College Student Suicide Risk: The Relationship between Alexithymia, Impulsivity, and Internal Locus of Control

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Abstract

Suicide has become the second leading cause of death for individuals between 15 and 29 years old and increasingly more common within college students (WHO, 2016). The purpose of this study was to examine the associations among alexithymia, impulsivity, and locus of control as predictors of suicide risk in college students. Participants were comprised of 550 undergraduate students from two universities in the southeastern United States. Multiple regression analyses were examined to evaluate what variables could be significant predictors of suicide risk in college students. Age, alexithymia subscales of difficulty identifying feelings and externally oriented thinking, and impulsivity subscales of motor, self-control, and nonplanning were considered significant in the regression analysis of suicide risk. Psychoeducational implications, limitations, and future directions are also discussed.

Keywords: alexithymia, suicide risk, impulsivity, college students

Riesgo de Suicidio en Estudiantes Universitarios: La Relación entre Alexitimia, Impulsividad y Locus de Control Interno

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Resumen

El suicidio se ha convertido en la segunda causa de muerte entre las personas entre 15 y 29 años y es cada vez más común entre los estudiantes universitarios (WHO, 2016). El propósito de este estudio fue examinar las asociaciones entre alexitimia, impulsividad y locus de control como factores predictivos del riesgo de suicidio en estudiantes universitarios. Los participantes fueron 500 estudiantes de grado de dos universidades en el sureste de los Estados Unidos. Se realizaron análisis de regresión múltiple para evaluar qué variables podrían ser predictores significativos del riesgo de suicidio en estudiantes universitarios. La edad, las subescalas de alexitimia de dificultad para identificar los sentimientos y el pensamiento orientado externamente, y las subescalas de impulsividad de motor, autocontrol y no planificación se consideraron significativas en el análisis de regresión del riesgo de suicidio. También se discuten las implicaciones psicoeducativas, las limitaciones y las direcciones futuras.

Palabras clave: alexitimia, riesgo de suicidio, impulsividad, estudiantes universitarios

S uicide has become the second leading cause of death for individuals between 15 and 29 years old worldwide (WHO, 2016). Colleges and universities across the country are not immune to its impact, as suicidal thoughts and behaviors (STB) are common among college students. Specifically, 12-month suicidal ideation estimates (i.e., either characterized as broad ideation or as seriously contemplating suicide) have been referenced to be in the 5–35% range (Robins and Fiske, 2009, Wong et al., 2011), and 12-month suicide attempts have been referenced to range between 0.6–11% (Chou et al., 2013, Eisenberg et al., 2013). The American College Health Association (2011) also stated that as many as six percent of college students consider suicide each month, and one out of every 100 college students has attempted suicide at some point in the past. Although a wide range of prevention interventions have been developed and implemented in colleges worldwide, a Cochrane review indicated minor support that these programs lead to reductions in suicidality (Harrod et al., 2014). For this reason, policy makers, college administrators, clinicians, and helping professionals must have accurate insight into and knowledge regarding the identification of at-risk students so that appropriate interventions may be put in to place to serve this individuals (Haas, Hendin, & Mann, 2003). Therefore, the purpose of this research was to examine the association among alexithymia, impulsivity, locus of control, and suicide risk in undergraduate students to help better explore the personal attributes or traits that may be associated with a phenotype or profile for suicidal risk.

Literature Review

Research in the field of suicide has been problematic, as much of the work completed to date has focused on the prediction of suicide rather than a clear understanding of the phenomenological aspects of suicide (Silverman, Berman, Sanddal, O'Carroll, & Joiner, 2007a; 2007b). Silverman et al. (2007a) recognized that the nuances of the term *suicide* contributed to the challenges faced in suicidology, and asserted how that a common nomenclature would better serve the field. Typically, when the term *suicide* is used, it is done so in a broad fashion, referring to many varied behaviors rather than a single action. Such behaviors may include suicidal thoughts, intentions,

ideation, gestures, attempts, completions, and equivalents. In addition, another problematic issue is that statistical data does not necessarily inform suicide prevention. Linehan (2008) asserted that most research on suicide has been based on the theory that suicide is a symptom of a mental disease. Under this assertion, one must treat the underlying disease in order to effectively treat suicide, which has resulted in various suicide prevention strategies being developed based upon this theoretical premise. Linehan argued this model has not been effective because no randomized trial has shown evidence that targeting mental disorders results in significant reductions in suicide attempts or deaths by suicide. She also referenced that suicide research should focus not on pathology, but on personality factors or traits that better predict suicidal ideation and behaviors.

Pompili (2010) similarly supported the theory that confining the etiology of suicide to psychiatric illness is problematic. Within this premise, suicide should be considered a phenomenological event, unique to individuals rather than a syndrome or symptom of a psychiatric illness. Although suicide research has focused on suicidal ideation, recent suicide attempts, and other short-term risk factors, Pompili referenced researchers should center the focus on personality factors because dispositions may hold the more precise cause or deeper reasoning for desiring suicide.

Nock and colleagues (2008) reinforced the notion for researchers to depart from examining demographic and psychiatric factors and move toward examining theoretical models that explain suicidal behaviors. The authors' premise was identifying risk factors and traits in a theoretical model would be critical in aiding college and helping professionals to develop appropriate interventions with suicidal students (Schwartz, 2006; 2011). By examining personal attributes or traits, a theoretical model may be formed that would better define a phenotype or profile for suicide. One such psychological factor—alexithymia—is the subject of exploration in this study.

Alexithymia and Suicidal Ideation
Alexithymia is a personality construct described by the subclinical incapacity to distinguish and verbalize emotions in the self. A number of studies have supported the position that alexithymia is related to suicide risk (Laget et al., 2006; Iancu et al., 1999; Alpaslan et al., 2015). In particular, Laget et al.

(2006) examined alexithymia scores on the Toronto Alexithymia Scale-20 with 570 participants who were characterized with dependence disorders. The researchers found that repeat attempters (both past and recent) had a more severe psychological profile compared to other suicide attempts. Furthermore, their findings indicated TAS-20 scores were higher among recent and past attempters. Iancu et al. (1999) studied alexithymia, affect intensity, and emotional range in suicidal clients. Using 60 participants, the researchers found that when comparing 20 suicidal depressed (SD) clients to 20 non-suicidal depressed (NSD) clients to 20 control group participants, the SD group had higher alexithymia scores on the Toronto Alexithymia Scale than the NSD and control group participants. Although the results indicated that alexithymia, affect intensity, and emotional range were not proven to be represent sensitive predictors of suicidal behavior, the researchers found that hopelessness and depression severity were more reliable in the prediction of suicidal risk. Likewise, Alpaslan and colleagues (2015) suggested that the presence of alexithymia is a significant predictor of suicide probability in a sample of 381 non-clinical Turkish high school girls with disorder eating attitudes (DEA). Their findings indicated the Suicide Probability Scale (SPS) total score, Hopelessness, Suicide Ideation, and the Hostility subscale scores of the SPS were significantly higher in the alexithymic DEAs group than the non-alexithymic DEAs group.

Locus of Control and Suicide Risk
Previous findings have identified an association between locus of control and suicidal behavior among adolescents and young adults. In particular, findings indicated that individuals who had engaged in suicidal behaviors were characterized by a more external locus of control orientation (Goldney et al., 1989; Goldney et al., 1991; Topol & Reznikoff, 1982). In an 8-year longitudinal study of suicidal ideation among high school students, Goldney et al. (1989; 1991), found that locus of control scores correlated with suicidal ideation over time. Goldney et al. (1991) proposed that suicidal ideation is not merely a temporary experience but is linked with more pervasive psychological traits. Topol and Reznikoff (1982) found that hospitalized suicidal adolescents scored more externally than hospitalized nonsuicidal teenagers and non-hospitalized controls. Topol and Reznikoff also proposed

the locus of control construct may be useful in identifying potentially suicidal adolescents. Recent findings have indicated suicide risk scores correlated negatively and significantly with self-esteem and resilience and positively with locus of control (Montes-Hidalgo & Tomás-Sábado, 2016) and that locus of control and family connectedness related to current nonsuicidal self-injury (NSSI) engagement (Wester et al., 2016).

Impulsivity and Suicide Risk
Recent studies using the Barratt Impulsiveness Scale (BIS; Patton et al., 1995) have indicated a connection between impulsivity and suicide risk (Izci et al., 2016; Ponsoni, et al., 2018; Menon et al., 2015). In particular, higher BIS-11 attention factor scores were found to be higher in adults with bipolar II disorder with a history of suicide attempts and higher BIS-11 motor and nonplanning factor scores in adults with bipolar I with histories of suicide attempt when compared to a nonclinical matched control group (Izci et al., 2016). Ponsoni et al. (2018) referenced differences in BIS-11 motor factor scores in clinical patients with a history suicide attempts compared to clinical patients without a history of suicide attempts. Their study revealed that each additional point on the BIS-11 motor factor scale increased probability of past suicide attempts by 1.14%. Lower motor impulsivity as measured by the BIS-11 have also been found to be an independent predictor of suicide intent with medically stabilized attempted suicide subjects (Menon, Sarkar, Kattimani, & Mathan, 2015). Furthermore, higher impulsivity and suicide risk was seen in clients with dependence and a history of suicidal ideations compared with same type clients without a history of suicidal ideations and significantly higher nonplanning factor scores. (Khemiri, Jokinen, Runeson, & Jayaram-lindström, 2016). Gvion & Apter (2012) proposed the construct of impulsivity, particularly as it relates to suicide and suicidal behavior, needs additional research to refine it to differentiate between state versus trait impulsivity as well as the role of other factors such as aggression relate to impulsivity as a risk factor in suicide.

College Students and Suicide Risk
A large national sample of undergraduate college students indicated that 8% had attempted suicide at least once in their lives (Drum, Brownson, Denmark,

& Smith, 2009). In spite of the fact that suicide is one of the leading causes of death on college campuses, few college students report receiving information about suicide from their college or university. A majority of college students (65.9%) reported they have not received information about suicide prevention from their college or university. Instead many students referenced that colleges and universities were much better about providing information concerning other topics, such as violence prevention, sexually transmitted disease/infection prevention, and stress reduction rather than suicide prevention. Garlow et al. (2008) found 16% of university students with suicidal ideation were actually receiving treatment. In another university study, only 20% to 25% of students that died by suicide had contacted campus counseling centers (Schwartz, 2006). Conversely, college students who utilized campus counseling centers were 18 times more at risk of suicide. This might indicate that more severely emotionally disturbed students are more apt to use campus counseling services. Nevertheless, the point remains that only about one in four college students who die by suicide contacted campus counseling centers. The vast majority do not receive any form of treatment. At this time, no statistics are available regarding how many college students contact their professors, instructors, or advisors with these concerns.

Implications of Current Study

While previous findings have indicated separate associations between the three constructs of alexithymia, locus of control, and impulsivity with suicide ideation using various populations, the purpose of this study is to examine the specific association between alexithymia, impulsivity, locus of control, and suicide risk together within college students. In addition, demographic factors such as age, sex, and race were investigated to understand the etiology of suicide. Assuming that suicide risk is multidimensional, an individual may understand the relationship between a dispositional variable (e.g., alexithymia) and suicide risk. If a dispositional precursor to suicide can be better understood, such information may inform the development of assessment and intervention protocols for colleges and universities that are interested in identifying and assisting high risk students.

Hypotheses

The main null hypothesis of our study is that there is no relationship between the variables of Alexithymia, Locus of Control, and Impulsivity, and the Suicide Brief Questionnaire-Revised total score. The alternative hypothesis/Ha is: At least one of the independent variables is useful in explaining/predicting SBQ-R, expressed as: H_1: At least one βi is $=/ 0$. In regards to expected results, the authors hypothesized that students with higher alexithymia and impulsivity total and subscale scores would have be at higher risk with suicide ideation and behavior. In addition, the authors theorized college students with higher SBQ-R total scores would be more internalized in their locus of control. If we fail to reject, we conclude that there isn't any evidence of explanatory power, which suggests there is no point in using this model or variables to evaluate these traits in college students for understanding suicide risk.

Method

This study used a quantitative design to examine alexithymia, impulsivity, and locus of control as predictors of suicide risk among college students and frequencies associated with these variables. Participants were undergraduate students recruited from two universities in the southeastern United States who were asked to complete a web-based, self-report survey. The first university was a mid-sized public university and the second was a mid-sized private university. A multiple regression analysis was used to analyze the relationship between each of the constructs and suicide risk. A number of covariates were included in the regression model including gender, race, school, and age. These analyses were conducted to help identify the factors that may be most predictive of suicide risk.

Participants

Invitations were sent to 879 college students. Out of these invitations, 621 (71%) accessed the survey (95 students at the private university and 526 at the public university). Of the 621 students to access the survey, 550 (89%) completed the survey in its entirety. Partial or incomplete surveys were not used in data analysis. Eligibility to participate in this study included an

enrolled status in the university systems and a required age limit of 18 years old. The university samples differed significantly by gender—whereas only 46.1% of participants at the public university were female, 73.3% of participants at the private university were female ($X^2 = 22.35$, $p < .001$). Freshmen comprised 42.7% of participants; 31.0% were sophomores, 16.0% were juniors, and 5.8% were seniors. Academic classification percentages were comparable across the two universities. As for the race identified by the participants, 446 (81.3%) were White or Caucasian, 29 (5.3%) were Black or African American, 29 (5.3%) were Middle Eastern (i.e., Saudi), 26 (4.6%) were Asian, 10 (2.6%) were Hispanic or Latino, seven (1.3%) were American Indian or Alaska Native, and one (.2%) was a Pacific Islander (i.e., Filipino). The public university was somewhat more racially diverse (i.e., 17.6% specifying a racial minority vs. 12.2% at the private university). Lastly, the mean age of respondents was 20.52 (*SD* = 3.60). The mean for the public university was 20.55 (*SD* = 3.63) and the mean for the private university was 20.35 (*SD* = 3.42; i.e., a non-significant difference).

Measures

   Toronto Alexithymia Scale–20. The Toronto Alexithymia Scale–20 (TAS– 20; Bagby, Parker, & Taylor, 1994a; 1994b) was developed with the assumption that individuals with alexithymia have difficulty identifying feelings, describing feelings, and are externally oriented in their thinking. The 20-item instrument includes a five-point Likert scale with three scales that can be summed to create a total alexithymia score. Scores of 51 or lower are considered low and scores equal to or higher than 61 are considered high (Taylor et al., 1992). The total scale has shown good internal consistency (.81; Bagby et al., 1994a). The TAS-20 has a three-factor model with: 1) *Difficulty Identifying Feelings, 2) Difficulty Describing Feelings* and 3) *Externally-Oriented Thinking.* Individual alexithymia factors have shown generally acceptable internal consistencies of 0.78, 0.75, and 0.66, respectively (Bagby et al., 1994a). Sample items include: "I have feelings I can't identify"; "It is difficult for me to find the right words for my feelings"; "Being in touch with emotions is essential."

   Barratt Impulsiveness Scale. The Barratt Impulsiveness Scale (BIS; Patton et al., 1995) is a 30-item instrument with a four-point Likert scale to

measure the construct of impulsivity. The scale has gone through eleven revisions and found to be effective in examining the impulsivity personality trait in clinical and non-clinical settings (Stanford et al., 2009). The BIS-11 assesses nine factors across two broader dimensions (Patton et al., 1995). Six of the factors (i.e., *attention, motor, self-control, perseverance, cognitive complexity,* and *cognitive stability*) have been identified as first order factors (Stanford et al., 2009). Sample items include "I plan tasks carefully" (*self-control*) and "I act on the spur of the moment" (*motor*). Second order factors (i.e., *attentional impulsiveness, motor impulsiveness, and non-planning impulsiveness*) include items such as "I spend or charge more than I earn" (*motor impulsiveness*) and "I don't pay attention" (*attentional impulsiveness*). According to Stanford et al. (2009), total scores of 72 or above should be used to indicate high impulsivity. The BIS-11 has shown well-established concurrent validity in college samples in comparison to other measures of impulsivity and that the measure had acceptable internal consistencies ranging from .71 to .83.

Internal Control Index. The Internal Control Index (ICI; Duttweiler, 1984) is a 28-item instrument used to measure internal versus external locus of control. The ICI measures two factors (internal and external) addressing an individual's expectancy for reinforcement. Sample items of Factor 1 include "When faced with a problem I try to forget it," and "Whenever something good happens to me I feel it is because I earned it." Factor 2 includes such items as "I need encouragement from others for me to keep working at a difficult task," and "I prefer to learn the facts about something from someone else rather than have to dig them out for myself.". These items are all scored through Likert-type responses of rarely, occasionally, sometimes, frequently, or usually. Possible scores range from 28 to 140 with higher scores indicating internal locus of control. The ICI has very good internal consistency (.84) and the instrument has been found to have higher reliability than other instruments measuring locus of control (Duttweiler, 1984).

Suicidal Behaviors Questionnaire-Revised. The Suicidal Behaviors Questionnaire-Revised (SBQ-R; Linehan, 1981) is a four-item, instrument used to measure past and future suicidal behavior (Osman et al., 2001). In particular, the SBQ-R asks three questions about past suicidal behavior (e.g., "Have you ever thought or attempted to kill yourself") and the fourth item is

future-oriented (i.e., "How likely is it that you will attempt suicide someday?"). Linehan (1981) developed the original version of the SBQ to be used as a structured interview to assess suicide risk. The SBQ-R has been normed using clinical and non-clinical samples. The non-clinical sample included high school students and undergraduate general psychology students. The SBQ-R has shown acceptable internal consistency among undergraduates (.76). Furthermore, Osman et al. (2001) determined that the SBQ-R scores was useful to determine risk factors for suicidal behaviors. A cutoff score of seven is recommended to be used for both non-clinical, adult samples (Osman et al. 2001). The SBQ-R has shown concurrent validity when compared to other measures of suicide risk (Cotton, Peters, & Range, 1995).

Results

Sums, means, standard deviations, and internal consistencies are provided for the TAS-20 (Bagby, Parker, & Taylor, 1994a), BIS-11 (Patton et al., 1995), ICI (Duttweiler, 1984) and SBQ-R (Osman et al., 2001). Furthermore, each instrument showed good internal consistency, ranging from .80 to .84.

Table 1. *Scale Sums, Means, Standard Deviations, and Internal Consistencies*

Scale	Sum Score	*M*	*SD*	A
TAS-20	48.39	2.42	.52	.83
BIS-11	63.30	2.11	.32	.80
ICI	98.73	3.54	.46	.84
SBQ-R	48.25	4.63	2.53	.80

Alexithymia
The TAS-20 sum scores ranged from 20 to 100. The overall mean was 48.39 ($SD = 10.33$), indicating low to moderate (or nearly moderate) scores. Mean scores were also computed by calculating the average score of individual items on the TAS-20. The overall mean score was 2.42 ($SD = .52$) on a five-point scale. Males had significantly higher alexithymia scores ($M = 2.50$, $SD = .49$) than females ($M = 2.34$, $SD = .53$), where $t = 3.67$, $df = 548$, $p < .001$. Examining mean differences across the samples, alexithymia was significantly higher among students at University 1 (the large public

university) (*M* = 2.46, *SD* = .50), *t* = 4.05, *df* = 548, *p* < .001. Mean alexithymia at University 2 was 2.22 (*SD* = .54).

Using the Taylor et al. (1992) alexithymia cut-off scores, 326 participants were in the low range (59.5%), 152 were in the medium range (27.7%), and 70 participants were in the high range (12.8%). Frequencies of participants in low, medium, and high ranges differed across university samples. In University 1, the breakdown was 56.8%, 29.9%, and 13.3%, respectively. In comparison, the percentages at the private university were 73.3%, 16.7%, and 10.0%, indicating a higher-than-expected frequency of students with medium and high alexithymia at University 1 (X^2 = 8.88. *df* = 2, *p* = .012). Given the large difference in the proportion of males and females in the two universities, the gender breakdown of alexithymia scores was examined. It was found that males had significantly higher rates of high and medium alexithymia scores (15.6% and 32.2%, respectively) compared to females (10.1% and 23.4%; X^2 = 11.81. *df* = 2, *p* = .003). These findings suggest that gender may account for the differences in alexithymia scores across universities.

Impulsivity
The results indicated sum scores on the BIS-11 ranged from 36.3 to 93.9 with a mean score of 63.3 (*SD* = 9.6). This was comparable to Stanford et al.'s sample mean of 62.3 (*SD* = 10.3). The findings indicated 72 participants (22.2%) who scored above 71 (i.e., denoted high impulsivity) and 428 participants (77.8%) who scored below 71 (i.e., denoted normal impulsivity). The mean score for the BIS-11 was 2.11 (*SD* = .32) on a four-point scale. Males were slightly more impulsive (*M* = 2.15, *SD* = .31) than females (*M* = 2.07, *SD* = .33), *t* = 2.82, *df* = 548, *p* = .005.

Locus of control
The range of ICI sum scores in this sample was 63 to 135 with a mean sum score 98.7 (*SD* = 13.81). This mean sum score was significantly lower than the mean found by Duttweiler (1984) for similarly aged respondents (*M* = 103.7, *SD* = 12.20), *t* = -8.85, *df* = 549, *p* < .001. The ICI mean score was 3.54 on a four-point scale (Table 2). Higher scores on the ICI indicate greater internal locus of control. Female participants had higher internal locus of control (*M* = 3.60, *SD* = .47) than male participants (*M* = 3.48, *SD* = .45), *t* =

-2.91, df = 548, p = .004. ICI scores at University 1 (M = 3.51, SD = .46) did not differ significantly from scores at University 2 (M = 3.66, SD = .46).

Suicide risk
The average SBQ-R score in this sample was 4.63 (SD = 2.5). Females showed a higher suicide risk (M = 4.86, SD = 2.70) than males (M = 4. 39, SD = 2.33), where t = -2.19, df = 539.3, p = .029. The Levene's test for equality of variances showed significantly higher variability in female suicide risk scores (F = 4.02, p = .046). Table 2 compares SBQ-R suicide risk of the two university samples. The range of SBQ-R scores in the current sample was 3 to 17. The recommended cutoff score for clinical samples is greater than or equal to 7 (Osman et al., 2001). In this sample, 99 college student participants had scores indicating suicide risk (18.0%).

Table 2. *SBQ-R Suicide Risk Rates (N = 550)*

Variable	< 7	%	≥ 7	%	Total
University 1	381	82.8	79	17.2	460
University 2	70	77.8	20	22.2	90
Total	451	82.0	99	18.0	550

Multiple Regressions
When evaluating the total scores of TAS-20, BIS, and ICI with the variables of Age, Gender, University, and Race in a multiple regression with the dependent variable as the SBQR total, the overall regression model was significant, $F(8, 137.39)$ = 2.85, p < .004, R^2 = .048, and adjusted R^2 = .031 (see Table 3). A closer evaluation of the variables within the regression model indicated Age, and TAS-20 total score as being considered significant in regards to the SBQR total. In addition, Gender was also very close to the cutoff score with a .058.

Table 3. *Coefficients[a] of Multiple Regression Analysis with Total Scores of TAS20, BIS, and ICI*

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	-1.021	2.119		-.482	.630
University	.105	.322	.015	.326	.744
Gender	.455	.239	.091	1.900	.058
Age	.085	.035	.127	2.429	.016
Race	.039	.134	.014	.294	.769
Class	-.131	.140	-.049	-.934	.351
TAS-20 SUM	.044	.013	.183	3.495	.001
ICI SUM	.006	.011	.030	.525	.600
BIS SUM	.014	.014	.056	1.020	.308

a. Dependent Variable: SBQR_Total

To provide a more thorough analysis, a multiple regression of the subscales of the TAS-20, BIS, and ICI were also examined. Utilizing the findings of the previous multiple regression, non-significant variables were eliminated (e.g., university affiliation, race, etc.).   The overall regression model was significant, $F(12, 367.65) = 5.48$, $p < .001$, $R^2 = .13$, and adjusted $R^2 = .11$ (see Table 4). The variables considered as significant in regards to SBQR total within the regression model were Age, TAS-20 Difficulty Identifying Feelings, TAS-20 Externally Oriented Thinking, BIS Motor, and BIS Self-Control.

Table 4. *Coefficients[a] of Multiple Regression Analysis with Subscales of TAS20, BIS, and ICI*

	Model	Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	1.888	1.976		.955	.340
	Age	.074	.032	.109	2.314	.021
	TAS20 DIF	.141	.028	.298	4.996	<.001
	TAS20 DDF	-.033	.034	-.057	-.951	.342
	TAS20 EOT	-.070	.032	-.117	-2.186	.029
	BIS Attention	.016	.055	.017	.296	.768
	BIS Motor	-.107	.041	-.134	-2.627	.009
	BIS Self-Control	.108	.045	.147	2.399	.017
	BIS Cognitive Complexity	-.017	.054	-.017	-.312	.755
	BIS Perseverance	.026	.077	.018	.342	.733
	BIS Cognitive Stability	.103	.077	.070	1.346	.179
	ICI Autonomous Behavior	-.011	.018	-.033	-.609	.543
	ICI Self-Confidence	.016	.018	.053	.880	.379

a. Dependent Variable: SBQR_Total

As the Barrett Impulsivity Scale also has second order factors of attentional impulsiveness, motor impulsiveness, and nonplanning impulsiveness, a regression analysis was performed using these variables with TAS-20 in regards to the dependent variable of SBQR total. The overall regression model was significant, $F(7, 339.03) = 8.73$, $p < .001$, $R^2 = .12$, and adjusted $R^2 = .10$ (see Table 5). In this model, Age, TAS-20 Difficulty Identifying Feelings, TAS-20 Externally Oriented Thinking, BIS Nonplanning Impulsiveness, and BIS Motor Impulsiveness were significant. In addition, BIS Attentional impulsiveness was also very close to the cutoff score with a .059.

Table 5. *Coefficients^a of Multiple Regression Analysis with TAS20 and BIS Second-Order Factors*

Model	B	Std. Error	Beta	t	Sig.
		Unstandardized Coefficients	Standardized Coefficients		
1 (Constant)	5.268	1.403		3.756	.000
Age	.068	.030	.101	2.258	.024
TAS20 DIF	.147	.027	.312	5.498	<.001
TAS20 DDF	-.029	.033	-.050	-.880	.380
TAS20 EOT	-.078	.028	-.132	-2.817	.005
BIS Nonplanning Impulsiveness	-.084	.030	-.133	-2.767	.006
BIS Motor Impulsiveness	-.070	.032	-.107	-2.215	.027
BIS Attentional Impulsiveness	.088	.046	.095	1.895	.059

a. Dependent Variable: SBQR_Total

To further illustrate the relationship between alexithymia and suicide risk, alexithymia categories (low, medium, high) were cross-tabulated with suicide risk. Overall, 18% of students were at risk for suicide, but the percentage of those classified at risk was highest among students with high alexithymia ($n = 70$; 30%), followed by 19.7% of those with moderate alexithymia ($n = 152$), and 14.7% in the low alexithymia group ($n = 326$; $X^2 = 9.48$, $p = .009$).

Discussion

The current study examined alexithymia, impulsivity, and locus of control as possible predictors of suicide risk in college students. When the alexithymia subscales were examined separately, *Difficulty Identifying Feelings* and *Externally Oriented Thinking* were the subscales most strongly associated with suicide risk recurrently throughout every multiple regression analysis. Impulsivity first-order subscales of Motor and Self-Control and second-order subscales of Motor Impulsiveness and Nonplanning Impulsiveness were found to be a significant variables of suicide risk. Locus of control subscales

were not significant with suicide risk. Examination of the four covariates indicated that age was a significant variable. In particular, for every year increase in age, suicide risk was .06 points higher. These results suggest that among these participants, alexithymia and impulsivity may better explain suicide risk in college students.

Psychoeducational Implications

Dealing with a suicidal student brings out anxiety in even the most seasoned mental health clinicians yet alone educators and academic staff (Rudd, 2006). Therefore, any empirical data that can help identify directions for risk assessment and referral are cogent. One study found that only 16% of university students with suicidal ideation were actually receiving treatment (Garlow et al., 2008). In another university study, only 20% to 25% of students that died by suicide had contacted campus counseling centers (Schwartz, 2006). Conversely, college students who utilized campus counseling centers were 18 times more at risk of suicide. This might indicate that more severely emotionally disturbed students are more apt to use campus counseling services. Nevertheless, the point remains that only about one in four college students who die by suicide contacted campus counseling centers. The vast majority do not receive any form of treatment. At this time, no statistics are available in regards to how many college students contact their professors, instructors, or advisors with these concerns.

In this study, nearly one in five students (18%) received SBQ-R scores highlighting that they were at risk of suicide. A large national sample of undergraduate college students indicated that 8% had attempted suicide at least once in their lives (Drum, Brownson, Denmark, & Smith, 2009). Our results indicated 2.2% of students reported a previous suicide attempt. Accurately predicting suicide is improbable, but the importance of identifying risk factors cannot be ignored (Bryan & Rudd, 2006). Discovering such risk factors is important if there is any hope to reduce suicide risk in college students. Our findings indicated the subscales of difficulty identifying feelings and externally oriented thinking of alexithymia, the first-order subscales of motor and self-control, and the second-order subscales of motor and nonplanning of impulsivity showed significance in relation to suicide risk.

More research needs be done to examine alexithymia and impulsivity, and the conditions in which these factors may contribute to suicidality.

If a college student comes to an educator or academic staff and is unable to identify their feelings, externally orient, and struggle with motor, self-control, and nonplanning impulsivity, our findings suggest the value of the educator referring to a mental health professional. In particular, motor impulsive responses such as "I do things without thinking" and "I act on impulse," coupled with self-controlled and non-planning impulsive statements of "I don't plan tasks carefully" and "I say things without thinking" would be important to note. In addition, these previous type of comments with an inability to identify how he or she feels with statements such as "I am often confused about what emotion I am feeling" and "I have physical sensations that even doctors don't understand" with externally-oriented comments like "I prefer talking to people about their daily activities rather than their feelings" or "I prefer to watch "light" entertainment shows rather than psychological dramas" could make an individual more at-risk for suicide ideation or behaviors, and therefore, may warrant additional evaluation from a mental health professional..

In spite of the fact that suicide is one of the leading causes of death on college campuses, few college students report receiving information about suicide from their college or university. As cited in our literature review, a majority of college students (65.9%) report that they have not received information about suicide prevention from their college or university (American College Association, 2011). If this held true in the current sample, only 33 of the 99 participants who had significant suicide risk would have received information from their respective institutions about suicide prevention. The study also referenced that colleges and universities were much better about providing information concerning other topics, such as violence prevention, sexually transmitted disease/infection prevention, and stress reduction rather than suicide prevention. Our findings suggest support towards this end, as many of our participants appear that they could benefit from psychoeducational activities of support groups, transfer of information, self-care, and provision of a safe place to identify and describe emotions.

Limitations
This study has several important limitations. First, the sample was fairly homogeneous, with 81% of participants identifying themselves as White or Caucasian. The university samples differed little in demographics, which suggests homogeneity of sub-groups (i.e., in spite of the relative size difference). Both universities were liberal arts schools in the southeast United States. As such, the results may not be generalized to other regions. Furthermore, the sample was drawn from psychology and business classes, based on convenience and access. The samples were not representative of the student bodies as a whole at either university.

Recommendations and Future Directions
There is a tremendous need for suicide risk assessment instruments to have good sensitivity (correctly identifying suicidal risk) and specificity (high accuracy in ruling out non-suicidal individuals). Schiepek et al. (2011) found that specificity is easier to determine than sensitivity; for the most part, however, investigation of risk factors has been conducted using linear models. Simply adding more variables to explanatory models may not overcome problems achieving sensitivity. According to Schiepek et al., the course of suicidality is nonlinear, requiring dynamic statistical analyses to model these processes. If variables such as alexithymia are to be used in models of suicide risk, they must earn their place by proving their predictive power, and future research needs to employ periodic assessment of at-risk samples to assess the veracity of these traits and their relationship to suicide risk.

Multiple attempters of suicide pose the greatest risk for eventual death by suicide (Joiner, 2005). Our findings identified a small percentage (2.2%) of college students who were previous attempters. Future research should focus on how and why alexithymia and impulsivity are linked, as college students who scored highest on these traits appear to be at higher risk for completed suicide. Joiner's model of suicide risk includes three elements: belongingness, burdensomeness, and acquired ability to enact lethal harm. We recommend that future studies should examine alexithymia in the context of Joiner's model (i.e., especially belongingness and burdensomeness), as well as how impulsivity relates to the act of self-harm.

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