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A Test of the Interpersonal Theory of Suicide in College Students

Stephen P. Becker^{1,2}, Josalyn A. Foster¹, Aaron M. Luebbe³

¹Division of Behavioral Medicine and Clinical Psychology, Center for ADHD, Cincinnati Children's Hospital Medical Center, Cincinnati, Ohio, USA

²Department of Pediatrics, University of Cincinnati College of Medicine, Cincinnati, Ohio, USA

³Department of Psychology, Miami University, Oxford, Ohio, USA

Abstract

Background: The interpersonal theory of suicide posits that perceived burdensomeness, thwarted belongingness, and acquired capability together interact to increase risk for lethal self-injury. Despite the prominence of this theoretical model, few studies have directly tested the three-way interaction central to the theory, with mixed findings reported in studies to date. The objective of this study was to test the theorized three-way interaction in relation to suicidal behaviors in a large sample of college students.

Methods: Undergraduate students were recruited from two universities ($N=1,686$; ages 18-29; 64.5% female). Participants completed measures of perceived burdensomeness and thwarted belongingness (Interpersonal Needs Questionnaire-25), fearlessness about death (Acquired Capability for Suicide Scale-Fearlessness About Death), and suicidal behaviors (Suicidal Behaviors Questionnaire-Revised).

Results: Multiple linear regression was used to test the three-way interaction among burdensomeness, belongingness, and fearlessness about death on suicidal behaviors. Controlling for sex and depressive symptoms, results indicated the presence of a significant three-way interaction. The interaction was probed by dichotomizing burdensomeness at high and low values. There was a significant two-way interaction at high burdensomeness such that low belongingness was only related to suicidal behavior at high levels of fearlessness about death.

Address correspondence to: Stephen Becker, Center for ADHD, Division of Behavioral Medicine and Clinical Psychology, Cincinnati Children's Hospital Medical Center, 3333 Burnet Avenue, MLC 10006, Cincinnati, Ohio 45229-3039; (513) 803-2066 (phone); stephen.becker@cchmc.org.

Contributors

Stephen P. Becker was the primary author of the manuscript and contributed the majority of the writing and is a PI on the study from which the data was sourced. Josalyn A. Foster contributed to the literature search and manuscript writing and refinement. Aaron M. Luebbe completed manuscript analyses, contributed to manuscript revision and refinement and is a PI on the study from which the data was sourced. All authors have approved the final article and agreed to authorship order.

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Conflict of interests: None.

Limitations: The study is cross-sectional and uses a composite measure of suicidal behaviors.

Conclusions: This study adds to a small but growing body of research testing the three-way interaction among perceived burdensomeness, thwarted belongingness, and capability for suicide in relation to suicidal behaviors. Longitudinal studies using measures that distinguish between suicidal ideation and suicide attempt within the ideation-to-action framework are needed.

Keywords

acquired capability; interpersonal-psychological theory; perceived burdensomeness; suicide; thwarted belongingness; university students

Suicide is a major public health concern worldwide and is the second leading cause of death among young adults, including college students (Centers for Disease Control and Prevention, 2015; World Health Organization, 2014). It is therefore imperative to build and examine models that can inform our understanding of the full continuum of suicidal thoughts and behaviors (O'Connor and Nock, 2014). One prominent model is the interpersonal theory of suicide (Joiner, 2005; Van Orden et al., 2010), which posits that hopelessness about states of thwarted belongingness (e.g., "I feel disconnected from others") and perceived burdensomeness (e.g., "I am a burden on society") together contribute to suicidal desire (suicidal ideation). An acquired capability for suicide, which lowers fear of death and increases physical pain tolerance, is theorized to increase the likelihood that an individual will transition from suicidal desire to suicidal intent including lethal or non-lethal suicide attempts (Joiner, 2005; Van Orden et al., 2010).

There is growing empirical support for the interpersonal theory of suicide (Chu et al., 2017; Ma et al., 2016). However, very few studies have directly tested a central hypothesis of the theory wherein thwarted belongingness, perceived burdensomeness, and capability for suicide will *interact* to predict suicidal behaviors. A recent systematic review of the theory's predictions found that only a small fraction (5.8%) tested the hypothesized three-way interaction (Ma et al., 2016). A few studies have found the three-way interaction to predict increased suicidal behaviors as expected (Anestis and Joiner, 2011; Anestis et al., 2015; Davidson et al., 2010; Glaesmer et al., 2017; Joiner et al., 2009), whereas others have not (Bryan et al., 2010; Czyz et al., 2015; Monteith et al., 2013). Potentially, nonsignificant findings were at least partly attributable to sample size limitations (Ma et al., 2016). In addition, it appears that the three-way interaction may not be specific to lethal or non-lethal suicide attempts as originally posited by the theory, but rather predicts a broader range of suicidal behaviors such as ideation (Chu et al., 2017; Ma et al., 2016). The purpose of the present study was to test the three-way interaction of the interpersonal theory of suicide in relation to suicidal behaviors in a large sample of college students, controlling for sex and depressive symptoms since female sex and higher depressive symptoms are related to increased suicidal behaviors (Becker et al., 2018; Wilcox et al., 2010). Given the interpersonal model of suicide's predictions (Joiner, 2005; Van Orden et al., 2010), and recent reviews of the empirical literature (Chu et al., 2017; Ma et al., 2016), we hypothesized that the three-way interaction would significantly predict higher scores on a composite measure of suicidal behaviors.

Methods

Participants

Participants were 1,696 college students enrolled in two public universities in the Midwest United States. Participants ranged in age from 18 to 29 years. There were 1,094 women, 594 men, and 6 participants who indicated their sex as Other. The majority (81.7%, $n=1,385$) of participants self-identified as White; the remaining participants self-identified as Asian/Asian American (7.7%, $n=130$), Black/African American (5.8%, $n=99$), Biracial/Multiracial (4.0%, $n=68$), American Indian/Alaska Native (0.4%, $n=6$), or Native Hawaiian/Other Pacific Islander (0.1%, $n=2$). Seventy-three participants (4.3%) self-identified as Hispanic/Latino. The sex, race, and ethnicity items were not completed by 2, 6, and 2 participants, respectively. Most participants (63.4%) were in their first year of college; the remaining participants were in their second (23.6%), third (8.7%), fourth (4.0%), or other (0.2%) year of college.

Procedures

This study was approved by the Institutional Review Board (IRB) at each institution. Students enrolled in introductory psychology courses were able to participate in a research study to fulfill a course requirement. Students were able to choose from a number of studies and could choose to participate in this study if they were 18 years old. Participants at each institution completed the survey in Qualtrics anonymously and received course credit for participation. All participants received the contact information of the local investigator, IRB, and student counseling center. For additional details, see (Becker et al., 2018).

Measures

Interpersonal Needs Questionnaire.—The Interpersonal Needs Questionnaire (INQ) (Van Orden et al., 2012) is a 25-item self-report measure that includes 10 items assessing thwarted belongingness and 15 items assessing perceived burdensomeness (Van Orden et al., 2012). Participants indicate how true each item is for them on a seven-point scale, with higher scores indicating greater thwarted belongingness and perceived burdensomeness. In the present study, Cronbach's α s = .89 and .96 for thwarted belongingness and perceived burdensomeness, respectively.

Acquired Capability for Suicide Scale-Fearlessness About Death.—The Acquired Capability for Suicide Scale—Fearlessness About Death (ACSS-FAD) is derived from the Acquired Capability for Suicide Scale (Ribeiro et al., 2014). The ACSS-FAD consists of seven items rated on a four-point scale, with higher scores representing more fearlessness about death (Ribeiro et al., 2014). In the present study, Cronbach's α = .80.

Suicidal Behaviors Questionnaire-Revised.—The Suicidal Behaviors Questionnaire—Revised (SBQ-R) (Osman et al., 2001) is a validated and reliable measure of suicidal behaviors (Osman et al., 2001). The SBQ-R includes four items that assess lifetime ideation/attempt, frequency of ideation over the past 12 months, telling someone else about ideation, and likelihood of attempting suicide in the future. The SBQ-R is the most frequently-used

composite measure of suicidal behaviors/suicide risk (Chu et al., 2017; Ma et al., 2016). In the present study, Cronbach's $\alpha = .82$.

Depression Anxiety Stress Scales.—The depression subscale of the Depression Anxiety Stress Scales-21 (DASS-21; (Antony et al., 1998; Lovibond and Lovibond, 1995) was used to assess depressive symptoms. The depression subscale consists of seven items, none of which focus on suicide or sleep. Each item is rated using a four-point scale (0 = *did not apply to me at all*, 3 = *applied to me very much or most of the time*). In the present study, Cronbach's $\alpha = .90$.

Results

Missing Data

A total of 1,704 participants completed the study. Overall, there was very little missing data (0.29% of all data; Little's MCAR $\chi^2(6) = 5.09$, $p = .532$, suggesting data were missing in a pattern consistent with missing completely at random). Eight participants were missing data on all three interpersonal theory of suicide variables. Given our focus on these three scores and the small loss of data, we chose to listwise delete these individuals. Once removing these data, we used the EM algorithm to impute a single value for the remaining missing values (i.e., two values for INQ-Burdensomeness and one value for INQ-Belongingness). The sample description above and the analyses below are based on the final sample of 1,696 participants.

Preliminary Analyses

Descriptive data and intercorrelations of all study measures are in Table 1. With the exception of age (skew=2.45; kurtosis=10.21), all data were within acceptable limits of skew (< 2.0) and kurtosis (< 4.0). Two small effects between demographic data and our primary outcome, suicide risk, were noted. First, suicide risk scores were significantly higher at one of our two data collection sites than the other. Second, women endorsed significantly higher suicide risk than men. This effect was small. Given these two significant effects, site and sex were included as covariates in primary analyses. Because there were only eight participants who identified as “other” when asked about sex, we did not include these individuals in our preliminary bivariate analyses. So as not to exclude these individuals from our sample, however, sex was accounted for by two dummy-coded vectors in primary analyses, with men as the reference group. Racial and ethnic minority / majority status and age were not related to suicidal behaviors and were not considered further. There were moderate to strong intercorrelations among low belongingness, high burdensomeness, depressive symptoms, and suicide risk. Although significant, the relation of fearlessness about death to suicide risk was quite small. Fearlessness about death was unrelated to belongingness, burdensomeness, and depression.

Primary Analyses

Multiple linear regression was used to test the three-way interaction among burdensomeness, low belongingness, and fearlessness about death on suicidal behavior. Controlling for data collection site, participant sex, and depression, results indicated the presence of a significant

three-way interaction (see Table 2). Because of a floor effect on burdensomeness, we probed the interaction by dichotomizing burdensomeness at high and low values (i.e., $-1SD$ and mean values on burdensomeness were identical given the distribution of this variable; see Figure 1). Examining two way interactions at these two levels, there was a significant two-way interaction at high burdensomeness ($b = .23, p = .010$), but not at low levels ($b = .04, p = .526$). Simple slopes analyses, probing the interaction at $+1SD$, mean, and $-1SD$ values on fearlessness about death indicated a disordinal interaction. Consistent with hypotheses, low belongingness was only positively related to suicidal behavior at high levels of burdensomeness and high levels of fearlessness about death (at $+1SD, b = .20, p = .065$).

Given the disordinal interaction, it would appear that at high levels of burdensomeness but when fearlessness is low, that low belongingness might actually be protective (i.e., an inverse relation). As such, it appears in Figure 1 that one would expect some of the highest rates of suicidal behavior from participants with low belongingness, low fearlessness, but high burdensomeness. However, only 1 participant in our sample of 1,696 would qualify for this data point.

Discussion

This study adds to a small but growing body of research directly testing the hypothesized three-way interaction among perceived burdensomeness, thwarted belongingness, and capability for suicide that is central to the interpersonal theory of suicide. Most previous studies finding support for this three-way interaction have used higher-risk clinical/military samples (Anestis and Joiner, 2011; Anestis et al., 2015; Joiner et al., 2009). The present study is, to our knowledge, only the second study to examine and find support for the three-way interaction in college students specifically, with the previous college student study comprised of 115 Black students attending a leadership conference (Davidson et al., 2010). Thus, our study provides an important replication in a larger, predominantly White sample from two universities. These findings provide important support for aspects of the interpersonal theory of suicide, though we note that we did not examine the key aspect of the theory that is specific to lethal or near-lethal suicide attempts. The SBQ-R used in this study is a composite measure that includes various features of suicidality, and studies are needed that include measures and methods that can distinguish between suicidal ideation and suicide attempt within the ideation-to-action framework (Klonsky et al., 2016). It will be important for future studies to also include other key constructs such as withdrawal (Joiner et al., 2016; Van Orden et al., 2010) and emotion dysregulation (Law et al., 2015).

Limitations of our study include the cross-sectional design that precludes drawing causal or temporal conclusions and a limited measurement of suicidal behaviors. Although there is evidence that the three-way interaction may not be specific to lethal or near-lethal suicide attempts as posited by the interpersonal theory of suicide (Chu et al., 2017; Ma et al., 2016), this is an especially important area for investigation, including among college students. Prospective longitudinal research is also sorely needed, as very few studies have tested the three-way interaction in studies using a longitudinal design (Czyz et al., 2015). Nevertheless, findings from the present study using a large sample to test a theory-driven hypothesis

provide important support for the combination of thwarted belongingness, perceived burdensomeness, and fearlessness about death in relation to increased suicidal behaviors.

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Highlights

- The interpersonal theory of suicide needs additional tests of key hypotheses.
- A three-way interaction provided support for the interpersonal theory of suicide.
- Low belongingness related to suicidal behavior at high fearlessness about death.
- Longitudinal studies and nuanced measurement are needed to build upon findings.

Figure 1.

Test of the three-way interaction among belongingness, burdensomeness, and fearlessness about death in relation to suicidal behavior. $^\dagger p < .07$.

Table 1

Intercorrelations, Means, Standard Deviations, and Range of Study Variables

	Site	Age	Sex	Race	INQ-Burden.	INQ-Belong.	FAD	DASS DEP	SBQ-R
Age	.11**	--							
Sex	.01	-.17**	--						
Race	-.01	-.07**	.01	--					
INQ-Burden.	.07**	-.01	-.02	-.08**	--				
INQ-Belong.	.08**	.05*	-.08**	-.12**	.59**	--			
FAD	-.02	.07**	-.17**	-.04	.03	.04	--		
DASS DEP	.06*	.01	-.01	-.06*	.55**	.54**	.03	--	
SBQ-R	.12**	-.01	.05*	-.04	.52**	.41**	.06**	.55**	--
<i>M</i>	0.50	18.98	0.65	0.82	1.69	2.70	1.98	0.57	5.17
<i>SD</i>	--	1.27	--	--	1.14	1.24	0.92	0.62	2.82
Range	0-1	18 - 29	0-1	0-1	1.00 - 7.00	1.00 - 6.67	0.00 - 4.00	0.00 - 3.00	3.00 - 18.00

Note. For most correlations $N = 1,696$. For those with sex, $N = 1,688$, and race, $N = 1,690$. For sex, male = 0, female = 1. For race, racial / ethnic minority = 0, White = 1. INQ-Burden = Interpersonal Needs Questionnaire – Burdensomeness subscale. INQ-Belong = Interpersonal Needs Questionnaire – Belongingness subscale. FAD = Fearless About Death scale. DASS DEP = Depression, Anxiety, Stress Scale – Depression subscale. SBQ = Suicide Behaviors Questionnaire-Revised.

* $p < .05$.

** $p < .01$.

Table 2

Testing the Interaction of Low Belongingness, Burdensomeness, and Fearlessness about Death in relation to Suicide Risk (N = 1,696)

DV = SBQ-R	<i>b</i>	<i>SE</i>	β	<i>t</i>	<i>sr</i>
$F(11, 1684) = 94.90, p < .001. R^2 = .38$					
Site	0.43	.11	.08	4.02**	.08
Sex_D1	1.41	.79	.03	1.78	.03
Sex_D2	0.41	.12	.07	3.54**	.07
Depression	1.66	.11	.36	14.90**	.29
Low Belongingness	0.06	.06	.03	1.07	.02
Burdensomeness	0.76	.08	.31	9.23**	.18
Fearlessness About Death	0.09	.07	.03	1.23	.02
Belong x Burden	-0.06	.05	-.04	-1.27	-.02
Belong x FAD	0.11	.06	.05	1.92	.04
Burden x FAD	-0.10	.09	-.03	-1.10	-.02
Belong x Burden x FAD	0.11	.05	.07	2.27*	.04

INQ-Burden = Interpersonal Needs Questionnaire – Burdensomeness subscale. INQ-Belong = Interpersonal Needs Questionnaire – Belongingness subscale. FAD = Fearless About Death scale. DASS DEP = Depression, Anxiety, Stress Scale – Depression subscale. SBQ-R = Suicide Behaviors Questionnaire-Revised.

*
 $p < .05$.

**
 $p < .01$.