Pearson chi-square = 684.443, df=4, p =.000).

Table 2

Percentage of High School Students Who Have Attempted Suicide at Least Once, 1991-2013

	Percent with at Least One Attempt
Native American Females	19.5% (151 students out of 773 students)
Hispanic Females	14.9% (3093 students out of 20696 students)
Native American Males	14.1% (129 students out of 915 students)
Asian & Pacific Islander Females	11.9% (357 students out of 3005 students)
Black Females	9.8% (1754 students out of 17847 students)
White Females	9.5% (3154 students out of 33027 students)
Asian & Pacific Islander Males	6.9% (216 students out of 3122 students)
Hispanic Males	6.8% (1313 students out of 19374 students)
Black Males	5.4% (814 students out of 15044 students)
White Males	4.5% (1490 students out of 33377 students)

Tables 3a and 3b present ordinary least square results for two models. Table 3a displays results from regression analysis of adolescent attempted suicide from 1999-2013 and table 3b displays results for 2009. In order to reduce repetition in explaining results, I will not repeat the phrase 'holding constant all other independent variables' when explaining regression results, although it is implied. In table 3a, we see that being forced to have sex, binge drinking, and sadness significantly increase suicide attempts for all groups of youth.

There is some variance, however, in which variables exert the strongest impact on attempted suicide. For example, the standardized coefficients in table 3a show that being forced to have sex is the strongest predictor for Asian and White males. Binge drinking is the strongest predictor for Black males, while sadness is the strongest predictor for the seven remaining groups of youth. Explained variance is fairly low in all of the models, with the models for Native American males (.267) and Asian males (.220) having the highest adjusted R^2.

Table 3a

Ordinary Least Square Standardized Regression Coefficients for Attempted Suicide Among American High School Students, 1999-2013

Independent Variable	Asian Males	Asian Females	Black Males	Black Females	Hispanic Males	Hispanic Females	White Males	White Females	Native Amer. Males	Native Amer. Females
Forced Sex	.269*	.190*	.173*	.128*	.208*	.190*	.242*	.157*	.200*	.187*
Binge Drinking	.233*	.191*	.227*	.134*	.158*	.126*	.111*	.064*	.185*	.112*
Sadness	.172*	.217*	.159*	.204*	.214*	.230*	.221*	.262*	.358*	.201*
Durbin-Watson	1.989	1.967	1.977	1.974	1.999	1.908	1.990	1.942	2.108	1.948
Adjusted R^2	.220	.163	.138	.095	.144	.138	.149	.123	.267	.113
N	2085	2039	8347	9780	12286	13185	21508	22009	624	538

*p<.05

When bullying and academic performance are introduced into the regression analyses, we see that poor academic performance significantly increases suicide attempts for Hispanic males, White males and females, and Native American males. Also, being bullied increases suicide attempts for all groups except Black males and Native American males and females. Further, we see that sadness and being forced to have sex significantly increase suicide attempts for all youth groups except Native American females. In fact, none of the predictors significantly impacts attempted suicide for Native American females.

This is likely an artifact of sample size, with only 42 cases being analyzed. Binge drinking significantly increases suicide attempts for all groups except White females and Native American males and females. Again we see some variance in the strength of association between the independent variables and attempted suicide. Being forced to have sex has the strongest impact on attempted suicide for Asian males and Hispanic females. Binge drinking has the strongest impact for Black males, while poor academic performance has the strongest impact for Native American males. Sadness has the strongest impact on attempted suicide for the remaining six groups (being raped

and sadness both had the strongest effect on White males). Explained variance is again fairly low in the regression models, with Native American males (.405) and Asian males (.382) having the highest adjusted R^2.

Table 3b
Ordinary Least Square Standardized Regression Coefficients for Attempted Suicide Among American High School Students, 2009

Independent Variable	Asian Males	Asian Females	Black Males	Black Females	Hispanic Males	Hispanic Females	White Males	White Females	Native American Males	Native American Females
Forced Sex	.339*	.117*	.228*	.149*	.176*	.207*	.210*	.163*	.262*	.055
Binge Drinking	.195*	.216*	.272*	.095*	.145*	.140*	.185*	.020	.006	.174
Sadness	.233*	.236*	.095*	.221*	.198*	.174*	.210*	.206*	.312*	.319
Grades	.070	-.039	-.063	-.042	.057*	.033	.054*	.084*	.357*	-.109
Bullied	.105*	.104*	.035	.074*	.071*	.124*	.106*	.082*	.030	.120
Adjusted R^2	.382	.156	.185	.114	.129	.165	.192	.122	.405	.122
N	301	348	743	833	1508	1618	2923	2930	59	42

*p<.05

The difference of means analysis is presented in table 4. This table is broken down into four parts, one for each possible combination of the three independent variables (forced to have sex, binge drinking, and sadness). Comparisons are between those who are experiencing a combination of problems (e.g., being forced to have sex and binge drinking) versus those who are not experiencing this same combination of problems. Based on the review of the literature, those who are experiencing each combination of problems will be labeled 'at risk' of suicide. In all 40 comparisons shown in table 4, experiencing some combination of problems significantly increases suicide attempts. For example, the mean number of suicide attempts for Hispanic males who have been forced to have sex and feel sad is 2.18, while it is 1.10 for Hispanic males who are not in the category 'forced to have sex and feel sad'. In other words, Hispanic males in the at risk group are about twice as likely to attempt suicide compared to those not in the at risk group. The average ratio for all 40 comparisons in table 4 is 1.83 (# at risk suicide attempts/# not at-risk suicide attempts). In other words, individuals who reported some combination of problems have, on average, close to double the suicide attempts than individuals who are not experiencing the same combination of problems. For youth in table 4 who have been forced to have sex and feel sad, Asian males, White males, and Native American males are over two times more likely to attempt suicide compared to other Asian, White, and Native American males. Hispanic males who have been forced to have sex and feel sad are almost (2.18/1.10=1.98) twice as likely as other Hispanic males to attempt suicide. For youth who have been forced to have sex and binge drink, Asian males and Native American males were over twice as likely to attempt suicide compared to other Asian and Native American males. Differences in suicide attempts between youth who binge drink alcohol and feel sad versus youth not in this category are the smallest in table 4, with the largest difference being for Native American males who binge drink and feel sad (1.9 times more likely). Conversely, the largest differences for each of the 10 groups are found when comparing youth who were forced to have sex and binge drink and feel sad compared to those not in this category. All males who are in this at risk category are more than twice as likely as males who are not in this category to have attempted suicide. For Asian males, this difference is almost three times greater (3.30/1.11=2.97). Asian females who are in this category are also more than twice as likely to attempt suicide than Asian females not in this category.

Discussion
Data from the Youth Behavior Risk Surveillance System from 1991-2013 show much variation in the frequency of attempted suicide among high school youth. For example, about one in five Native American females and almost 15% of Hispanic females attempted suicide at least once. On the other end of the spectrum, just over 5% of Black males and just under 5% of White males attempted suicide at least once. While these differences could be due to the fact that some groups of youth are less likely to admit to attempting suicide, these are nonetheless striking differences.
Regression and difference of means analyses of suicide attempts among high school students in the United States revealed both similarities and

Table 4

Difference of Means Tests for Attempted Suicide Among Self-Identified Depressed American High School Students, 1999-2013: Interaction Effects

Mean Number of Suicide Attempts For Students Who Have Been Forced to Have Sex AND Feel Sad Vs. Mean Number of Suicide Attempts For Students Not in the Category 'Have Been Forced to Have Sex and Feel Sad'									
Asian Males	Asian Females	Black Males	Black Females	Hispanic Males	Hispanic Females	White Males	White Females	Native American Males	Native American Females
2.84 (n=56) Vs. 1.10 (n=2158)	1.94 (n=109) Vs. 1.15 (n=2015)	1.91 (n=258) Vs. 1.08 (n=9040)	1.57 (n=745) Vs. 1.12 (n=9818)	2.18 (n=342) Vs. 1.10 (n=12643)	1.95 (n=1026) Vs. 1.18 (n=12701)	2.37 (n=358) Vs. 1.06 (n=22119)	1.73 (n=1452) Vs. 1.10 (n=21301)	2.45 (n=40) Vs. 1.16 (n=635)	1.86 (n=64) Vs. 1.22 (n=501)
Mean Number of Suicide Attempts For Students Who Have Been Forced to Have Sex AND Binge Drink Vs. Mean Number of Suicide Attempts For Students Not in the Category 'Have Been Forced to Have Sex and Binge Drink'									
Asian Males	Asian Females	Black Males	Black Females	Hispanic Males	Hispanic Females	White Males	White Females	Native American Males	Native American Females
2.54 (n=50) Vs. 1.10 (n=2894)	2.23 (n=60) Vs. 1.17 (n=2841)	1.99 (n=224) Vs. 1.07 (n=13273)	1.72 (n=229) Vs. 1.14 (n=16608)	2.07 (n=339) Vs. 1.09 (n=16296)	1.96 (n=667) Vs. 1.20 (n=18052)	2.01 (n=442) Vs. 1.06 (n=28445)	1.62 (n=1069) Vs. 1.12 (n=28590)	2.41 (n=29) Vs. 1.16 (n=775)	2.08 (n=39) Vs. 1.26 (n=666)
Mean Number of Suicide Attempts For Students Who Binge Drink AND Feel Sad Vs. Mean Number of Suicide Attempts For Students Not in the Category 'Binge Drink and Feel Sad'									
Asian Males	Asian Females	Black Males	Black Females	Hispanic Males	Hispanic Females	White Males	White Females	Native American Males	Native American Females
1.92 (n=119) Vs. 1.09 (n=2822)	1.79 (n=135) Vs. 1.16 (n=2764)	1.63 (n=425) Vs. 1.07 (n=13132)	1.55 (n=587) Vs. 1.13 (n=16267)	1.53 (n=1239) Vs. 1.07 (n=15346)	1.64 (n=1932) Vs. 1.18 (n=16715)	1.48 (n=1799) Vs. 1.05 (n=27183)	1.48 (n=2863) Vs. 1.10 (n=26852)	2.15 (n=67) Vs. 1.13 (n=732)	1.75 (n=71) Vs. 1.26 (n=632)
Mean Number of Suicide Attempts For Students Who Have Been Forced to Have Sex AND Binge Drink AND Feel Sad Vs. Mean Number of Suicide Attempts For Students Not in Category 'Have Been Forced to Have Sex and Binge Drink and Feel Sad'									
Asian Males	Asian Females	Black Males	Black Females	Hispanic Males	Hispanic Females	White Males	White Females	Native American Males	Native American Females
3.30 (n=30) Vs. 1.11 (n=2925)	2.53 (n=38) Vs. 1.18 (n=2868)	2.39 (n=102) Vs. 1.08 (n=13505)	1.92 (n=153) Vs. 1.14 (n=16728)	2.58 (n=186) Vs. 1.09 (n=16516)	2.18 (n=491) Vs. 1.20 (n=18262)	2.59 (n=237) Vs. 1.06 (n=28813)	1.88 (n=709) Vs. 1.12 (n=29043)	2.95 (n=20) Vs. 1.17 (n=788)	2.11 (n=27) Vs. 1.27 (n=678)

differences among 10 different demographic groups. Regression results during 1999-2013 reveal that sadness is a common and relatively powerful predictor of suicide attempts. In fact, it significantly increases attempted suicides among all 10 groups of youth. Further, being forced to have sex and binge drinking also have a significant impact on attempted suicide for all 10 groups of youth. When academic difficulties and being bullied were added to the regression model, each exerted some significant effects on attempted suicide. For example, poor academic performance was the strongest predictor of attempted suicide for Native American males, while bullying increased suicide risk for seven of the 10 groups of

youth. A more detailed discussion of both regression and difference of means results is interpreted against the background of existing literature below.

Regression results on the impact of binge drinking, especially those among Black males, support previous research. For example, Tomek et al. (2015) find that frequent alcohol consumption among Black adolescents significantly increases suicide attempts. While binge drinking significantly increased suicide attempts among all high school students in the present study, only for Black males did binge drinking have the strongest impact of independent variables examined in table 3a. All in all, this gives further support to the statement by

Tomek et al. that professionals should pay close attention to alcohol use in high school youth. However, binge drinking had the weakest impact of the three independent variables for Native American males and females. It did increase the risk of suicide attempts, but not as much as forced sex and sadness. Alcohol use is often found to be a strong predictor of suicide among Native American youth (Ballard et al. 2015; Barlow et al. 2012). These results suggest that binge drinking may not be as powerful of a predictor of suicide attempts for Native Americans as sadness and being forced to have sex.

In their discussion of the inferior minority assumption, Whaley and Noel (2013) report that poor academic performance is associated with an increased likelihood of suicidality for both Asian-Ameicans and Blacks. However, the current study finds that poor academic performance most strongly applies to Native American males and, to a weaker degree, to Hispanic males, White males, and White females. In Whaley and Noel's discussion of the inferior minority assumption, they explain that there are minority groups whose negative attitudes toward school result in a poor academic performance. These results agree with Whaley and Noel, especially for Native American males, in that poor academic performance increases feelings of inferiority and, possibly, hopelessness.

While sadness significantly increased suicide attempts in all 10 models in table 3a, it had a relatively strong impact for White females and Native American males (based on the relatively large Beta coefficients). Presuming that prolonged sadness can result in depression, teens who are depressed need to be assessed for how they respond to stressful situations, regardless of the teen's sex and race/ethnicity (Kroning, 2016). Kroning goes on to explain that depressed adolescents need attention from those around them to help them feel valued, important, and accepted.

Results from the difference of means analysis reveal that the combination of being forced to have sex and binge drinking alcohol and being sad resulted in the most significant outcomes for attempted suicide. Compared to students who have not been forced to have sex and do not binge drink alcohol and are not sad, those who are in this at risk category tend to have, on average, one more suicide attempt. The most noticeable difference is for Asian males, where those in this at risk group have, on average, 3.3 suicide attempts compared to 1.11 attempts for those not in this category. Just why this at risk category increases suicide attempts more for Asian males than for other groups remains to be discovered. These are striking results and could certainly help guide individuals who counsel suicidal youth, including teachers, school counselors, and peers.

Regardless of the combination of variables examined in table 4, high school students who were in an 'at risk category' were significantly more likely to attempt suicide than students of the same sex and racial/ethnic background who were not in an at risk group. The panel which compared those who have been forced to have sex and who binge drink and who feel sad to those not in this category shows that each group of males in this at risk group is over two times more likely to attempt suicide. Asian females are also over two times more likely to attempt suicide compared to Asian females not in this at risk group. Since attempted suicide is often the result of a combination of problems in adolescents' lives (Klomek et al. 2015), one direction future research could focus on is examining combinations of risk factors. Further, two groups that emerged as being particularly vulnerable to attempted suicide in table 4 are Asian males and Native American males. In three of the four comparisons in table 4, Asian males had the largest differences in attempted suicide. For example, in the panel comparing those who have been forced to have sex and who feel sad to students who have not been forced to have sex and are not sad, Asian males in the at risk group were 2.58 times more likely to attempt suicide (2.84/1.10). Native American males in the at risk groups also exhibited striking differences compared to their counterparts who are not in the at risk groups. For example, those who binge drink and feel sad are 1.9 times more likely to attempt suicide than Native American males not in this category. This is the largest difference in this panel. Perhaps Asian American males and Native American males are foremost among minority groups who receive minimal mental health care services (Holden, Satcher, McGregor, Thandi, Fresh, Sheats, Belton, and Mattox, 2014) and, as a result, do not get needed help when they become suicidal.

Although bullying was not included in the difference of means analysis, a discussion of bullying is needed, given information presented by Klomek and Gould (2014) and Klomek et al. (2015). For example, Klomek et al. explain that other factors work in conjunction with bullying in creating long-term negative outcomes. Although there are not enough cases to examine bullying for each of the 10 groups individually (since bullying data are only available for 2009), a difference of means test was performed for all youth combined for all predictors in table 3b (table not shown).

There were 31 students who reported being forced to have sex and were binge drinkers and were sad and had poor academic performance and were bullied. Compared to other students, these 31 students were 3.31 times more likely to attempt suicide (3.74 attempts on average versus 1.13 attempts on average; this difference is statistically significant, $p < .001$). Clearly, bullying must be examined in conjunction with a combination of other factors when trying to help male and female suicidal youth of various racial and ethnic groups.

Orbach (2009) related the following quote from a teenager's suicide note: "My life is going down the drain and I feel as if there is nothing else left to do. What do I do to make the pain go away? I want to help everyone else but I can't. I want the pain to go away." Orbach further explained that an important point to be made here is that self-hate and mental pain often go hand in hand; self-hate is a result of mental pain, especially if we feel we can't control the pain. If the self-hate won't go away, the person often ends up committing suicide. Conversely, if the pain is removed, the person is much less likely to take his or her own life. The best way to help a suicidal person is to immediately reduce his pain. How can we do this? Orbach argues that one way is to empathize with the person—to see things and understand things from his/her viewpoint. This reduces the person's loneliness because the person now sees that s/he is no longer alone in these feelings. Further, we can use 'us' or 'we' words (e.g., "that's not fun when this type of things happen to us") since such words help the person feel like s/he is not alone with these struggles.

While efforts to reduce hopelessness and depression have been proven effective in reducing suicidal behaviors among youth, strategies that focus on improving well-being may also be effective in reducing suicidal behavior. For example, encouraging youth to (1) develop (or continue to develop) emotional bonds with friends and family and (2) setting, and working towards attaining, achievable goals could help individuals reduce suicidal behaviors (Hirsch, Visser, Chang, and Jeglic, 2012). Further, since most suicidal youth confide in peers and prefer peer support over parental support, programs that help train teens and young adults to know how to help suicidal peers are needed (Bernik, 2011). Finally, suicide prevention efforts may be most effective when done in a culture-specific context since culture often influences the meaning behind one's motives to commit or consider suicide (Hirsch et al., 2012).

Muehlenkamp and Gutierrez (2004) stress that early identification could help adolescents receive treatment services that could help them develop healthy coping behaviors. Those who work in high schools should be ready to intervene if they notice warning signs that indicate youth may engage in self-injury. Martin et al. (2005) further argue that one of the major problems related to accurately identifying adolescent suicide risk is that those who have the most consistent contact with teenagers are often not trained to assess risk and are not sure how to proceed to help youth receive the help they need. Martin et al. identify teachers, counselors and administrators as educational professionals who could, if properly trained, help adolescents obtain needed help to reduce the risk of suicidal behaviors.

There are, however, several limitations to this study that need to be addressed. First, this analysis covers a broad range of time (1991-2013) and it is possible that social changes in recent years that have more strongly stigmatized mental illness and suicide (Holmes and Almendrala, 2016) could have made students less willing in recent years to admit to suicidal behaviors. Second, factors that have been found to be significant predictors of suicidal behavior among youth, including age, suicidal ideation, and sexual orientation (Hooper et al., 2015; Tomek et al., 2015) were not included in analyses. Third, while sadness was found to increase the likelihood of attempted suicide, both alone and in combination with other factors, one aspect of sadness that should be examined is how it impacts attempted suicide once family and community factors are considered (Cwik et al. 2015). For example, issues that are external to the adolescent, such as drug problems among other family members and having available community support and counseling services, are just as important as internal factors, such as their own depression. Fourth, students may under-reported the occurrence of undesirable behaviors such as binge-drinking (Barlow et al., 2012).

It is hoped that the research conducted herein will be of use in training programs for educational professionals to help identify and guide suicidal adolescents, especially given increased emphasis on recognizing and appropriately responding to warning signs of youth suicidal behaviors (Substance Abuse and Mental Health Services Administration, 2015) and the success of school-based suicide prevention programs such as the Youth Aware of Mental Health (Wasserman et al., 2015). What type of information from the present study might be used in such training? One glaring result from this analysis is the powerful and sweeping manner in which being forced to have sex increases the risk of attempting suicide across gender and racial groups. Another result is that

some groups are adversely impacted by bullying and alcohol use while others are not. But perhaps the most striking results are those that reveal the impact that combinations of risk factors have on attempted suicide. Understanding the combination of risk factors that greatly increase the risk of suicide attempts will arm educational professionals and peer groups with needed knowledge to guide troubled youth to receive the help they need to avoid suicidal behavior.

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Original research

Characteristics of and Barriers to Suicidology Training in Undergraduate and Clinically-Oriented Graduate-Level Psychology Programs

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Abstract: Suicide prevention efforts are focused at many levels, including ensuring competence among mental health professionals and training gatekeepers to recognize warning signs. Yet previous research has found that only approximately half of psychology trainees receive suicidology training and it is not clear how prevalent suicidology courses for undergraduates, potentially important gatekeepers on college campuses, are. The twofold aim of this study was to identify the prevalence of suicidology courses in psychology undergraduate programs, and to update the literature regarding the characteristics of suicidology training in clinically-oriented graduate psychology programs. Psychology faculty members (*N* = 177) responded to an email request to participate in an online study. At the undergraduate level, approximately 3% of responding institutions offered suicidology courses. At the graduate level, a majority of responding programs offered training in the assessment and treatment of suicidal clients; training was primarily incorporated into existing courses and practica, and few offered suicidology courses or workshops. Approximately 4% of clinically-oriented graduate psychology programs offered no suicidology training. Beliefs about offering suicidology training were generally positive, but a number of barriers were noted, such as lack of resources and knowledge about suicidology. Responses suggest a recent shift toward offering more suicidology training in psychology graduate programs, though additional work is needed to ensure that training is adequate and all psychologists are competent in this area. Efforts are also required to address barriers to offering suicidology training at the graduate and undergraduate levels.
Keywords: Suicide; Courses; Curriculum; Beliefs; Competence

Introduction

Suicide is a significant problem in the United States. It is the 10th leading cause of death among Americans, resulting in over 40,000 deaths in 2013 (Centers for Disease Control and Prevention, 2015), and the second leading cause of death among college students (Schwartz, 2006). As the suicide rate has continued to rise over the past decade (Centers for Disease Control and Prevention, 2015), multiple avenues for suicide prevention have been recommended, including training gatekeepers to identify suicide warning signs among peers and ensuring that mental health professionals are competent to assess and treat suicide risk (U.S. Department of Health and Human Services, 2012).

On college campuses, undergraduate students may be particularly important gatekeepers, as students are more likely to disclose suicide-related ideation to their peers than to professors or other authority figures (Drum, Brownson, Denmark, & Smith, 2009). However, for undergraduate students to act as gatekeepers, they must be trained in the identification of warning signs and risk factors commonly associated with suicide, and how to refer at-risk students to qualified mental health professionals. Research has shown that undergraduates who received gatekeeper suicide prevention training used the knowledge they gained to assist others at-risk for suicide in the months following the training (Indelicato, Mirsu-Paun, & Griffin, 2011), suggesting that even a brief training that includes information on suicide warning signs and evidence-based methods for referring at-risk individuals can have a significant impact on undergraduate students' behavior.

Another way to provide this type of information to undergraduate students is through offering a suicidology course at a college or university, which can increase undergraduates' knowledge and awareness of suicide risk factors and warning signs, and reduce beliefs in suicide myths (McIntosh, Hubbard, & Santos, 1985). This finding is consistent with research showing that students exposed to suicidology curriculum through self-study, lectures, or both demonstrated better performance on measures testing knowledge of suicide myths, warning signs, and prevention and intervention strategies than those without such exposure (Abbey, Madsen, & Polland, 1989). Together, these studies provide evidence for the argument that exposing undergraduates to

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suicidology curriculum can dispel myths, improve knowledge regarding suicide warning signs, and increase the likelihood of identifying suicide risk and referring at-risk individuals to mental health professionals for treatment, consistent with the *National Strategy for Suicide Prevention* update's objective to increase the number of gatekeepers (U.S. Department of Health and Human Services, 2012). Suicidology curriculum can also potentially benefit campus suicide prevention efforts, in addition to the students taking suicidology courses. Unfortunately, many mental health providers receiving these referrals may not have been adequately trained during graduate school to assess and treat persons at risk for suicide and may not be competent in this area of professional practice. A lack of suicidology training among psychologists has been documented for decades (e.g., Bongar & Harmatz, 1991; Debski, Dubord Spadafore, Jacob, Poole, & Hixson, 2007; Dexter-Mazza & Freeman, 2003; Ellis & Dickey, 1998; Kleespies, Penk, & Forsyth, 1993), though recent evidence suggests that more training is occurring within graduate psychology programs (e.g., Liebling-Boccio & Jennings, 2013). One objective of the *National Strategy for Suicide Prevention* (U.S. Department of Health and Human Services, 2001) was to increase the proportion of programs offering suicidology training, and this objective was reiterated in the recent *National Strategy for Suicide Prevention* update (U.S. Department of Health and Human Services, 2012), as well as a recent call for increased training among all mental health disciplines (Schmitz et al., 2012). Therefore, it is important to examine progress made toward this objective and the potential barriers to achieving this goal, and to potentially provide converging evidence for recent findings regarding a higher prevalence of suicidology training in clinically-oriented graduate psychology programs.

Training in the assessment and treatment of suicidal behavior is vital for psychologists, yet, in a study that surveyed clinical psychology graduate program directors, Bongar and Harmatz (1991) found that only 40% of the programs had formal training in suicide intervention (e.g., courses, mandatory colloquia specific to the topic of suicide intervention). Other studies have reported that only 40% to 55% of psychology trainees and practicing psychologists had received formal training in suicide risk assessment or management (Debski et al., 2007; Dexter-Mazza & Freeman, 2003; Kleespies et al., 1993). However, other studies have found that the prevalence of graduate-level suicidology training is higher. For example, Ellis and Dickey (1998) found that 75% of

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surveyed American Psychological Association (APA)-accredited psychology internships offered didactic training on this topic; 94% offered training through psychotherapy supervision. Peruzzi and Bongar (1999) also reported that approximately 70% of psychology trainees or psychologists had received formal training in suicidology. Additionally, Liebling-Boccio and Jennings (2013) surveyed directors of accredited school psychology graduate programs and found that 97.6% of respondents reported that they offered suicide risk assessment training through information integrated into existing coursework and 78.8% indicated that this training was also included in clinical training (e.g., practica, externships, internships). These findings may suggest that there has been a recent increase in the prevalence of suicidology training in clinically-oriented graduate psychology programs.

Given the recommendations to enhance suicide prevention through gatekeeper training and increase the competence of mental health providers to assess and treat suicidal behavior (U.S. Department of Health and Human Services, 2012), alongside the evidence that undergraduate suicidology courses can improve knowledge and change behaviors (i.e., leading to possible gatekeepers; Indelicato et al., 2011; McIntosh et al., 1985), and the shortcomings of graduate-level training in suicidology (e.g., Dexter-Mazza & Freeman, 2003; Liebling-Boccio & Jennings, 2013), this study had two aims. The first aim was to examine the availability of formal suicidology courses among undergraduate psychology programs, including barriers to and beliefs about such courses. The second aim was to update the literature regarding the characteristics (e.g., the types of training offered, barriers to offering such training, and beliefs about the risks and benefits of offering such training) of training in the assessment and treatment of suicide risk in clinically-oriented graduate-level psychology courses.

Method

Participants and Procedures

A total of 183 participants responded to an email request for participation. All recruiting and research procedures were consistent with the approved Institutional Review Board protocol. Participants were recruited via emails that explained the purpose and procedures of the study. The email also provided the web address where the study questions were hosted. The questions were created and distributed via Qualtrics, an online survey software program.

A list of department chairs and program directors in the United States was compiled through an extensive online search. We used four lists (i.e., APA, 2010; Association of Heads of Departments of Psychology, 2010; University Source, 2010; U.S. College Search, 2010) to find universities, colleges, and professional schools that offered bachelors-level degrees in psychology, graduate degrees in psychology, or both. Subsequently, we found a contact name and email address for each institution. Participants were then emailed an invitation to participate in the study, which consisted of online questions that could be completed at a time convenient to the participant. A total of 1,186 department chairs and program directors were invited to participate, indicating a response rate of 14.9%. Additionally, nine emails were returned as undeliverable, four potential participants responded to say they were not interested in participating, and two potential participants declined to participate unless their respective institutions' Institutional Review Boards approved the procedures. Participants were not compensated for their participation in the study.

Measures

Participants were asked 42 questions relevant to suicidology training at their institutions. Question content focused on the availability of undergraduate and graduate suicidology training, beliefs about suicidology training, barriers to offering suicidology training, descriptive information about the institutions, and likelihood of offering suicidology courses and training in the future. Participants were able to answer only questions relevant to their institution. Participants answered open-ended and multiple-choice questions, which were used for qualitative and quantitative descriptive analyses respectively. The questions used for this study are available from the authors.

Data Analysis

Descriptive statistics were used to examine the availability of suicidology training (including types of training at the graduate level), beliefs about suicidology training, and barriers to suicidology training. Additionally, we used a qualitative analysis (i.e., grounded theory) to identify themes and develop a theory regarding suicidology course offerings from participants' free responses. In grounded theory analysis, considered a bottom-up approach to theory development (Luca, 2009), responses are examined and coded for the key points (Glaser & Strauss, 1967). Codes are not created a priori; instead, they are developed during the process of reviewing responses. These

codes are then collected into concepts, which are grouped into categories that generate a theory to explain the observed responses. In the current study, each free response was considered a unit and could be assigned multiple codes if applicable, as has been done in previous studies (Calloway & Knapp, 1995). Two authors independently coded responses and created concepts. The codes and concepts were then compared, and any discrepancies found were resolved through discussion.

Categories and a theory were collaboratively developed between the two authors.

Results

Participants

See Table 1 for characteristics of participants. For the undergraduate-level analyses, participants were 177 faculty members in psychology or social science departments nationwide that offered undergraduate degrees in psychology. At the graduate-level, participants were 48 faculty members from psychology and departments at colleges and universities nationwide who were associated with institutions that offered clinically-oriented graduate degrees in psychology.

Table 1 Characteristics of Participants

Characteristic	N
Respondents from Undergraduate Programs	177
Position	
Department chair	100
Other faculty	33
Missing data	44
Type of Institution	
Four-year college/university	132
Professional school of psychology	2
Missing data	43
Respondents from Graduate Programs	48
Position	
Department chair	34
Other faculty	8
Missing data	6
Type of Institution	
Four-year college/university	39
Professional school of psychology	4
Missing data	5
Type of Degree	
Ph.D. in clinical psychology	15
Master's degree in clinical psychology	14
Master's degree in counseling psychology	11
Master's/Doctoral degree(s) in school psychology	7
Master's/Doctoral degree(s) in clinical health/medical psychology	4
Psy.D. in counseling psychology	2
Ph.D. in counseling psychology	1
Master's/Doctoral degree(s) in counseling	1
Master's/Doctoral degree(s) in marriage and family therapy	1
Accreditation-Eligible Programs	
APA-accredited	13
Not APA-accredited	2
Missing data	3

Note: Many respondents overlapped between samples (i.e., were associated with both undergraduate and graduate programs).

Undergraduate Suicidology Courses

In the present sample, only 5 undergraduate programs out of 152 (3.3%; 25 programs did not respond) offered a suicidology course. Despite the low number of courses currently being offered, directors of many programs expressed interest in including an undergraduate suicidology course (20.4%). In addition, 37.3% reported that their

department would be inclined to offer a course if a curriculum were developed. See Table 2 for details

about respondents' beliefs about offering undergraduate suicidology courses.

Table 2
Beliefs about Offering Undergraduate Suicidology Courses

Belief	Percentage Endorsed
Course would increase the diversity of course offerings	80.3
Course would help with community suicide prevention efforts	77.0
Course would be of interest to students	61.8

Although a majority of respondents endorsed a positive view about offering an undergraduate suicidology course, few of the respondents endorsed currently offering one. This may be due

to several barriers that prevent the offering of such a course. See Table 3 for details regarding barriers endorsed by undergraduate programs.

Table 3
Barriers Endorsed by Undergraduate Programs

Barrier	Percentage Endorsed
Lack of classroom space or flexibility in course schedules	47.5
Lack of instructor availability	44.0
Lack of funding	30.5
Lack of curriculum available to work from	16.3
A suicidology class was against university's beliefs	4.3

Graduate Suicidology Training
Only two (4.2%) of the responding graduate programs reported that they did not provide

suicidology training to their graduate students (see Table 4); both were doctoral-level programs.

Table 4
Types of Suicidology Training Offered in Graduate Programs

Type of Training	Percentage Endorsing Training
Integrated into other clinically-related courses	77.1
Direct clinical experience (practicum/internship)	52.1
Not aware of available training, but it may exist	16.7
Optional workshops (e.g., seminars, colloquia)	12.5
Mandatory workshops (e.g., seminars, colloquia)	10.4
No training is available or provided	4.2
A specific course on suicide	2.1
Other	2.1

An additional 16.7% of respondents indicated that they were not aware of the types of suicidology training their graduate programs may offer. A majority of programs offered suicidology training, and most did so through integration of this information into other clinically-oriented classes and/or direct clinical experiences. Other forms of training less frequently endorsed included

mandatory workshops, optional workshops, and specific courses in suicidology. One respondent noted that his/her program had not previously offered a suicidology course, but was planning to do so in the future. Graduate programs reported a variety of barriers to offering a suicidology course, similar to those endorsed by undergraduate programs; see Table 5.

Table 5
Barriers Endorsed by Graduate Programs

Barrier	Percentage Endorsed
Lack of space in classroom or curriculum	58.5
Lack of instructor availability	17.1
Lack of curriculum available to work from	17.1
Lack of funding	14.6
Lack of student interest	12.2

The topics covered in training offered by graduate psychology programs included: assessment of suicide risk (81.1%), crisis response (78.4%), treatment of suicide risk (70.3%), suicide prevention (56.8%), and postvention (21.6%). Three participants (6.3%) indicated that they did not know what topics were covered in suicidology training for their graduate students. Additionally, graduate programs appear to have community resources available to train their graduate students, as 26.1% of respondents reported that there are regularly occurring trainings or workshops regarding clinical suicide intervention skills in their communities that their graduate students could or must attend.

Overall, graduate programs seemed to value training in suicidology. A majority of graduate programs (65.2%) reported that they were interested in incorporating more suicidology training into their respective programs, and 53.3% stated that they would be more likely to include training if guidelines were readily available. Most programs (77.8%) reported interest in incorporating suicidology training through integrating information into other courses, and 11.1% were interested in offering a suicidology course to their graduate students. See Table 6 for respondents' beliefs about graduate suicidology training.

Table 6
Beliefs about Offering Graduate Suicidology Training

Belief	Percentage Endorsed
Suicidology training would improve student attitudes toward suicide risk assessment and treatment	97.8
Suicidology training would improve student comfort with treatment of suicidal behavior	95.7
Suicidology training would be of interest to students	87.0
Suicidology training would increase the diversity of training	77.7
Suicidology training would benefit instructors and students	68.9
Suicidology training would help reduce suicide-related stigma	66.7
Suicidology training would negative affect students/campus (e.g., increase suicide ideation or suicidal behaviors)	2.3

Qualitative Examination of Free Response Data
The grounded theory analysis provided a number of codes and concepts, which resulted in three broad categories that inform a general theory regarding the prevalence of graduate- and undergraduate-level suicidology courses. This theory suggests that a lack of resources and knowledge prevents such courses from being offered, with implications that addressing these two broad issues may allow suicidology courses to be offered more widely. The categories that were developed from the grounded theory analysis included: resources available to offer such a course, institutional issues, and knowledge about suicidology.

These categories were derived from six concepts, which were generated from 21 separate codes. The first concept focused on the availability of institutional resources and included these codes: faculty availability to teach courses, financial resources available, constraints on the number of

courses departments were allowed to offer, and an administrative focus on reducing course offerings. Participants noted things such as, "We are unable to offer such specific courses due to staffing issues..." and, "[There] is such a press for getting regular [psychology] stuff into the undergraduate program there is not much room left over for suicide material." Similarly, a respondent associated with a graduate program noted that there is "No room in [an] already tight curriculum" for a suicidology course. Finally, a common theme was budget constraints, and responses such as, "[At] our school our [department] is small… and our budget is smaller (which curtails our ability to use adjuncts with any frequency)…" were frequent. Another concept that arose from the analysis was program-related variables. Topics that were discussed within this concept as barriers included: the incorporation of suicidology into other courses, other entities on campus already offering suicide education and prevention, religious issues that

may negatively affect the offering of suicidology courses, and programs not having a clinical focus. Participants regularly noted that they offered suicide-focused content in other courses, stating for example, "This issue is discussed in courses such as Abnormal, Clinical-Counseling, and Death and Dying." In terms of a lack of clinical focus, participants indicated, "[The] department has changed and is very experimental and less and less clinical," and respondents associated with graduate programs also noted that the topic "Does not fit our research emphasis." Additionally, one participant indicated that religious issues may arise, stating, "[The course] [w]ould have to be very carefully constructed to fit into Catholic college context, would help to have it co-taught with a theologian." Finally, some participants provided comments such as, "Suicide prevention and education is the purview of the counseling center," indicating that this content is offered by other entities on campus.

More specific course- or curriculum-related issues was also a concept found in many responses, with codes including the topic being too narrow for a full course and the content being better served by a short course as opposed to a traditional course. At the undergraduate level, codes also included the content being inappropriate for undergraduate students and the topic being too applied/skill-based for undergraduate students. Many respondents noted things like, "It doesn't seem compelling to offer an entire course in this area... it doesn't need a whole course." We also noted responses that suggested issues like, "Too specialized to provide undergrad level content," and, "It is a very important topic, but seems more appropriate at a graduate level." Among graduate programs, responses indicated that it "Works better to integrate it with other clinical assessment and treatment material," and, "An entire course is neither needed [nor] practical." Less frequently, respondents indicated, "Shorter extra-curricular programs or a 1 credit course might be interesting."

An additional concept that arose was interest in the subject matter, coded both by faculty and student interest. Participants indicated that their faculty may not want to teach such a course, explaining, "Lack of an interested faculty member to teach it." They also indicated that students may not be interested in taking such a course, noting, "Not enough interest," and, "A course dedicated to suicide would probably be too specialized [for] our... student body."

We also derived a concept that we termed "faculty knowledge" from the data, which included codes of: never having considered offering such a course,

lack of awareness of suicidology, and not knowing why a course was not being offered. Responses included statements such as, "No idea [why a course is not offered]," and "Have never considered it." Additionally, one respondent noted a "Lack of knowledge about suicidology" as a barrier. One concerning response from a department chair was "Not familiar with the topic... advocating suicide?" suggesting a significant lack of knowledge regarding of suicidology. Additionally, though research has not shown iatrogenic effects of talking about suicide (Gould et al., 2005), one participant noted, "Fear of negative outcomes, e.g., increased suicide attempts" as a barrier.

The last concept that arose was one we titled "agreeability." This concept included codes that reflected that a suicidology course was a good idea, was already offered, or was in development, or that suicidology content could be incorporated into other courses. Responses included statements such as, "Sounds like a wonderful idea," "I am quite interested in offering a class on suicidology," "We are now developing such a course," "I teach [a course] every other year," and, "[We] could... support the teaching of a module on suicide within another course." Collectively, these responses suggest that a lack of resources and lack of knowledge prevent graduate- and undergraduate-level suicidology courses from being offered.

Discussion

Results from the current study indicated that 2% to 3% of the responding graduate and undergraduate programs offered suicidology courses, respectively. However, a majority of responding clinically-oriented graduate psychology programs (*N* = 48) offered suicidology training (79.1%), mostly through integration into clinically-oriented courses and clinical practicum experiences. On both the undergraduate and graduate levels, a majority of the respondents endorsed positive beliefs about offering suicidology training or courses, but also endorsed a number of barriers. Broadly, it seems that a lack of resources and lack of knowledge contribute to the low prevalence of suicidology training at both the undergraduate and graduate levels. Some respondents also noted that offering such a course would conflict with their university's belief systems (e.g., faith-based universities) or had concerns that a course could potentially lead to an increase in suicide attempts on their respective campuses, and some respondents did not know what suicidology was.

It is especially concerning that there are doctoral-level programs in clinical and counseling psychology that do not offer any training (4.2%) or

in which faculty were not aware of any training (16.7%), given the frequency with which psychologists treat suicidal clients (Dexter-Mazza & Freeman, 2003; Kleespies et al., 1993), and that psychologists are ethically and legally responsible for providing competent treatment for their patients, which may include suicide risk. However, such programs are a minority, and it appears that the large majority of clinically-oriented psychology graduate programs report offering some suicidology training to their graduate students, consistent with Liebling-Boccio and Jennings' (2013) findings. This shift in the field of psychology is notable, particularly because training has been demonstrated to improve trainees' self-rated competence and risk documentation when working with suicidal clients (McNiel et al., 2008). Yet, it is not clear whether this training creates competence among mental health professionals, as most of it is incorporated into clinically-focused courses or is part of direct clinical experience and may not include the depth and breadth of didactic instruction and skill practice required to attain competence (as recommended by Cramer, Johnson, McLaughlin, Rausch, & Conroy, 2013 and Rudd, Cukrowicz, & Bryan, 2008).

Additionally, undergraduate-level suicidology courses, though rare, can also improve knowledge (McIntosh et al., 1985) and change behavior (Indelicato et al., 2011), thus contributing to progress on the *National Strategy for Suicide Prevention* update's (U.S. Department of Health and Human Services, 2012) goals to increase the number of gatekeepers and thus reduce suicide rates. On a larger scale, suicidology courses have the potential to reduce stigma on campuses around the country and may lead to the development of prevention efforts, as well as contributing to campus suicide prevention efforts. In addition, students may continue to use these skills throughout their lives to recognize and refer individuals at risk for suicide.

While this study provides valuable information regarding characteristics of suicidology training and courses, some limitations exist. First, in terms of graduate-level training, we did not assess the quality (e.g., if the training provides recent information based on the science in the field) or quantity (e.g., how many hours are devoted to this topic) of this training, nor whether graduate students attained competency in this area, as discussed previously. Similarly, we did not survey graduate students in these programs, who may have viewed the availability of training differently than the faculty members who responded. Across undergraduate- and graduate-level respondents, we were limited in our sampling, as we only collected information about programs online and had a low response rate. Therefore, we may not have identified programs that were not listed online, or may not have made contact with faculty members for whom we could not contact via email. Additionally, we may have created sampling bias or demand characteristics due to the face valid nature of the request for participation and questions (e.g., programs that offer suicidology training may have been more likely to respond, respondents may have reported favorable views of suicidology training due to the focus of the study). Finally, this study was limited to psychology programs, though students and professionals from a variety of other fields (e.g., social work, psychiatry, nursing) interact with suicidal individuals and also should be trained in the appropriate assessment and treatment of clients at risk for suicide.

This study lays the foundation for a number of future endeavors. First, the limitations of this study should be addressed through further research. Attempting to obtain a higher response rate and ensuring that all programs are contacted would ensure that our results are generalizable. Including other professions that also work with suicidal clients would give more data to assess the overall progress of the *National Strategy for Suicide Prevention* update's (U.S. Department of Health and Human Services, 2012) objectives to increase training. Future research is needed to explore whether the grounded theory presented herein can be substantiated. If research supports our grounded theory, suicidologists and others should work to address the barriers and examine the efficacy of suicidology courses in campus suicide prevention efforts and the preparation of mental health professionals in assessing, managing, and treating suicide risk.

Suicidology training at the graduate level has academic merit and important implications for professional competence; at the undergraduate level, it also has the potential to reduce stigma within university campuses and assist with suicide prevention efforts. Additionally, suicidology training is an important part of national goals to reduce suicide rates (U.S. Department of Health and Human Services, 2012). Although many faculty members acknowledged the benefits of suicidology courses and training, not all offer it and many endorse barriers to it, some of which suicidologists may be instrumental in addressing. We hope that the current findings create momentum to address these barriers and thereby move the field of psychology forward in providing suicidology training at the graduate and undergraduate levels.

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Case report

SUICIDE COMMUNICATIONS ON FACEBOOK

Suicide communications on Facebook as a source of information in suicide research: A case study

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Abstract: Social networking sites such as Facebook, have become one of the major platforms for global communication and information exchange. This modern many-to-many communication pattern has raised concerns for suicide prevention professionals that a variation of the Werther effect and cybersuicide can increase youth suicides. However, the positive aspects of social networking sites in suicide prevention are less discussed. This case study illustrates how social media and online communications can reflect and even impact the suicidal behavior of a young Chinese girl. The case and related materials were identified from the Coroner's Court file in Hong Kong. The girl's suicide notes, diary, online communications in a pro-suicide group on Facebook, and browsing history in her computer were investigated for potential violation of the Hong Kong Ordinance. This case study sheds light on the practicability of using suicide communications posted on social media and browsing history as a data source to enhance the understanding of young people's suicide.

Keywords: Suicide, case study, Hong Kong, Facebook, secret suicide group, non-engaged youth

The rapid development of the Internet has great impacts on human psychology and behavior, especially on our modes of communication and information exchange (Ogburn, Messias, & Buckley, 2011; Wong et al., 2013). Social networking sites shift the communication pattern from traditional point-to-point conversations to modern many-to-many communications (Manago, Taylor, & Greenfield, 2012).

People with common interests easily gather and form communities to support each other, share experiences and exchange information on the Internet (Eysenbach et al., 2004; Li, Xu, & Chau, 2017).

This new form of communication pattern, however, has raised concerns for healthcare professionals and suicide prevention researchers (Mok, Jorm, & Pirkis, 2015). It is worried that an evolution of the Werther effect, a phenomenon that describes an increase in completed or attempted suicide incidents following the portrayals of an individual's suicide in the media, may be spread through social networking sites among potential suicidal individuals (Ruder, Hatch,

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Ampanozi, Thali, & Fischer, 2011). The cybersuicide phenomenon, wherein two or more people interact online and agree to meet in real life in order to commit suicide together, has also attracted the attention of the media, researchers, and governments since the early 2000s (Starcevic & Aboujaoude, 2015).

It is noteworthy that studies on social media and suicide are limited, possibly because of the limitation of data collection. A study by Ruder and colleagues (2011) reported a case of an individual who announced his suicide plan on Facebook and the authors discussed potential effects of suicide notes on Facebook on suicide prevention and the Werther effect. They urged healthcare professionals to pay attention to this new type of suicide announcement and its possible negative consequences. In addition, using social media as a research tool to understand suicidal behavior has received even far less discussion (Cheng, Chang, & Yip, 2012; Robinson et al., 2015). Analysis of the deceased's online documents is important for examining the "thinking" of the deceased, and can yield detailed information on various domains linked to suicide, especially in examining the leading events that occurred days before the death (Li, Chau, Yip, & Wong, 2014; O'Dea, Larsen, Batterham, Calear, & Christensen, 2017). Accordingly, this case study aims to illustrate how examining the communications and information collected from social media websites, i.e., Facebook and YouTube, visited by a young girl who died by hanging could enrich the depth of our understanding of her suicide, in addition to the usual death investigation conducted by the police and the Coroner's Court. Most importantly, it is hoped that this case study would illustrate the usefulness of utilizing information from social media as an adjunct data source to enhance the understanding of an individual's suicidal mind and action.

Method

The case study and the related materials were identified from the Coroner's Court. Hong Kong follows the British coronial system under which every suspected suicide death, prior to being assigned a verdict of suicide by the Coroner, is investigated by forensic pathologists and police officers. The role of the Coroner is to determine the cause of death and the role of the police is to investigate the possibility of the presence of any criminal activity surrounding the death. The Coroner's Court's files of suicides generally include socio-demographic information; circumstances of the death collected through witnesses and families of the deceased; acute and chronic life situations;

autopsy and toxicology reports; police investigation records; medical and psychiatric reports; suicide notes and insurance policies (Wong et al., 2009). The file also included interview transcripts of individuals being interviewed by the police during the investigation. In this case, the parents and sisters of the deceased were interviewed by the police as part of the death investigation.

Results

The background

The deceased was a 22-year-old female. She suffered from early psychosis since she was 13 years old and had attempted suicide twice by overdose and by jumping from a height. She was an out-patient at the time of death but had stopped taking prescribed medicine for six months prior to her death. She had several part time jobs after completing her high school but she quitted her job a year before her death. During this non-engaged time period, she spent most of her days in her room playing computer games, watching online videos, and Facebooking. In the Coroner's Court file, the deceased was described as having no friend and being quiet at home without communicating with others. It was reported that the deceased refused/declined to talk with her family members and lost her temper easily in the last few days of her life. She finally hanged herself in the washroom with a nylon string while her parents and sister were not at home.

Deceased's diary and suicide notes

A diary that contained her entries for about a year was included in her death file. In her diary, the early entries were about her feelings of staying at home and also some of her feelings when she saw her friends whom she had met when she was an inpatient in a psychiatric ward. She described that she had tried to live a meaningful life and be a problem solver. She also described a short trip to China with her father and her eagerness to return to Hong Kong to see her mother and friends. She then described that she became very unhappy and stopped writing the diary about six months prior to her death. Her last entry was found to be very different from the former entries. The last entry indicated that the deceased was looking for ways of killing herself but had yet to make up her mind. This might had been the first time she documented her suicidal ideation:

"*Life is meaningless. I really want a comfortable way to kill myself. I thought about using drugs, but after doing some searches on the web, it is pretty hard to die by drug overdose. I look uglier and uglier. I have no hope for the future. I have no*

courage to kill myself by jumping. I do not have the motivation, and eagerness to have a life as I had had before. I WANT TO DIE (bolded and enlarged by the deceased)."

The deceased wrote two suicide notes before her death but dates of these notes were not mentioned. Both of them contained self-blame messages "I am worse than a piece of rubbish", instructions of how to dispose her possessions "No funeral, just cremate me", and to let her parents know that she is a useless daughter and a burden to the family.

Police investigation

The police later found that (reasons not mentioned in the death file) the deceased had joined a secret group on Facebook named as "Suicide Group" and frequently visited YouTube for suicide information. It seemed that the deceased was not asocial completely, and she was communicating with others on the Internet. According to Facebook, non-members of secret groups cannot find these groups in searches or see anything about the group, including its name and member list. The name of the group will not display on the timelines of members. To join a secret group, individuals need to be added by a member of the group. According to the Hong Kong Ordinance's CAP212 Offences against the person ordinance's 33B dealing with criminal liability for complicity in another's suicide: "A person who aids, abets, counsels or procures the suicide of another, or an attempt by another to commit suicide, shall be guilty of an offence triable upon indictment and shall be liable on conviction to imprisonment for 14 years." Hence, the police looked into the hard-disk of the deceased's computer and found some of the communications between the deceased and the group members of the secret suicide group. The police also investigated the deceased's most recent search history on YouTube. For the sake of illustrations in this case study, parts of the information collected by the police from social media websites visited by the deceased were translated into English from traditional Chinese by one of the authors and agreed by another author to ensure the accuracy of the translation.

Deceased's writings on the secret suicide group's page on Facebook

After the last entry in her diary, the deceased did not write more about her suicidal messages in the diary but she started to share her thoughts in the virtual world. In the document that contains message exchanges in the group, we found 56 posts in the group almost a month before her death. Out of the 56 posts, there were 28 posts expressing negative emotions and distress, five posts mentioning self-harm, six posts showing suicidal ideation, six posts supporting group members and arranging a gathering, nine posts for group administration, one post sharing another suicide group, and a suicide note from another member. The most appearing comments on these posts were pro-suicide and pessimistic statements. The deceased was not an active member in the group as only a few entries by her were documented. Below are the messages she posted on the secret suicide group on Facebook in response to another group member's negative writings about life:

"I also want to kill myself, the sooner the better! I feel like I am a piece of trash. I have not left my room for a few months!

Although people keep saying that suicidal individuals should always think about the pain that they can bring to their family members after they have died, but to people like us, the meaningless and the worthless ones, and the tasteless in lives are just too overwhelming.

I have thought about killing myself with alcohol and sleeping pills, but the information from the Internet said its lethality is low. Also, if I failed, there will be plenty of side-effects (will bring more pain to the families). I have heard that jumping from a height is highly lethal, but I am scared. Dying by charcoal-burning seems to be the most ideal one. I want to die with others who also want to kill themselves by charcoal-burning somewhere. Too lonely to die alone. Anyone care to join me? (It's difficult to do it at home, will be intervened very easily).

No one knows what life will be like after death, but I have no meanings in life to live for.

I really want to die. I wish this "Group" can meet and die together.

You can MSN me (xxxxxx@hotmail.com). I have plenty of time."

Reply from the group members:

"If you really want to die, you should not be scared."

"I am (also) afraid of the process, but if that passes by quickly, we can reach Nirvana (together)."

"I am not afraid of dying, I am afraid of losing the ability to live."

YouTube Videos accessed by the deceased

According to the deceased's browsing history of YouTube seven days prior to her death, she accessed a number of videos that were related to suicide. Their Chinese names were "Hanging suicide", "Suicide", "A song that killed 547 people", "Wrist-cutting at the age of 15, a 21-year-old Korean Model died by drug-overdose", "A

beautiful air-hostess hanged herself". We visited those videos retrospectively when we obtained the file and found some of the comments left by the viewers including "*I don't know why YouTube suggested this to me, and I only have a vague understanding of Chinese, and I'll never get those 30 seconds of my life back, but I now have the greatest mystery of all to unravel: what the xxxx did I just watch?*", "*Crazy*", "*Stupid*", and "*Scary*" etc.

Discussion

Prior to the Web 2.0 era, if a retrospective case review of death record with examination of deceased writings and interviews with the next-of-kin of this young girl were to be conducted, a brief conclusion of this death was very likely to be - "A young girl suffered from psychosis since 13 with two prior suicide attempts. Possibly due to the side effects of the antipsychotic drugs, especially, weight gain which affected her appearance, she decided to stop the medication against medical advice. Her unemployment, lack of social contacts with friends and family members, loneliness, and hopelessness were the crucial factors that contributed to her death. However, her reasons for choosing to hang herself as a way to kill herself, and recent events that led to her death remained unknown because she had little to no contact with anyone shortly prior to her death".

Consequently, one would hastily suggest suicide prevention interventions for youth with severe mental illness should include better rehabilitation of those with mental illnesses, strengthening referral system for youth who have exhibited suicidal ideation and related behavior, early identification of suicidal risk education for family members, and limiting access to suicide means. These conclusions and recommendations would be justifiable if the deceased was part of a territory wide psychological autopsy study that was used to establish that psychopathology or psychiatric diagnosis as a major contributory cause of suicide.

However, the information collected by psychological autopsy can only present the "portrayals" of the young girl depicted by her parents and sisters but not much about the young girl's lived experience. Apart from recall bias or other information bias which may affect the reliability and validity of the data derived from the interviews, the informants of the young girl may have different perspectives about the suicide and even have limited knowledge about the girl.

When we are eager to get a closer understanding of the suicidal process of this young girl or even to address the issue of causation about her death, there are still many questions left unanswered. For instance, "What was she doing when she had mostly locked herself in the room? ", "Since she had two suicide attempts by overdose and jumping from a height, why did she choose to hang herself this time?", "Why did she stop taking prescribed drugs suddenly after all the years she had been diagnosed?". The extra information gathered from the "communications" left on the social networking sites may provide information that might not be available prior to the Web 2.0 era because many offline communications by traditional means, i.e., face-to-face, were not documented unless extra efforts were made to document them. In the Web 2.0 era, all of the on-line communications are documented, this is also named as "digital footprint", unless extra efforts are made to not document them like Snapchat and Telegram which are self-destructing message apps that are capable of sending messages that delete itself after a certain period of time and leave no trace or history.

After studying her communications on Facebook and the videos she accessed through YouTube, it is known that, at least: 1) this young girl did communicate her suicidal wishes with someone in a context of hopelessness stimulated by the sense of loss in physical and mental health; 2) while she was contemplating of her death, her suicidal wish and feeling might have been reinforced by her reading about the pessimistic and negative messages of the group members posted in a closed secret group; 3) while she was refusing to take the prescribed drugs for her psychosis, her behavior was also probably reinforced by the group members as some of them were also posting about the same issue; 4) while she was searching for a desirable way to kill herself, she was indecisive until she had watched a number of videos about jumping from a height; and this might have "enhanced" her scared feeling towards using jumping as a way to kill herself and had chosen hanging instead other suicide means.

The Internet was the channel through which the girl connected to the outside world while she was mainly home-bound. The extra information may explain the girl's thoughts and feelings in her life and the reason why she chose to hang herself as a way of suicide. Besides, although she was suffering from psychosis at the time of death, her thinking was not illogical as shown in the development of her suicidal thinking to suicidal plan and act. We believe that the young girl's attitudes and desires can be found in other young suicides by documenting and analyzing their online behaviors and suicidal communications.

Advancement of Information and Communication Technology (ICT) has indeed changed our lives.

There is a paucity of study on Internet and suicide, and the existing studies tend to focus on the negative impact of the Internet. Very little has been written about the positive side of utilizing ICT in the study of suicide. In this case study, the added value of analyzing a young girl's suicidal communication on social networking sites has been illustrated. While social networking sites have become significant communication platforms among the youth, if their peers are better equipped to respond constructively to their friend's suicidal communication, they may have a potential and viable means of intervening effectively (as a gatekeeper) with their suicidal friends and achieving suicide deterrence or prevention among those at risk. Having said that, the closed nature of the "Suicide Group" makes the provision of intervention very challenging. The group was invisible to the non-members and thus making it impossible to intervene in the suicidal processes of the group members since this group is apparently pro-suicide. In fact, the most recent Blue Whale suicide game (Mok, 2017) appears to have become a world concern, which may become another form of cybersuicide probably with the additional issue about cyberbullying and aiding and abetting the suicide of another or attempt to commit suicide. In this case, social networking service providers in collaboration with the local law enforcers can act as gatekeepers by timely identification and referring helping professionals to engage with those at-risk group members. It is indeed encouraging to learn that Facebook announced in May 2017 that additional people will be employed to monitor inappropriate, including suicide materials, posted to the social network.

In Hong Kong, because a person who assists the suicide of another shall be guilty of an offence under the Hong Kong Ordinance's CAP212 Offences against the person ordinance's 33B; hence, the Hong Kong Police can also be involved in the incidents. Crisis negotiators in particular are one of the key gate-keepers in suicide prevention and intervention when an individual discloses his or her imminent suicide act using social platform. Training and research in the area of cyber crisis negotiation can be further explored in the international crisis negotiator community. Additionally, the helping professionals may also think about proactive ways of engaging at-risk or suicidal young people using various forms of ICT. One good local example of e-engagement of prolonged socially withdrawn young people who have almost no opportunities to be reached to by professionals in the real world is to engage these youth through online gaming websites (Li and Wong, 2015). We believe that with the emergence of ICT, there are new challenges in suicide prevention but the validity and reliability of the traditional suicide study methodology can also be improved, and more understanding on suicide will eventually lead to suicide prevention.

Acknowledgment

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EPA Section of Suicidology and Suicide Prevention

There is but one truly serious philosophical problem, and that is suicide. A. Camus

The EPA Section of Suicidology and Suicide Prevention is one of the sections of the European Psychiatric Association.

The Section aims at improving research in this field and translating research findings into clinical practice. In this sense it adheres to a bio-psycho-social perspective and involves an international and multidisciplinary network of researchers and clinicians.

The objectives of the EPA Section of Suicidology and Suicide Prevention are:

- Raising awareness about suicide as important public health issue and fighting the stigma surrounding it;
- Improving understanding of risk and protective factors;
- Sharing experience and knowledge on suicide prevention;
- Disseminating best practices on management and treatment of the suicidal patients.

ACTIVITIES

The EPA Section of Suicidology and Suicide Prevention organises symposia and workshops during major scientific events, such as the annual congress of the European Psychiatric Association or the European Symposium on Suicide and Suicidal Behaviour.

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