

An Analysis of Suicidal Ideation in a College Sample

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Two studies were designed to develop and validate a model of current suicidal ideation. In Study 1, students that reported past suicide attempts ($n = 48$) were compared to controls ($n = 49$) on nine variables previously linked to suicidal behavior. In the resulting model, borderline personality characteristics and social support were found to correlate with current suicidal ideation, supporting a mediating model. In Study 2, the Borderline/Social Support (BTSS) model was validated in an independent sample. Implications for risk assessment, prevention and treatment of suicidal college students are discussed.

Keywords borderline characteristics, social support, suicidal ideation

Suicide is the third leading cause of death for Americans aged 18–24 (Anderson & Smith, 2003). Young people between the ages of 18–24 have the highest incidence of reported suicide ideation (Crosby, Cheltenham, & Sachs, 1999), and are more likely to have made a suicide plan compared with other adults (CDC, 1996). Community surveys of suicidal ideation have shown that up to 24% of adolescents between the ages of 15 and 19 years, and 55% of the college student population have experienced suicidal ideation at some point in their lives (van Heeringen, 2001). Although it may be argued that suicidal ideation and attempts rarely result in completed suicides in this population, college students are engaging in potentially lethal behaviors at rates that surpass those of the general population. Thus it is important to gain an understanding of suicidal ideation and attempts in this population and

models that account for variance in both ideators and attempters would be particularly useful (Rudd, Joiner, & Rajab, 1996).

To date, a large part of suicidology has focused on identifying variables that correlate with or predict suicide by focusing on sociocultural and clinical risk factors. In order to fully understand the complexity of suicidal behavior one must take into consideration a variety of factors including current and past life stressors, psychopathology, personality variables, and coping and problem solving strategies.

Stressors

Individuals who contemplate suicidal behavior differ from the general population in the frequency and severity of stressors. In a study that compared a sample of adolescents who had attempted suicide to a

sample of nonpsychiatric adolescent controls, suicide attempters reported recent histories of more severe life stress (Wilson, Stelzer, Bergman et al., 1995). Stressors that have been linked to suicidal behavior in college students include negative life events (Wilburn & Smith, 2005), childhood abuse (Arata, Langhinrichsen-Rohling, & Bowers, 2005), and poor family environment (Yama, Tovey, Fogas et al., 1995).

Psychopathology

Mental illness is one of the most important factors that affect suicide completion (Hiroeh, Appleby, Preben et al., 2001). Using a sample of persons under the age of 30, Shafii and colleagues (1988) found that 95% of the people that had completed suicide had a serious psychiatric disorder. Depression, substance abuse, personality disorders, and conduct disorder have all been linked to suicide in adolescent and college student samples.

Results of the The National College Health Assessment Survey indicated depressed mood is a risk factor for suicidal behavior in college students (Kisch, Leino, & Silverman, 2005). After accounting for intercorrelations between variables, Beautrais, Joyce, and Mulder (1996), found that depression was by far the largest contributor to the likelihood of suicidal behavior in adolescents aged 13 to 24 years. Related to depression, hopelessness has received considerable support as a risk factor for suicidal behavior and was found to be associated with suicidal ideation in college students (Chioqueta & Stiles, 2005). Loneliness has been linked to suicidal ideation and parasuicide in samples of high school students, college students, and a general population sample (Stravynski & Boyer, 2001). These findings suggest a direct relationship between the severity of depressive symptoms and increased risk for suicidal behavior.

In a review of the literature on predictors of suicidal behavior in adolescents, Evans and colleagues concluded that alcohol use has been associated with both suicidal ideation and attempts in adolescents (2004). In a nationally representative sample of college students, episodic heavy drinking was correlated with suicidal ideation (Brener, Hassan, & Barrios, 1999).

Although personality disorders are related to suicidality (Goldsmith, Fyer, & Frances, 1990), borderline personality traits are particularly associated with chronic and recurrent suicidal behavior (Linehan, 1993). High rates of antisocial personality disorder also have been found among adolescents and young adults who make medically serious suicide attempts (Beautrais, Joyce, & Mulder, 1996). Langhinrichsen-Rohling and colleagues (2004) found that college students with an arrest history were more likely to report past suicidal ideations. Self-reported delinquent behavior typical of conduct disorder predicted suicide prone behavior.

Other Personality Variables

Anger and aggressive behavior have been closely linked to suicidal behavior in young adults, with many suicide attempters reporting intense feelings of anger and rage immediately preceding their suicide attempt (Velting, Rathus, & Miller, 2000). A considerable amount of literature has found links between impulsivity, suicide attempts and completed suicides (Corruble, Damy, & Guelfi, 1999). In a comparison of psychiatric patients who had previous suicide attempts, psychiatric patients without suicide attempts, and healthy controls, Horesh and colleagues (1997) found that only impulsivity was specific to the suicidal group.

Results from a number of studies have found that perfectionism is correlated with suicidal ideation in college students (e.g., Chang, 2002). Students who score high

on measures of maladaptive perfectionism can set unattainable goals for academic performance that lead to feelings of depression, hopelessness, and suicidal ideations when those goals are not achieved.

Social Support

Clum, Canfield, Arsdel, Yang and Febrano (1997) compared high and low suicide-ideating depressed adolescents on a variety of measures and found that low social support was an independent predictor of suicidal behavior. Others have suggested that social support acts as a mediator in predicting suicidal ideation. That is, social support in college students appears to act as a buffer in the relationship between stressors and suicidal ideation, thereby reducing risk following a stressor for students with support (Clum & Febrano, 1994). Some studies, particularly of high school students and adolescents, have failed to find an association between measures of social wellbeing and suicidal ideation. After reviewing 5 studies examining social support and suicidal behaviors in adolescents, Evans and colleagues (2004) found the results to be inconclusive. The inconsistent results of studies of social support and suicidal behavior may be due to differences between high school and college students in the role of social support as a protective factor.

Problem Solving and Coping

Problem solving and coping are also associated with suicidal behavior. D'Zurilla, Chang, Nottingham et al. (1998) found poor social problem solving ability was correlated with depression, hopelessness and suicidal ideation in college students. College students with high levels of suicidal ideation reported less ability to cope with life stress, suppress angry feelings, and control anger by calming down compared to

students with low suicidal ideation (Kralik & Danforth, 1992).

The Current Studies

The preponderance of college students who experience suicidal ideation or engage in suicidal behaviors do not do so for a single reason, but as a result of a combination of general risk factors and precipitating events (Gould & Kramer, 2001). A large part of suicidology has focused on finding variables that correlate with or predict suicide by focusing on individual sociocultural and clinical risk factors. Few studies have presented and tested multivariate models that satisfactorily explain this phenomenon. The present studies are some of the first to empirically derive and validate such a model in a sample of college students.

Adolescents who have previously attempted suicide are much more likely to attempt suicide again in the future (Shaffer, Gould, Fisher et al., 1996). Therefore, students who reported a past suicide attempt were selected in order to ascertain the risk factors that may put them at risk for future suicide attempts. Those variables that differentiated attempters from nonattempters were used to develop a model that described current suicidal ideation in this sample. Since current suicidal behavior is a low base-rate occurrence, current suicidal ideation was used as an outcome measure. In Study 1, variables that previously had been shown to differentiate suicide attempters from non-attempters were examined in a sample of college students: depression, substance abuse, borderline personality disorder characteristics, antisocial personality disorder characteristics, perfectionism, anger/hostility, social support, coping/problem solving strategies and stressors.

In Study 2, the model derived in Study 1 was validated by examining current suicidal ideation in an independent sample of undergraduate college students. Studies suggest

that although psychological symptoms may be more intense in individuals who complete suicide, they are generally the same psychological symptoms experienced by attempters (Pinto & Whisman, 1996). We therefore expected the model found in suicide attempters to be replicated when predicting suicidal ideation in a general sample of college students, even though most students in this sample would not have current suicidal ideation. A model that predicts suicidal ideation in a general college student sample could have utility to screen for students at risk to predict or perhaps prevent later suicide attempts.

STUDY 1

METHOD

Participants and Procedure

Students in an introductory psychology class at a large university in upstate New York completed screening measures for participation in this study. Over the course of two semesters approximately 850 students completed the Self Harm Inventory (SHI; Sansone, Wiederman, & Sansone, 1998) and the Symptoms Checklist-90 Revised (SCL-90R; Derogatis, 1994). Students who endorsed a prior suicide attempt on the SHI ($n = 73$; 8.4%) were contacted via telephone by a research assistant and invited to participate in a follow-up study consisting of interviews and questionnaires. Sixty-seven percent of the students who were contacted ($n = 48$) participated in the study. There were no statistical differences in SCL-90 Global Severity Index (GSI) scores between those who participated and those who declined participation. A sample of controls ($n = 49$) who did not indicate that they had previously attempted suicide, and who were matched to the suicide attempters on gender and GSI score were also selected for participation. By

matching on GSI scores, we hoped to remove a potential alternative explanation for differences found between the two groups. We anticipated that the group with a history of a suicide attempt would have higher levels of current distress than the group of students who had never attempted suicide. Since levels of current distress are known to be associated with many of the variables of interest, it would be unclear if differences between the groups were associated with history of suicide attempts or current level of distress. To eliminate this confound, the groups were matched on current level of distress (GSI scores) to ensure that variables associated with history of suicide, not current distress, were accounting for differences between the groups. Interviewers tape-recorded a subset of interviews that were scored by another interviewer to assess inter-rater reliability. Interviewers were blind to the status (attempter or control) of the participants. All students received course research credit for their participation in the study. Students who reported that they were currently experiencing suicidal ideation were evaluated by a licensed psychologist and were given appropriate referrals.

Overall suicide attempters were 18.6 years old ($SD = 1.08$), female (73%), and Caucasian (Caucasian 60%; Asian 20%, Hispanic 8% and Black 4%). Controls were 18.2 years of age, female (74%), and Caucasian (Caucasian 74%, Asian 14%, Hispanic, 4% and Black 6%). The average GSI score was 89.1 ($SD = 65.04$) for suicide attempters and 88.4 ($SD = 62.32$) for controls. The only statistically significant difference between the two groups on demographic characteristic was participant age ($t = 2.52, p < .05$), with the suicide attempter group being slightly older than the control group. Additionally, the suicide attempters were rated significantly lower than the controls on the Structured Clinical Interview for the DSM-IV Global Assessment of Functioning

(SCID-I GAF; Spitzer, Gibbon, Gibbon et al., 1997)($t = -3.72, p < .01$).

Measures

Unless otherwise specified, participants completed the same measures in both Study 1 and Study 2. The measures are grouped according to the latent variable they assess. Students completed the questionnaire measures in testing sessions that were 2 hours in duration and participated in interviews in separate meetings lasting approximately 2 hours.

Participants in Study 1 completed the SHI, a 22-item self-report measure of self-injurious and destructive behaviors including suicide attempts, to screen for past suicide attempts. Students who responded “Yes” to the question “Have you ever attempted suicide?” were considered suicide attempters for the purpose of this study.

Participants completed five measures to assess depressive symptoms. The Beck Depression Inventory (BDI-II, Beck, Steer, & Brown, 1996) is a 21-item self-report measure of depressive symptoms. Graduate student interviewers used the non-patient version of the Structural Clinical Interview for the DSM-IV – Axis I (SCID; Spitzer, Gibbon, Gibbon et al., 1997; Study 1 participants only) to assess the presence of current and past Axis I psychopathology including major depression. Contrary to the skip-out instructions, all symptoms of major depression were assessed. In this study inter-rater reliability for the presence of major depressive disorders was calculated with perfect agreement ($\kappa = 1.0$) among the interviewers. The structured interview version of the Hamilton Depression Rating Scale (HDRS; Hamilton, 1960; Williams, 1988; Study 1 participants only), a semistructured interview used to assess the level of current depressive symptomatology, was embedded into the SCID. Participants also completed the

UCLA Loneliness Scale – Revised (Russell, Peplau, & Cutrona, 1980), a 20-item self-report measure of loneliness. Finally, we assessed hopelessness using the Beck Hopelessness Scale (BHS; Beck, Weissman, Lester et al., 1974), a 20-item true-false self-report measure of hopelessness.

We assessed presence and severity of past and current drug and alcohol abuse using the SCID (Study 1 only) and the 10-item self-report Alcohol Use Disorders Identification Test (AUDIT; World Health Organization, 1992).

Participants completed the SCID – Axis II Borderline Personality Disorder Module (SCID-II BPD; First, Gibbon, Spitzer et al., 1997; Study 1 only), the SCID–Axis II – Personality Questionnaire (SCID-II PQ; First, Gibbon, Spitzer et al., 1997), and the Barratt Impulsivity Scale (BIS; Barratt, 1994) to assess borderline characteristics. The SCID-II is a semi-structured interview based upon the DSM-IV diagnostic criteria for personality disorders. In this study, symptoms on the SCID-II BPD were assessed as continuous variables. Perfect inter-rater reliability ($\kappa = 1.0$) for the presence of BPD was found among the interviewers. The SCID-II PQ is a self-report questionnaire version of the SCID-II interview. The item pertaining to recurrent suicidal behavior or self harm was excluded from the analyses as BPD characteristics were used as a predictor of current suicidal ideation. The BIS is a 30-item self-report measure of global impulsivity. Elevated scores on the BIS have been found in patients with BPD (Henry, Mitropoulou, & New, 2001). Participants also completed the Youth Self Report (YSR; Achenbach, 1991) Delinquent Behavior and Aggressive Behavior Scales to assess antisocial personality disorder traits.

Students completed two scales to assess perfectionism. The Multidimensional Perfectionism Scale (MPS Hewitt; Hewitt & Flett, 1991) is a 45-item self-report

measure that assesses self-oriented perfectionism, other-oriented perfectionism, and socially prescribed perfectionism. The Multidimensional Perfectionism Scale (MPS; Frost; Frost, Marten, Lahart et al., 1990) is a 35-item self-report scale that yields an overall perfectionism score.

We administered two questionnaire measures of anger and hostility. The Multidimensional Anger Inventory (MAI; Siegal, 1986) is a self-report assessment of feelings of anger while the Buss-Durkee Hostility Scale (BDHS; Buss & Durkee, 1957) measures feelings of hostility.

We assessed social support using the Social Network List (SNL, Hirsch, 1980) and the Multidimensional Scale of Perceived Social Support (MSPSS; Zimet, Dahlem, Zimet et al., 1988). The SNL is a self-report instrument used to enumerate the members of a participant's social support system and the degree of satisfaction with the social support they receive. The MPSS is designed to assess perceived social support from family, friends, and a significant other.

Students completed two self-report measures of coping and problem solving abilities. The Coping Strategies Indicator (CSI; Amirkhan, 1990) is a factor analytically derived measure that assesses problem solving, seeking social support, and avoidance. The Subjective Experience of Problem Irresolvability Scale (SEPI; Orbach, Mikulineer, Blumenson et al., 1999) is designed to measure an individual's sense of lack of control due to being pressured to solve irresolvable problems within the family circle and is related to suicidal behavior (Orbach, Mikulineer, Blumenson et al., 1999).

The presence of past and present life stressors was assessed using the Life Events Checklist for College Students (LES, Tomoda, 1997), the Comprehensive Child Maltreatment Scale for Adults (CCMS for Adults; Higgins & McCabe, 2000), the Measure of Past Failures Scale

(MPFT; Jeglic, unpublished measure) and The Family Environment Survey (FES; Moos & Moos, 1994). The LES is a self-report measure used to assess stressful life events that occurred during the past 12 months in the lives of college students. The CCMS for Adults is a 22-item retrospective self-report measure that assesses an individual's perceptions of their childhood experiences of potentially abusive and neglectful behaviors including sexual abuse, physical abuse, psychological maltreatment, neglect, and witnessing family violence. The MPFT is a 6-item scale designed to assess the degree to which students believe they have failed in academic achievements, goals they have set for themselves, their relationships with friends and family, and an overall question of failure (e.g., "I am a failure") using a Likert scale. The FES is a 45-item measure of general family environment.

To assess suicidal ideation and attempts, students completed the Suicidal Behaviors Questionnaire (SBQ; Linehan & Neilson, 1981), the Suicide Intent Scale (SIS; Beck, Schyler, & Herman, 1974) (Study 1 only), and the Beck Scale for Suicidal Ideation (BSS; Beck, Steer, & Ranieri, 1988). The SBQ is comprised of four questions that are designed to assess the past suicidal behavior, suicidal ideation, suicidal threats and the likelihood of future attempts. Since only current suicidal ideation (in the past year) was relevant to the present studies, only questions 2 (SBQ2; current suicidal ideation) and 4 (SBQ4; the likelihood that they will commit suicide in the future) were used in the analyses. The SIS is a semi-structured interview designed to assess the seriousness and the intent to die during the suicide attempt. Finally, the BSS is a 19-item self-report measure that is highly correlated with clinical ratings of suicidal risk (Beck, Kovacs, & Weissman, 1979). Only questions pertaining to current suicidal ideation were used in the analyses. Additionally, question 9 on the Beck

Depression Inventory-2 was used as a measure of current suicidal ideation.

RESULTS

All variables were assessed for normality prior to the analysis. The variables that were non-normally distributed were normalized using square-root transformations: SCID, HDRS, SCID-II, SNL, LES, SBQ4. Group differences were tested using independent samples t-tests. According to Huberty and Morris (1989) it is appropriate to use multiple univariate analyses when the research being conducted is exploratory in nature. Individual tests have been grouped according to the latent variable they are measuring. Since each of the measures within the latent variable is highly correlated, individual measure Bonferroni adjustments would be too conservative (Perneger, 1998). Therefore Bonferroni adjustments were made using each of the latent variables as a group, making the overall α level 0.0045. Descriptive statistics, t-tests, observed power and effect size are presented in Table 1.

EQS (Bentler, 1995) was used for model generation. A model was designed that comprised nine dependent latent variables (depression, substance abuse, borderline personality characteristics, antisocial personality characteristics, perfectionism, anger/hostility, social support, coping/problem solving, and stressors) that predicted the independent latent variable Current Suicidal Ideation.

The Maximum Likelihood (ML) method of estimation was employed. In the initial regression model the independence model was not rejected and the regression model was not significant, indicating that the model was a poor fit for the data. Exploratory analyses using Lagrange Multiplier and Wald post-hoc tests were conducted to develop a better fitting model. The resulting model

(Borderline Traits/Social Support Model) is presented in Figure 1. In this model, the relationship between borderline traits, a latent variable with three indicators (SCID-II BPD, SCID-II BPD self-report, and BIS) and Current Suicidal Ideation, a latent variable with four indicators (SBQ2, SBQ4, BSS, and BDI9) is mediated by Social Support, a latent variable with three indicators (MPSS, SNL3, and SNL4).

Further tests suggest this is a good fitting model. The independence model was rejected $\chi^2(45, N = 97) = 334.28, p < .001$ and the final model was non-significant $\chi^2(32, N = 97) = 16.30, p = .99$, indicating that the model fits the data (Tabachnick & Fidell, 2001). The Normed Fit Index (NFI) and the Non-normed Fit Index (NNFI; Bentler & Bonett, 1980) provide information about how much better the model fits compared to a baseline model (i.e., a null model). The Comparative Fit Index (CFI; Bentler, 1980) measures model fit based on uncorrelated variables and noncentrality parameters. NFI, CFI values can range from 0 (lack of fit) to 1 (perfect fit), while NNFI values can be greater than 1. The Normed Fit Index (NFI), the Non-normed Fit Index (NNFI) and Comparative Fit Index (CFI) were .95, 1.08, and 1.00 respectively, indicating that the model is superior to a baseline model. The Root Mean Square of Approximation (RMSEA) estimates the lack of fit in a model compared to a perfect model. Values less than .06 are indicative of a good fitting model. (Tabachnick & Fidell, 2001). The Root Mean Square of Approximation (RMSEA) value was 0.0, indicating that the model is not significantly different from a statistically perfect model. A chi-square difference test comparing the Borderline Traits/Social Support (BTSS) model with the original regression model (in which the nine latent variables were regressed upon suicidal ideation) was significant ($\chi^2 = 1273.76, df = 260, p < .05$, indicating that the BTSS model significantly reduces the model's χ^2 ,

TABLE 1. Means, Standard Deviations and T-test Results for Dependent Variables for Participants in Study 1 and 2

Measure	Attempters (n = 48)		Controls (n = 49) Power		ES	Study 2 (n = 392)		
	M	SD	M	SD		r	M	SD
Depression								
SCID	4.29	4.36	3.08	3.47	.477	.158	—	—
HDRS	6.29	5.50	4.08	3.37	.436	.192	—	—
BDI-II	13.85	10.93	11.05	8.65	.637	.129	6.97	7.39
BHS	6.93	5.89	5.47	4.01	.678	.144	3.35	3.15
LS	43.02	13.25	38.22	11.46	.901	.192	35.61	10.73
Substance abuse								
AUDIT	6.87	5.59	7.46	5.08	.638	.056	6.20	4.93
SCID-Alcohol Abuse	.25	.57	.33	.72	.370	.030	—	—
SCID-Drug abuse	.46	1.54	.42	1.55	.142	.033	—	—
Borderline personality characteristic								
SCID-II BPD	4.08	3.98	2.20	2.89**	.808	.303	—	—
BPD Self Report	6.71	3.34	4.43	3.57**	.836	.315	3.26	3.01
BIS	68.56	10.04	65.77	9.28	.803	.144	64.60	8.73
Antisocial personality characteristics								
SCID-II ASPD	1.58	2.54	.58	1.25	.518	.235	—	—
ASPD Self Report	.91	1.22	.85	1.47	.443	.070	.57	.78
YSR	14.65	8.97	11.45	6.33	.781	.191	3.03	1.17
Perfectionism								
MPS	190.18	36.65	179.19	34.43	.933	.158	174.59	26.49
MPSF	112.88	23.32	106.63	18.23	.758	.150	102.13	19.85
Anger/hostility								
MAI	110.15	21.29	107.77	20.58	.534	.057	103.85	21.93
BD	36.47	9.08	34.35	11.15	.549	.105	33.62	10.34
Social support								
MSPSS	60.00	15.92	65.89	11.47	.793	.210	68.99	13.40
SNL friends	2.51	1.65	2.14	1.40	.522	.121	1.34	.44
SNL family	3.02	2.06	2.20	1.49	.591	.218	1.33	.45
Coping/problem solving								
SEPI	57.54	18.37	50.08	13.79	.774	.226	44.98	17.12
CSI-Problem Solving	23.87	4.91	23.73	4.51	.839	.015	24.86	5.48
CSI-Seeking Social Support	24.69	5.99	24.73	5.64	.421	.003	25.64	5.49
CSI-Avoidance	22.02	4.35	21.60	5.43	.464	.004	19.73	4.71

(Continued)

TABLE 1. (Continued)

Measure	Attempters (n = 48)		Controls (n = 49) Power		ES	Study 2 (n = 392)		
	M	SD	M	SD		r	M	SD
Stressors								
LES	2.76	.77	2.66	1.06	.730	.056	2.06	.79
FES	51.72	8.26	51.32	7.37	.891	.026	51.49	7.72
MPFT	16.39	5.97	13.88	4.71	.901	.231	12.42	4.97
Current suicidal ideation								
SBQ2	1.69	1.36	.65	.92**	.949	.411	.29	.51
SBQ4	.79	.92	.20	.40**	.948	.384	.08	.27
BDI-Suicide	.52	.65	.28	.44	.609	.212	.11	.30
BSS	1.76	1.41	.80	1.11**	.979	.357	.91	2.28

*p < .05 **p < .0045

ES = Effect Size; SCID-depression = Structured Clinical Interview for the DSM-IV depression module; HDRS = Hamilton Depression Rating Scale; BDI-2 = Beck Depression Inventory-2; BHS = Beck Hopelessness Scale; LS = Loneliness Scale; SCID-AA = Structured Clinical Interview for the DSM-IV Alcohol Abuse Module; SCID-DA = Structured Clinical Interview for the DSM-IV Drug Abuse Module; AUDIT = AUDIT; SCID-II BPD = Structured Clinical Interview for the DSM-IV Borderline Personality Disorder Module BPD SR = Borderline Personality Disorder module of the Structured Clinical Interview for the DSM-IV Personality Questionnaire; BIS = Barrett Impulsivity Scale; SCID-II ASPD = Structured Clinical Interview for the DSM-IV Antisocial personality Disorders Module ASPD-SR = Antisocial Personality Disorder module of the Structured Clinical Interview for the DSM-IV Personality Questionnaire; YSR = Youth Self Report; MPS = Multidimensional Perfectionism Scale; MPSF = Multidimensional Perfectionism Scale Frost; MAI = Multidimensional Anger Inventory; BD = Buss Durkee; MSPSS = Multidimensional Scale of Perceived Social Support; SNL-Social Network List; SEPI = Subjective Experience of Problems Irresolvability; CSI = Coping Strategies Indicator; LES = Life Events Checklist for College Students; FES = Family Environment Scale; MPFT = Measure of Past Failures Scale; SBQ = Suicidal Behaviors Questionnaire; BDI-9 Beck Depression Inventory-2; Question 9; BSS-Beck Scale for Suicidal Ideation.

thus significantly improving the overall fit of the model.

STUDY 2

PARTICIPANTS AND PROCEDURES

In Study 2, we validated the model developed in Study 1 using an independent sample. Students in introductory psychology classes signed-up for a study investigating “thoughts, feelings and emotions.” Participants (n = 392) completed the series of questionnaires administered in Study 1 and received course research credit for their participation in the study. Twelve

students from Study 1 also participated in study 2 (5 attempters and 7 controls). When these 12 cases were excluded from the analyses, the results remained unchanged. Means and standard deviations for the measures are presented in Table 1.

Overall, the students were 18.5 ($SD = 2.32$) years old, female (62%), and Caucasian (60% Caucasian, 23% Asian, 17% Black and 6% Hispanic) with a mean SCL-90R GSI score of 52.43 ($SD = 50.56$). Seventeen students (4.5%) reported that they had attempted suicide in the past, and 155 (41%) of the students endorsed suicidal ideation at some point in their lives with 92 (25%) endorsing some degree of suicidal ideation in the past year.

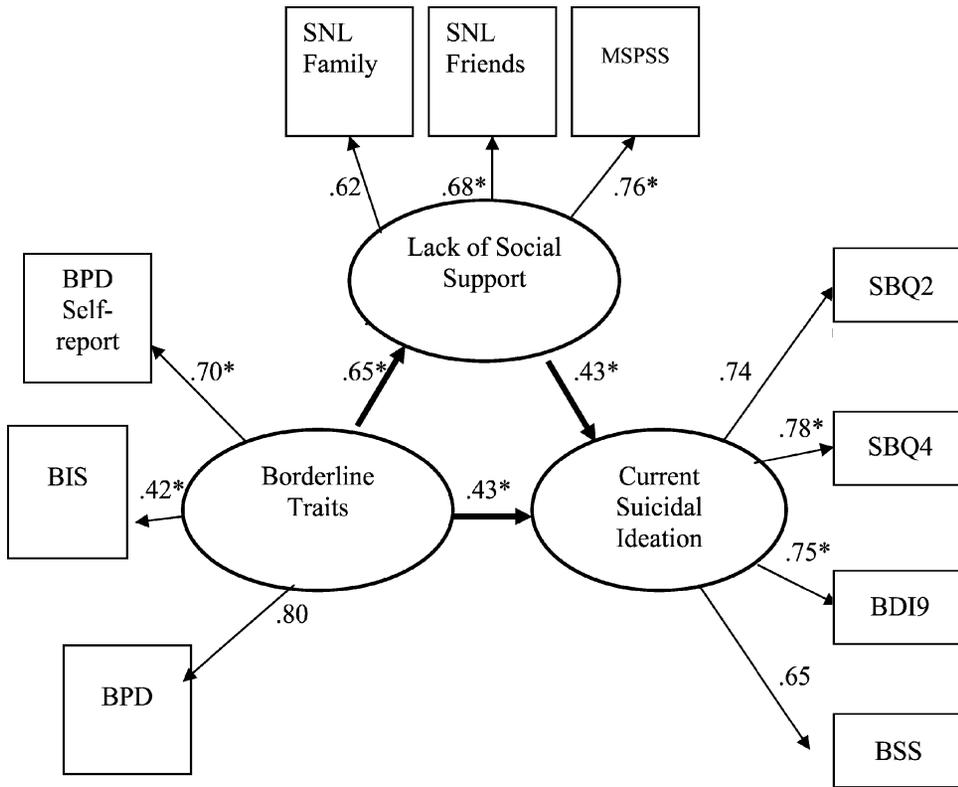


FIGURE 1. BTSS model describing the factors that predict suicidal ideation in a college sample. All parameters are standardized ($p < .05$). Note: BPD = Borderline Personality Module of the Structured Clinical Interview for the DSM-IV; BPD SR = Borderline Personality Disorder module of the Structured Clinical Interview for the DSM-IV/ Personality Questionnaire; BIS = Barrett Impulsivity Scale; MSPSS = Multidimensional Scale of Perceived Social Support; SNL-Social Network List; SBQ = Suicidal Behaviors Questionnaire; BDI-9 Beck Depression Inventory – 2; Question 9; BSS – Beck Scale for Suicidal Ideation.

RESULTS

The predictor variables were entered into a simultaneous multiple regression model. BPD characteristics were significantly positively associated with suicidal such that a one unit increase in BPD characteristics increased suicidal ideation by .195 points. The remaining predictors were not statistically significant.

The BTSS model that was created in Study 1 was tested using the sample in Study 2 using suicidal ideation level as the dependent variable (see Figure 2). Using the ML method of estimation, the independence model was

rejected $\chi^2(36, N = 372) = 861.59, p < .001$ and the final model was nonsignificant $\chi^2(24, N = 97) = 30.06, p = .18$, indicating that the model fits the data. The value of the Normed Fit Index (NFI) was .97, the Non-normed Fit Index (NNFI) was .99, the Comparative Fit Index (CFI) was .99 and the RMSEA = 0.03, indicating that the model generated in study 1 is a good fit for the data.

DISCUSSION

In these studies a model of suicidal ideation in a nonclinical sample of college students

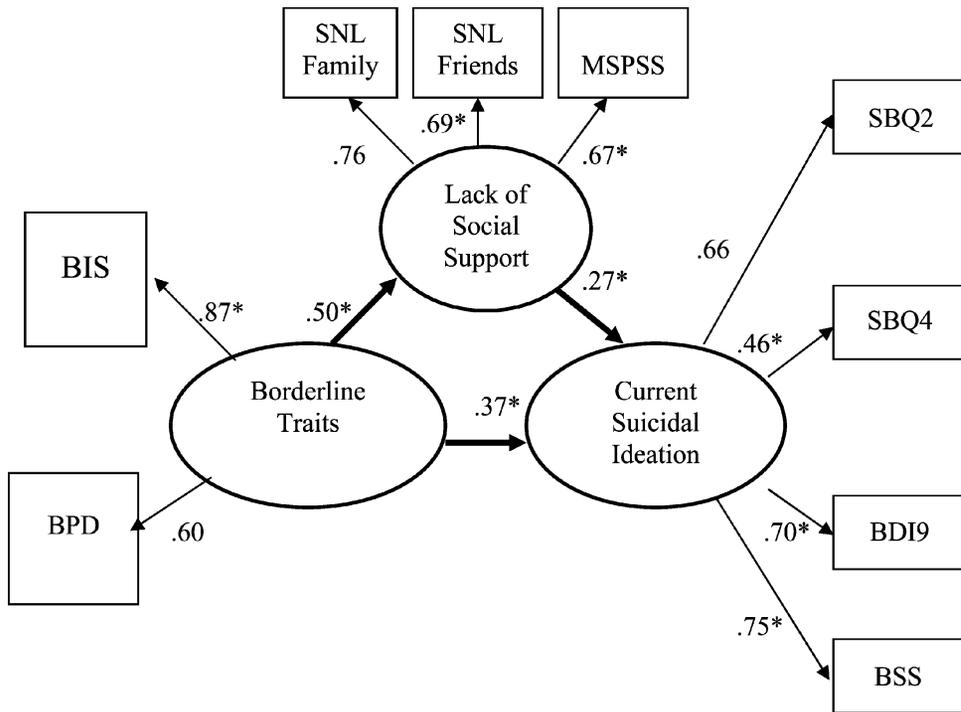


FIGURE 2. BTSS Model developed in Study 1 tested using Independent Sample from Study 2. All parameters are standardized* ($p < .05$). Note: BPD SR = Borderline Personality Disorder module of the Structured Clinical Interview for the DSM-IV Personality Questionnaire; BIS = Barrett Impulsivity Scale; MSPSS = Multidimensional Scale of Perceived Social Support; SNL-Social Network List; SBQ = Suicidal Behaviors Questionnaire; BDI-9 Beck Depression Inventory – 2; Question 9; BSS – Beck Scale for Suicidal Ideation.

was developed and validated. In Study 1, a comprehensive model (BTSS model) of suicidal ideation in college students was developed using a sample of students who attempted suicide in the past, and a sample of students who did not attempt suicide, but were matched to the suicide attempters on level of current distress. Our data are consistent with a model wherein borderline personality characteristics, mediated by social support, predicted current suicidal ideation. In Study 2, the BTSS model was tested in an independent sample of students using suicidal ideation as a continuum. The model provided a good fit for the data in an independent sample of students. These findings suggest

that suicidal ideation in college students is associated with elevated levels of affective lability and perceptions of low social support from their family and friends.

It should be noted that in this study, Borderline Personality Disorder (BPD) characteristics were assessed as a continuum rather than a diagnosis. In a review of the literature, Tanney (2000) posits that it is the presence of the symptoms or characteristics of BPD that are predictive of suicidal ideation, and not whether an individual meets diagnostic criteria. Group means for the suicide attempter group were well-below diagnostic threshold, supporting Tanney's conclusion that it is the presence of the symptoms or characteristics of

BPD, and not necessarily the severity of those symptoms that predict suicidal ideation. This suggests that the presence of BPD characteristics may independently predict suicidal ideation in both clinical and non-clinical samples.

Social support was found to influence the relationship between borderline traits and suicidal ideation. There is some question as to whether low levels of social support are a response to discrete interpersonal conflict, or if they are indicative of more chronic relationship difficulties. King (1997) suggests that recent stressful events that are interpersonal in nature can increase the risk of suicidal behavior among adolescents. In particular, Adams, Overholser, and Spirito (1994) found that stressors related to parents and close friends were predictive of suicidal behaviors in a sample of adolescent suicide attempters. However, in this study no differences were found between groups on the number of stressful interpersonal events (such as the break-up of a relationship and difficulties with family and friends), nor was the number of stressful interpersonal events found to be predictive of suicidal ideation. There were significant between group differences on perceived level of social support. We found preliminary support for a mediational model where social support mediates the relationship between borderline traits and suicidal ideation. These results suggest that it is a more chronic dissatisfaction with support from family and friends rather than a specific interpersonal incident that is associated with suicidal ideation in this population.

Contrary to expectation, perfectionism, depression and hopelessness did not predict suicidal ideation in this sample of college students. While these factors were related to suicidal ideation in this sample, when shared variance with BPD characteristics and low levels of social support were included in the model, they did not contribute significant unique variance to the

equation. Almost exclusively, the literature examining suicide in college students has focused on depression and hopelessness as predictors of suicidal behavior. Despite contradictory evidence, it is often taken as a fact among suicidologists that both depression and hopelessness directly predict suicidal ideation, attempts and completion (e.g., Mann, Waternaux, Haas et al., 1999). Numerous studies have even used hopelessness and depression as outcome rather predictor variables in studies of suicidal behavior (e.g., Maris, Berman & Silverman, 2000). However, in this study no significant differences were found between the suicide attempters and controls on either level of depressive symptoms, current or past diagnosis of major depression, or level of hopelessness. The time lag between suicide attempts and Study 1 may explain why the attempter group had low scores on depression and hopelessness. On average, students reported that they had attempted suicide 46 months (approximately 4 years) prior to the date of interview. In addition, by matching the control group to the suicide attempter group on distress levels in Study 1, levels of depression and hopelessness may have also been equated. However, using the full sample in Study 2, depression and hopelessness still failed to predict suicidal ideation.

Another possible explanation for the findings of this study could be that past studies generally examined individual variables in isolation, and this study was one of the first to empirically derive a model using many of the variables that have been found to be related to suicidal behavior. Therefore, it is possible that both borderline traits and lack of social support have shared variance with other variables such as depression, and antisocial personality traits.

In interpreting these results several methodological limitations must be kept in mind. The sample size used to generate

the model in Study 1 was small. Bentler and Chou (1987) note that researchers may go as low as five cases per parameter estimate in SEM analyses. However, replications in a larger sample may produce different results. This study relied upon self-report to determine past suicide attempts. This brings to light not only issues concerning selection bias, but also the questionable validity and accuracy of retrospective self-report, particularly given the average four-year time delay between reported attempts and study participation. There are many sources of potential error in retrospective reports including low reliability and validity of autobiographical memory, memory impairment associated with psychopathology and mood-congruent memory biases associated with psychopathology (Brewin, Andrews, & Gotlib, 1993). Some of these errors could be alleviated in future studies with the use of corroborative methods. However, corroboration of events is very difficult with this population, as often no one knows that the attempt has occurred. Furthermore, even if the attempt was corroborated, this would not necessarily clarify the intent or lethality of the attempt. Likewise, the cross-sectional nature of this study is inherently a limitation. In order to test the predictive validity of the BTSS model, it would be important to follow students longitudinally. A prospective design could be employed whereby students are tested upon entry into college, and then followed during over the course of their four years at college. An additional concern is that our sample in Study 2 consisted largely of students without suicidal ideation. Although this may limit the clinical utility of the model, we found it interesting the same model held in two different adolescent samples. Finally, we describe the BTSS as a mediational model, in that we suggest that social support mediates the relationship between BPD traits and current suicidal ideation. It must be considered that the purpose of these studies were to

develop and independently validate an empirical model of suicidal ideation among college students. The data in the current study provide a good fit to the BTSS, which suggests a mediational role for social support. While a full test of a mediational model is beyond the scope of this paper, this can be examined in future investigations.

The BTSS model could serve as a guide in understanding suicidal ideation in college students and determining which risk factors should be given more weight when assessing for potentially lethal suicidal behaviors. Using this model as a framework, professors, counselors, parents and peers could perhaps more accurately identify students who are experiencing suicidal ideation and thus are at a more serious risk for completing suicide. Future studies could investigate the clinical utility of the BTSS model.

This model also may have value in terms of suicide prevention and intervention among college students. Traditionally, these types of interventions have focused on treating symptoms related to depression and hopelessness (Rudd, Joiner, & Rajab, 2001; Weishaar & Beck, 1990). The findings of these studies suggest that treatment techniques designed to target symptoms of BPD such as the interpersonal effectiveness and distress tolerance modules employed in Dialectical Behavior Therapy (Linehan, 1993) could be considered when working with suicidal college students. However more research is needed before definitive conclusions can be reached.

Finally, this model was designed to explain suicidal ideation in college students. However, the majority of the factors that were analyzed in study 1 have been found to be predictive of suicidal behavior in clinical samples as well. A test of the BTSS model in a clinical sample could further aid in elucidating the relationship between borderline traits, social support and suicidal ideation.

AUTHOR NOTES

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