

Integrating the Interpersonal Psychological Theory of Suicide Into the Depression/Suicidal Ideation Relationship: A Short-Term Prospective Study

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We examined the hypothesis that depressive symptoms are associated with increased beliefs about perceived burdensomeness and thwarted belongingness identified in the interpersonal psychological theory of suicide and that these beliefs are associated with changes in suicidal ideation. Participants with clinical levels of depressive symptoms ($n = 299$) were selected from a larger group ($n = 508$) and completed measures of depressive symptoms, perceived burdensomeness and thwarted belongingness, and suicidal ideation twice over a period of 2 months. Results of a structural equation model found that depressive symptoms were associated with increases in burdensomeness and lack of belonging, which were associated with suicidal ideation. Moreover, this hypothesized integrated model demonstrated a significantly better fit than an alternative model that assumed burdensomeness and lack of belonging were associated with changes in depressive symptoms, which were associated with suicidal ideation. Our findings suggest that the well-established relationship between depressive symptoms and suicidal ideation is associated with changes in beliefs that one is a burden on others and lacks belonging. More generally, these results suggest that it may be fruitful to integrate theories of suicide risk to form a

comprehensive model that can inform future research and clinical interventions.

Keywords: suicide; suicidal ideation; depression; interpersonal theory of suicide; structural equation model

AMONG ALL AGE GROUPS suicide is the tenth leading cause of death in the United States and the second leading cause of death among 18- to 25-year-olds (Centers for Disease Control and Prevention, 2012). Given this high rate of suicide, there has been considerable research on biological, cognitive, social, and behavioral risk factors (see Nock et al., 2008, for a review). One of the strongest risk factors for suicide is depression, and the link between the two has been well established (Brown, Beck, Steer, & Grisham, 2000; Cheng, Chen, Chen, & Jenkins, 2000). Indeed, thoughts of suicide are one of the diagnostic criteria for depression (American Psychiatric Association, 2000).

In recent years, attention has shifted from depression itself to other risk factors that contribute to suicide. Several models have proposed cognitive and interpersonal factors that predict suicidal thinking and behavior, over and above the impact of depression. This includes hopelessness (Mann et al., 2005) and most recently the interpersonal beliefs associated with Joiner's interpersonal theory of suicide (IPTs; Joiner, 2005; Joiner, Van Orden, Witte, & Rudd, 2009; Van Orden et al., 2010). Within IPTs, the desire to die by

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suicide is a product of perceptions that one is a burden to others (perceived burdensomeness) and does not belong to a social group of others (thwarted belongingness).

Actual suicide attempts require a third factor, the capacity for the pain of suicide, which can be acquired through previous suicide attempts or exposure to so-called painful and provocative events such as injuries from contact sports (Van Orden, Witte, Gordon, Bender, & Joiner, 2008). The acquired capacity for suicide can exist independently of suicidal ideation in that many individuals may acquire the capacity to die by suicide (i.e., a necessary, but not sufficient, cause of suicide) without ever having the actual desire to die by suicide. The present research is concerned with just perceived burdensomeness and thwarted belonging, as these are related to suicidal ideation while the acquired capacity is only posited to be related to actual suicide attempts.

There is substantial evidence that perceived burdensomeness is associated with suicidal ideation in college students (Joiner et al., 2009; Lamis & Lester, 2013; Van Orden, Lynam, Hollar, & Joiner, 2006), patients with chronic pain (Kanzler, Bryan, McGeary, & Morrow, 2012), and psychiatric outpatients (Garza & Pettit, 2010). Thwarted belongingness is associated with suicidal ideation in prison inmates (Simlot, McFarland, & Lester, 2013) and history of previous suicide attempts in methadone patients (Conner, Britton, Sworts, & Joiner, 2007). Several studies find that perceived burdensomeness and thwarted belongingness synergistically predict suicidal ideation (Joiner, Van Orden, Witte, Selby, et al., 2009; Monteith, Menefee, Pettit, Leopoulos, & Vincent, in press; Van Orden et al., 2008). Examinations of suicide notes find that themes of perceived burdensomeness and thwarted belonging frequently appear (Cox et al., 2011; Gunn, Lester, Haines, & Williams, 2012; Joiner et al., 2002). Finally, the IPTS variables have been found to contribute to the prediction of suicidal ideation above and beyond the effects of other risk factors such as hopelessness (Van Orden et al., 2006) and depressive symptoms (Van Orden et al., 2008).

Although the beliefs from the IPTS about thwarted belongingness and perceived burdensomeness may be associated with suicidal ideation beyond the effects of depression, it seems likely that depression may also be associated with an increase of such beliefs. For example, it is possible that as individuals become depressed they begin to view themselves as burdensome to others and as disconnected from other social groups. Indeed, social withdrawal appears to be a common feature of depression. Individuals who are depressed may view themselves more negatively and

as less attractive and interesting. Moreover, depressed individuals tend to experience interpersonal difficulty once they are depressed (Kandel & Davies, 1986). Thus, depression may be associated with changes in beliefs about burdensomeness and belongingness, and these beliefs are associated with increased suicidal ideation. Such a broadened or unified model includes both depression and interpersonal beliefs about burdensomeness and lack of belonging in a single integrative framework.

A relevant study by Davidson, Wingate, Grant, Judah, and Mills (2011) found some evidence consistent with this hypothesis using a cross-sectional design with unselected undergraduates. While depressive symptoms were associated with both perceived burdensomeness and thwarted belongingness, only perceived burdensomeness was associated with depressive symptoms, which were associated with suicidal ideation. However, their study did not assess whether depression was associated with changes in IPTS variables and suicidal ideation. We presently sought to build upon this previous study by examining *changes* in the IPTS variables and suicidal ideation. The present study also used a large sample of undergraduates who were selected to be at elevated risk for suicidal ideation.

The Present Study

The goal of the present study is to examine the associations between depressive symptoms, IPTS beliefs about burdensomeness and lack of belonging (Joiner, 2005; Van Orden et al., 2010), and suicidal ideation within an integrated framework. Specifically, we used structural equation modeling to test the integrated hypothesis that (a) depressive symptoms are associated with increased beliefs about thwarted belongingness and perceived burdensomeness, and (b) these interpersonal beliefs are associated with suicidal ideation. Support for such a model would be a first step toward clarifying the relationships between these risk variables and increased suicidal ideation. We examine this hypothesis in a short-term prospective study using a diverse sample of undergraduates selected for elevated levels of depressive symptoms. We selected individuals with high levels of depressive symptoms as depressive symptoms are one of the factors most strongly associated with risk for suicide (Brown et al., 2000; Cheng et al., 2000). Thus, selecting individuals who are high in depressive symptoms created a group of participants at increased risk for suicidal ideation. Additionally, this hypothesis was specifically examined in college students because suicide is the second leading cause of death in this population (Centers for Disease Control and Prevention, 2012), and there is a recognized need for better understanding of the

processes underlying suicidal risk in this group (Anestis, Bagge, Tull, & Joiner, 2011).

Method

PARTICIPANT

Participants were selected from a larger sample of 508 undergraduates. Participants were included in the current study if their Center for Epidemiology Scale for Depression (CES-D) score was equal to or above 16, the most widely used cut point in previous research¹ (Radloff, 1991; Zich, Attkisson, & Greenfield, 1990). When compared with major depression diagnoses according to research diagnostic criteria (RDC; Spitzer, Endicott, & Robins, 1978), a cutoff score of 16 has been found to yield a false positive rate of 16.6% and a false negative rate of 40% (Roberts & Vernon, 1983).

The final sample of participants meeting screening criteria on the CES-D was 299 undergraduates (85.9% female) from a large university. That 58% of our initial sample met criteria for possible depression diagnosis on the CES-D may appear high, as other studies find prevalence rates of possible depression diagnoses using the CES-D around 45% (Santor, Zuroff, Ramsay, Cervantes, & Palacios, 1995). However, this finding is consistent with the pattern of symptom severity found using different measures of depressive symptoms (e.g., Beck Depression Inventory [BDI] and Depression Anxiety Stress Scales [DASS]) in other samples in this undergraduate population (see Kleiman & Riskind, 2012). One possibility for this high level of possible depression diagnoses is that study recruitment was targeted at depressed or suicidal individuals (e.g., the words “depression” and “suicide” were included in the title and the study advertisement). Alternatively, evaluations of the CES-D in college populations find that scores above 16 differentiate not just currently depressed individuals from nondepressed individuals but also differentiate individuals who had been depressed at any point in their lifetime from those who have never been depressed (Shean & Baldwin, 2008). Thus, another possibility is that our sample includes both currently and formerly depressed individuals. The mean age at baseline was 20.94 years ($SD = 4.80$). Approximately 53% of the sample was Caucasian, 17% Asian, 11% African American, and the rest self-identified with another race.

¹ We tested the model at higher cut points (i.e., CES-D = <23) and it still had acceptable model fit. We reported results with a cut point of 16, as the results were essentially unchanged, as a higher cut point of 23 has been found to increase the false negative rate for major depression diagnoses to 60% (Roberts & Vernon, 1983).

PROCEDURE

Participants completed self-report measures twice, separated by approximately 6–8 weeks on a secure Web site as a part of an IRB-approved study. On average, the second time point (T2) was completed 50.19 days ($SD = 11.35$ days) after the first time point (T1). Participants completed measures of depressive symptoms (CES-D), perceived burdensomeness and lack of belongingness (Interpersonal Needs Questionnaire [INQ]), and suicidal ideation (Beck Scale for Suicidal Ideation [BSS]) at both time points. Stringent suicide risk assessment procedures were utilized to ensure participant safety.

MEASURES

Depressive Symptoms

The CES-D (Radloff, 1991) is a widely used 20-item measure of depressive symptoms. Participants rate the frequency with which a variety of symptoms occurred over the past week on 4-point Likert scales (i.e., 0 = *rarely or none of the time* to 3 = *most or all of the time*). Higher scores reflected higher levels of symptoms. The CES-D is particularly useful in studies of suicidal ideation because unlike other measures of depressive symptoms, it includes no items that assess suicidal ideation, thus allowing us to avoid potential confounds associated with using a covariate that also measures the outcome variable. Previous studies reported consistently strong psychometric properties for this measure across a variety of populations, including college populations (Radloff, 1991).

Lack of Belongingness and Perceived Burdensomeness

The INQ (Van Orden, Cukrowicz, Witte, & Joiner, 2012) is a 12-item measure of the variables associated with IPTS. Seven items assess perceived burdensomeness (e.g., “These days I think I make things worse for the people in my life”) and five items assess a lack of belonging (e.g., “These days, I feel disconnected from other people”). Each item was rated on a 7-point Likert scale (i.e., 1 = *not at all true for me* to 7 = *very true for me*). The measure is coded such that higher scores for the two scales indicated higher thwarted belongingness and perceived burdensomeness. The INQ demonstrates strong convergent validity with measures of related constructs, such as social support and loneliness, and demonstrates consistent factor loading across a variety of samples including outpatients, undergraduates, and the elderly (Van Orden et al., 2012).

Suicidal Ideation

The BSS (Beck & Steer, 1991) is a 21-item self-report measure that assesses current suicide ideation. Only

the first 19 items, which measured suicidal ideation, were used. Studies have reported strong psychometrics for this scale in college students (Chioqueta & Stiles, 2006). Moreover, some studies have found that, in general, individuals are more likely to disclose potentially embarrassing behaviors, such as those relating to suicidality, in self-report assessments than in interviews (Turner et al., 1998).

ANALYTIC STRATEGY

We tested three sets of structural equation models (SEM) using AMOS version 21.0 (Arbuckle, 2009): (a) our hypothesized model with the IPTS components (perceived burdensomeness and thwarted belonging) as separate observed variables (i.e., a two-factor solution), (b) our hypothesized model with the IPTS components loaded on to one latent variable (i.e., a one-factor solution) that was necessary after testing the first model and finding that model modifications were needed, and (c) an alternative model of directionality with depressive symptom and IPTS variables reversed from the first two models (i.e., the IPTS variables associated with changes in depressive symptoms that were associated with suicidal ideation).

The first two models tested our main hypothesis that depressive symptoms would be associated with the IPTS variables, which are associated with suicidal ideation. Our first model was a two-factor model, in which we took a purely theory-driven approach and had the two IPTS subscales as separate observed variables, as specified by the IPTS (e.g., Joiner, Van Orden, Witte, & Rudd, 2009; Joiner, Van Orden, Witte, Selby, et al., 2009). As will be discussed later, this model required modification in the measurement of the IPTS variables. Our second model was a one-factor model where we took a more data-driven, but still theoretically informed, approach and created a latent IPTS variable consisting of both observed IPTS components. We specified the model so that the IPTS variables would load on to one latent variable for both theoretical (i.e., the variables are conceptually related) and empirical (i.e., the variables are strongly correlated and doing so vastly improved model fit) reasons. In the present study, we find high correlations between the two variables at T1 and T2 ($r = .66, .78$, respectively). Thus, given the high intercorrelations, we determined that a more data-driven solution in the present study was to have perceived burdensomeness and thwarted belonging load on to one latent variable. Moreover, such an approach is compatible with a study of the factor structure of the INQ (Freedenthal, Lamis, Osman, Kahlo, & Gutierrez, 2011) that found nearly equal support for both a one- and two-factor structure.

The specified paths were similar across the one- and two-factor models. All necessary paths were specified to test an indirect effect (T1 depressive symptoms to T2 IPTS observed variables or latent and suicidal ideation, and T2 IPTS observed/latent to T2 suicidal ideation).

Paths were also added from all T1 variables to corresponding T2 variables (from T1 to T2 IPTS variables, and from T1 to T2 suicidal ideation) to allow us to examine increases in the IPTS variables rather than just directional relationships. We allowed all T1 predictor variables to covary as they are all conceptually related and significantly correlated at the bivariate level. Covariances were added between the errors for T1 and T2 burdensomeness and T1 and T2 thwarted belonging, as autocorrelation would be expected between variables measured twice or between two subscales of the same measure. Each set of models contained two nested models: one with the path from T1 depressive symptoms to T2 suicidal ideation specified and one with the path from T1 depressive symptoms to T2 suicidal ideation constrained to zero. We analyzed two models because doing so allowed us to see if the effects of depressive symptoms on suicidal ideation were fully accounted for or only partially accounted for by the IPTS variables.

Finally, we tested a third model (see Figure 3) that examined the specificity of the direction specified in our hypothesized model. We tested this model because while we hypothesize that depressive symptoms are associated with changes in the IPTS variables, which are associated with suicidal ideation, it may also be possible that the reverse is true and the IPTS variables are associated with changes in depressive symptoms, which are associated with suicidal ideation. Thus, in this model, we tested the variables in the opposite order where the IPTS variables at T1 were associated with depressive symptoms at T2 (controlling for symptoms at T1), which were associated with suicidal ideation at T2.

To summarize, we tested three sets of models: (a) the hypothesized model with the IPTS variables as separate observed variables, (b) the hypothesized model with the IPTS variables loaded on to one latent variable, and (c) a model where the order of depressive symptoms and IPTS variables were reversed to test the specificity of the order of variables in our model. All three sets of models contained two nested models, one with the path from T1 depressive symptoms (Models 1 and 2) or T1 IPTS variables (Model 3) specified and one with it constrained to zero. We assessed fit for all models using the commonly established criteria established by Hu and Bentler (1999): $\chi^2/df < 2$, TLI close to 1, RMSEA $< .08$. We compared the fit of models that were nested (i.e., contained the same

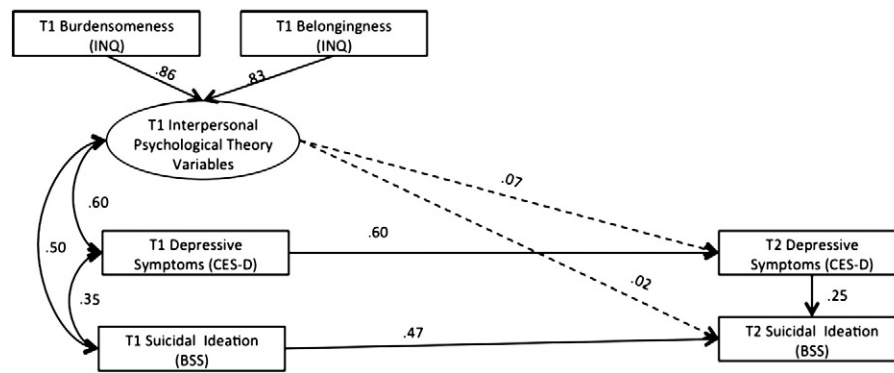


FIGURE 3 Alternate model: Changes in depressive symptoms are indirectly associated with the IPTS variable/suicidal ideation relationship. Note. INQ = Interpersonal Needs Questionnaire; CES-D = Center for Epidemiological Studies Depression Scale; BSS = Beck Suicide Scale; standardized weights displayed; solid lines are $p < .05$; dashed lines are $p > .05$.

a Poisson model unacceptable. We also tested our model using asymptotically distribution-free estimation, which is more appropriate for non-normally distributed data. The results of the main hypothesized model using this estimation technique ($AIC = 56.00$) were not appreciably different from the model estimated with the more commonly used maximum likelihood estimation with a log transformation ($AIC = 55.56$). Thus, the best remaining option was to log transform the T2 BSS scores, which reduced the skew ($skew = 1.88$, $SE = 0.17$) and helped us to avoid violating the assumptions of regression.

Results

Means, standard deviations, intercorrelations, and alpha statistics are presented in Table 1. All variables were positively correlated with one another at the $p < .001$ level and demonstrated acceptable internal consistency (all alphas $\geq .70$). Approximately 23% of the sample reported suicidal ideation (i.e., Beck Suicide Scale Scores > 0 ; Beck & Steer, 1991) at T1, and 15% reported suicidal ideation at T2. Moreover, 9% of participants had indicated on the demographics screener that they had attempted suicide in the past. These rates are notably higher than a recent cohort study of suicidality on college campuses that found a 12% rate of suicidal ideation *throughout* 4 years of college (Wilcox et al., 2010) and a 6% lifetime prevalence of suicide attempts (Arria et al., 2009). There was variability in suicidal ideation scores across time points. Approximately 7% of the sample that reported no suicidal ideation at T1 reported suicidal ideation at T2 and 13% of the sample that reported suicidal ideation at T1 did not report suicidal ideation at T2. Among those who reported suicidal ideation at both T1 and T2, the average absolute change between time points was 3.89 points on the Beck Suicide Scale ($SD = 3.63$).

MODEL 1: TEST OF HYPOTHESIZED MODEL USING A TWO-FACTOR SOLUTION

The model with the direct path from T1 depressive symptoms to T2 suicidal ideation identified had overall acceptable fit ($\chi^2_{[df = 6]} = 27.83$, $p < .001$; $\chi^2/df = 4.56$, $TLI = 0.93$, $RMSEA = .11$). The model with the direct path from T1 depressive symptoms to T2 suicidal ideation constrained to zero (i.e., removed) also had acceptable fit ($\chi^2_{[df = 7]} = 40.68$, $p = .001$; $\chi^2/df = 5.81$, $TLI = 0.95$, $RMSEA = .10$). A chi-square difference test suggested that the model with the direct path from T1 depressive symptoms to T2 suicidal ideation fit the data significantly better than the model without it ($\chi^2_1 = 12.85$, $p < .001$), thus we only further discuss the better-fitting model.

As can be seen in Figure 1, all direct paths in the model are significant. The variables in the model accounted for 64% of the variance in T2 suicidal ideation. The negative regression weight from T1 CES-D to T2 BSS is likely a case of suppression by T1 BSS and T1/T2 IPTS variables. A suppressor effect is diagnosed when the sign of the direct effect (i.e., negative or positive) is different from the sign of the indirect effect (MacKinnon, Krull, & Lockwood, 2000), as is the case in our study. According to Tzelgov and Henik (1991), a suppressor effect is further evidenced by the difference in sign between the bivariate correlation of T1 CES-D and T2 BSS (.22) and the partial correlation between T1 CES-D and T2 BSS, controlling for T1 BSS and T1/T2 IPTS variables ($-.04$). Such a suppressor effect does not preclude interpretation of the indirect effects of our model (MacKinnon et al., 2000). Finally, the standardized indirect effect of depressive symptoms on T2 suicidal ideation through changes in the IPTS variables was significant ($b = .05$, 95% CI $[0.02, 0.10]$, $p = .010$). Although these results do support our hypothesis, the model fit statistics

Table 1
Alphas, Means, Standard Deviations, and Intercorrelations of Study Variables

	1	2	3	4	5	6	7	8
1. T1 Depressive symptoms (CES-D)	--							
2. T1 Burdensomeness (INQ-Burden)	.42***	--						
3. T1 Lack of belonging (INQ-Belong)	.46***	.66***	--					
4. T1 Suicidal ideation (BSS)	.31***	.45***	.28***	--				
5. T2 Depressive symptoms (CES-D)	.64***	.34***	.40***	.19***	--			
6. T2 Burdensomeness (INQ-Burden)	.45***	.49***	.48***	.38***	.46***	--		
7. T2 Lack of belonging (INQ-Belong)	.42***	.45***	.60***	.29***	.53***	.78***	--	
8. T2 Suicidal ideation (BSS)	.22***	.32***	.19***	.69***	.30***	.43***	.35***	--
Mean	25.12	2.08	2.74	1.04	20.72	2.02	2.63	1.00
SD	8.11	1.01	1.16	3.27	9.16	1.06	1.26	3.33
Skewness	0.96	1.55	0.80	3.02	1.50	1.69	0.90	2.83
Kurtosis	0.57	2.22	0.25	10.32	2.75	3.21	0.30	7.69
Alpha	.69	.89	.88	.88	.90	.86	.91	.92

Note. CES-D = Center for Epidemiology Depression Scale; INQ = Interpersonal Needs Questionnaire; BSS = Beck Suicide Scale.
*** $p < .001$.

(e.g., RMSEA > .80) indicate that model modification may be necessary.

MODEL 2: TEST OF HYPOTHESIZED MODEL USING ONE-FACTOR SOLUTION

Given that the model fit indices for the two-factor solution indicated that some model modification was necessary, we tested another set of models using a one-factor solution where the IPTS variables loaded on to one latent factor. As described earlier, we chose this modification due to the conceptual overlap of the two IPTS variables and their relatively high correlation in the present study. The model with the direct path from T1 depressive symptoms to T2 suicidal ideation identified had overall excellent fit ($\chi^2_{[df = 4]} = 4.47$, $p = .364$; $\chi^2/df = 1.12$, TLI = 0.99, RMSEA = .02). The model where the direct path from T1 depressive symptoms to T2 suicidal ideation was constrained to zero (i.e., removed) had only acceptable model fit ($\chi^2_{[df = 5]} = 19.68$, $p = .001$; $\chi^2/df = 3.94$, TLI = 0.95, RMSEA = .10). A chi-square difference test suggested that the model with the direct path from T1 depressive symptoms to T2 suicidal ideation fit the data significantly better than the model without it ($\chi^2_1 = 15.21$, $p < .001$), thus we only further discuss the better-fitting model.

As can be seen in Figure 2, all direct paths in the model are significant. Like the previous model, the negative direct effect between T1 CES-D and T2 BSS is likely the result of a suppressor effect. The variables in the model accounted for 67% of the variance in T2 suicidal ideation. Finally, the standardized indirect effect of depressive symptoms on T2 suicidal ideation through changes in the IPTS variables was significant ($b = .10$, 95% CI [0.05, 0.76], $p = .010$), confirming our hypothesis. Com-

parison of the AIC values indicated that the one-factor hypothesized model (AIC = 55.56) was a better fit to the data than the previously tested two-factor model (AIC = 71.38). These results support both our hypothesized model and a one-factor solution for the IPTS variables.

MODEL 3: TEST OF ALTERNATIVE DIRECTIONALITY

We also tested a set of models where the IPTS variables and depressive symptoms were reversed. Given that the one-factor model (i.e., both IPTS factors on one latent variable) testing the main hypothesis demonstrated more optimal fit than the two-factor model, we only tested a one-factor model with the order of the variables reversed. Both the model with the direct path with the path from T1 IPTS variables to T2 suicidal ideation identified ($\chi^2_{[df = 5]} = 31.48$, $p < .001$; $\chi^2/df = 6.30$, TLI = 0.92, RMSEA = .11) and the model with the path from T1 IPTS variables to T2 suicidal ideation constrained ($\chi^2_{[df = 6]} = 31.58$, $p < .001$; $\chi^2/df = 5.26$, TLI = 0.93, RMSEA = .10) had poor fit to the data. The model fit indices did not significantly differ ($\chi^2_1 = 0.10$, $p = .750$), thus we chose to report the model with the path from T1 IPTS to T2 suicidal ideation identified to be consistent with our reporting of the main hypothesized model.

The model is depicted in Figure 2. Unlike the hypothesized models in which all direct paths were significant, only the direct path from T2 depressive symptoms to T2 suicidal ideation was significant. The variables in this model accounted for 36% of the variance in T2 suicidal ideation. Finally, the indirect effect of the IPTS variables on T2 suicidal ideation through changes in depressive symptoms was not significant ($b = .02$, 95% CI [-0.02, 0.05], $p = .318$). Comparing the AIC values indicated that the one-

factor hypothesized model ($AIC = 55.56$) was a better fit to the data than the alternative model ($AIC = 63.45$). These results support the specificity of the direction of the mediators in our hypothesized model.

Discussion

Over the past several decades, there has been considerable research on the role of depression as a risk factor in suicide (see [Nock et al., 2008](#), for a review). Research has also rapidly grown on IPTS ([Joiner et al., 2009](#); [Van Orden et al., 2010](#)). Despite this, there has been little study of how these two literatures can be bridged. In an attempt to connect the two bodies of literature, we used SEM and found support for a structural model that assumes that (a) depressive symptoms are associated with increased beliefs about thwarted belongingness and perceived burdensomeness (i.e., the IPTS variables), and (b) these beliefs are associated with suicidal ideation. Moreover, the data did not support an alternative model where the IPTS variables were associated with changes in depressive symptoms that were associated with changes in suicidal ideation. Such an integrative model helps to bring together work on depression and suicide with work on the interpersonal psychological theory of suicide.

Our findings were within the context of depression, and thus it is not known to what extent the IPTS beliefs were associated with the effects of other risk factors such as anxiety, substance use, or negative life events. It is possible that beliefs about belongingness and burdensomeness could also be associated with the effects of these other risk factors. Alternatively, there may be other pathways for the links between other risk factors and suicide. For example, hopelessness, which can be seen both as a precursor and product of depression, may also account for the effects of depression on suicidal ideation over time ([Abramson, Metalsky, & Alloy, 1989](#); [Brown et al., 2000](#)). There may be other interpretations of the part of our analysis where T1 depressive symptoms were associated with T2 IPTS variables controlling for T1 IPTS variables. While we conceptualized this to show that depressive symptoms were associated with *change* in the variables, another interpretation could be that T1 depressive symptoms simply were associated with T2 IPTS variables over and above T1 IPTS variables or that T1 depressive symptoms were associated with residual variance in T2 IPTS variables after baseline variance is accounted for. Either conceptualization, however, is still consistent with our overall framework.

A further important point is that we did not specify the actual antecedent variables that were associated with depression. Our present results are potentially

consistent with a more complex model in which other distal factors for suicide such as negative cognitive style ([Abramson et al., 1998](#)), negative life events ([Joiner & Rudd, 2000](#)), or biological vulnerabilities, such as the serotonin transporter gene ([Mann et al., 2000](#)), influence depressive symptoms that in subsequent steps are associated with suicide through variables such as beliefs about burdensomeness and belongingness. If so, it may be counterproductive to see any one model as all-superior because there are likely multiple pathways as well as steps to suicide, and the best understanding of suicide risk may come from integration of multiple supported literatures and models.

One methodological issue that deserves attention is that the measurement model that best fit our data deviates in one respect from the one assumed by the IPTS model. Within the IPTS, perceived burdensomeness and thwarted belongingness are proposed to be two separate, but related, factors. Although our model containing the two variables separately did have acceptable fit, the model of best fit had the IPTS two factors loaded on to one latent variable. One interpretation might be that the factor structure of the INQ (which measures IPTS) is questionable. Indeed, when [Freedenthal et al. \(2011\)](#) examined the factor structure of the INQ in college students, they found nearly equal support for both the two-factor structure posited by IPTS as well as the one-factor structure in the present study. Moreover, [Davidson et al. \(2011\)](#), who conducted similar SEM analyses with the IPTS factors as separate variables, also had model fit that indicated that modifications were needed (e.g., their RMSEA was > 1). However, [Davidson et al. \(2011\)](#) did not modify their model with a one-factor latent variable so it is not possible to know if such a modification would have also improved model fit. Another interpretation is that our data-driven modification is unique to our sample (and possibly that of [Davidson et al., 2011](#)) and that the two-factor structure of the INQ proposed by [Van Orden et al. \(2012\)](#) is correct. Given that both one- and two-factor models still produced acceptable fit (albeit with the one-factor model producing far better fit), either factor structure is consistent with our hypothesis. Nevertheless, studies may be needed to further investigate the factor structure of the INQ.

It is also important to note that our model did not consider the third factor in IPTS, the acquired capacity for suicide. Within IPTS, the acquired capacity for suicide is an independent facet of the desire to die by suicide. Indeed, individuals can acquire the capacity to die by suicide, thus increasing their risk for suicide, without ever having the desire to die. Thus, we limited our exploration to variables associated with the desire

to die (i.e., suicidal ideation). Future studies are needed that further expand our model to include the capacity to die by suicide and prediction of actual suicide attempts.

Clinically, our findings imply that monitoring perceived burdensomeness and thwarted belongingness in the treatment of depressed clients may help to provide an index of suicide risk as changes in the IPTS variables may indicate elevations in risk for suicidal ideation. When a clinician does notice that the IPTS beliefs are beginning to increase, they may be able to switch treatment modalities from treating depression to treatments that target the IPTS variables (e.g., Joiner, Van Orden, Witte, & Rudd, 2009).

The present study had several limitations that should be acknowledged. First, our study had two time points. Three time points are needed to test a mediational model that can only demonstrate mediation if the mediator occurred temporally after the predictor and before the outcome variable. Our data only allowed us to assess if depression symptoms were associated with changes in the IPTS variables and suicidal ideation occurring at the same time. Second, we used a sample of undergraduates selected for high depressive symptoms, not actual depression diagnoses. Third, suicidal ideation had a relatively low base rate of occurrence in our sample. Future studies could correct these weaknesses using a high-risk sample with clinical depression that would likely have a higher rate of suicidal ideation. Strengths of the study include the use of a group of participants at elevated risk for suicidal ideation selected from a relatively large sample of diverse young adults. Finally, this study is among the first to our knowledge to bridge two related literatures in an attempt to create a more comprehensive understanding of how these different risk factors are related to suicidal ideation.

Conflict of Interest Statement

The authors declare that there are no conflicts of interest.

References

- Abramson, L. Y., Alloy, L. B., Hogan, M. E., Whitehouse, W. G., Cornette, M., Akhavan, S., & Chiara, A. (1998). Suicidality and cognitive vulnerability to depression among college students: A prospective study. *Journal of Adolescence*, 21, 473–487.
- Abramson, L. Y., Metalsky, G. I., & Alloy, L. B. (1989). Hopelessness depression: A theory-based subtype of depression. *Psychological Review*, 96, 358–372.
- Akaike, H. (1987). Factor analysis and AIC. *Psychometrika*, 52, 317–332.
- American Psychiatric Association (2000). *Diagnostic and statistical manual of mental disorders* (4th ed.). New York, NY: American Psychiatric Publishing.
- Anestis, M. D., Bagge, C. L., Tull, M. T., & Joiner, T. E. (2011). Clarifying the role of emotion dysregulation in the interpersonal-psychological theory of suicidal behavior in an undergraduate sample. *Journal of Psychiatric Research*, 45, 603–611.
- Arbuckle, J. (2012). *AMOS [Computer program]*. New York, NY: IBM.
- Arria, A. M., O'Grady, K. E., Caldeira, K. M., Vincent, K. B., Wilcox, H. C., & Wish, E. D. (2009). Suicide ideation among college students: A multivariate analysis. *Archives of Suicide Research*, 13, 230–246.
- Beck, A. T., & Steer, R. A. (1991). *Manual for Beck Scale for Suicidal Ideation*. New York, NY: Psychological Corporation.
- Brown, G. K., Beck, A. T., Steer, R. A., & Grisham, J. R. (2000). Risk factors for suicide in psychiatric outpatients: A 20-year prospective study. *Journal of Consulting and Clinical Psychology*, 68, 371–377.
- Centers for Disease Control and Prevention (2012). WISQARS Injury Mortality Report. *Web-Based Injury Statistics Query and Reporting System (WISQARS)*. Retrieved from, <http://webappa.cdc.gov/cgi-bin/broker.exe>
- Cheng, A. T. A., Chen, T. H. H., Chen, C. -C., & Jenkins, R. (2000). Psychosocial and psychiatric risk factors for suicide. *British Journal of Psychiatry*, 177, 360–365.
- Chioqueta, A. P., & Stiles, T. C. (2006). Psychometric properties of the Beck Scale for Suicidal Ideation: A Norwegian study with university students. *Nordic Journal of Psychiatry*, 60, 400–404.
- Conner, K. R., Britton, P. C., Sworts, L. M., & Joiner, T. E. (2007). Suicide attempts among individuals with opiate dependence: The critical role of belonging. *Addictive Behaviors*, 32, 1395–1404.
- Cox, D. W., Ghahramanlou-Holloway, M., Greene, F. N., Bakalar, J. L., Schendel, C. L., Nademin, M. E., ... Kindt, M. (2011). Suicide in the United States Air Force: Risk factors communicated before and at death. *Journal of Affective Disorders*, 133, 398–405.
- Davidson, C. L., Wingate, L. R., Grant, D. M., Judah, M. R., & Mills, A. C. (2011). Interpersonal suicide risk and ideation: The influence of depression and social anxiety. *Journal of Social and Clinical Psychology*, 30, 842–855.
- Freedenthal, S., Lamis, D. A., Osman, A., Kahlo, D., & Gutierrez, P. M. (2011). Evaluation of the psychometric properties of the Interpersonal Needs Questionnaire-12 in samples of men and women. *Journal of Clinical Psychology*, 67, 609–623.
- Garza, M., & Pettit, J. W. (2010). Perceived Burdensomeness, Familism, and Suicidal Ideation among Mexican Women: Enhancing Understanding of Risk and Protective Factors. *Suicide and Life-Threatening Behavior*, 40, 561–573.
- Gunn, J. F., Lester, D., Haines, J., & Williams, C. L. (2012). Thwarted belongingness and perceived burdensomeness in suicide notes. *Crisis: Journal of Crisis Intervention and Suicide Prevention*, 33, 178–181.
- Harrell, F. E. (2001). *Regression modeling strategies: With applications to linear models, logistic regression, and survival analysis* (Corrected.). New York, NY: Springer.
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6, 1–55.
- Joiner, T. E. (2005). *Why people die by suicide*. Cambridge, MA: Harvard University Press.
- Joiner, T. E., Pettit, J. W., Walker, R. L., Voelz, Z. R., Cruz, J., Rudd, M. D., & Lester, D. (2002). Perceived burdensomeness and suicidality: Two studies on the suicide notes of those attempting and those completing suicide. *Journal of Social and Clinical Psychology*, 21, 531–545.
- Joiner, T. E., & Rudd, M. D. (2000). Intensity and duration of suicidal crisis vary as a function of previous suicide attempts and negative life events. *Journal of Consulting and Clinical Psychology*, 68, 909–916.

- Joiner, T. E., Van Orden, K., Witte, T. K., & Rudd, M. D. (2009). *The interpersonal theory of suicide: Guidance for working with suicidal clients*. Washington, DC: American Psychological Association.
- Joiner, T. E., Van Orden, K. A., Witte, T. K., Selby, E. A., Ribeiro, J. D., Lewis, R., & Rudd, M. D. (2009). Main predictions of the interpersonal-psychological theory of suicidal behavior: Empirical tests in two samples of young adults. *Journal of Abnormal Psychology, 118*, 634–646.
- Kandel, D. B., & Davies, M. (1986). Adult sequelae of adolescent depressive symptoms. *Archives of General Psychiatry, 43*, 255–262.
- Kanzler, K. E., Bryan, C. J., McGeary, D. D., & Morrow, C. E. (2012). Suicidal ideation and perceived burdensomeness in patients with chronic pain. *Pain Practice, 12*, 602–609.
- Kleiman, E. M., & Riskind, J. H. (2012). Cognitive vulnerability to comorbidity: Looming cognitive style and depressive cognitive style as synergistic predictors of anxiety and depression symptoms. *Journal of Behavior Therapy and Experimental Psychiatry, 43*, 1109–1114.
- Lamis, D. A., & Lester, D. (2013). Gender differences in risk and protective factors for suicidal ideation among college students. *Journal of College Student Psychotherapy, 27*, 62–77.
- MacKinnon, D. P., Krull, J. L., & Lockwood, C. M. (2000). Equivalence of the mediation, confounding and suppression effect. *Prevention Science, 1*, 173–181.
- Mann, J. J., Apter, A., Bertolote, J., Beautrais, A., Currier, D., Haas, A., ... Hendin, H. (2005). Suicide prevention strategies: A systematic review. *Journal of the American Medical Association, 294*, 2064–2074.
- Mann, J. J., Huang, Y. Y., Underwood, M. D., Kassir, S. A., Oppenheim, S., Kelly, T. M., ... Arango, M. (2000). A serotonin transporter gene promoter polymorphism (5-HTTLPR) and prefrontal cortical binding in major depression and suicide. *Archives of General Psychiatry, 57*, 729–738.
- Monteith, L. L., Menefee, D. S., Pettit, J. W., Leopoulos, W. L., & Vincent, J. P. (in press). Examining the interpersonal-psychological theory of suicide in an inpatient veteran sample. *Suicide and Life-Threatening Behavior*.
- Nock, M. K., Borges, G., Bromet, E. J., Cha, C. B., Kessler, R. C., & Lee, S. (2008). Suicide and suicidal behavior. *Epidemiologic Reviews, 30*, 133–154.
- Radloff, L. S. (1991). The use of the Center for Epidemiologic Studies Depression Scale in adolescents and young adults. *Journal of Youth and Adolescence, 20*, 149–166.
- Roberts, R. E., & Vernon, S. W. (1983). The Center for Epidemiologic Studies Depression Scale: Its use in a community sample. *American Journal of Psychiatry, 140*, 41–46.
- Santor, D. A., Zuroff, D. C., Ramsay, J. O., Cervantes, P., & Palacios, J. (1995). Examining scale discriminability in the BDI and CES-D as a function of depressive severity. *Psychological Assessment, 7*, 131–139.
- Shean, G., & Baldwin, G. (2008). Sensitivity and specificity of depression questionnaires in a college-age sample. *Journal of Genetic Psychology, 169*, 281–292.
- Simlot, R., McFarland, K., & Lester, D. (2013). Testing joiner's theory of suicide in jail inmates: An exploratory study. *Psychological Reports, 112*, 100–105.
- Spitzer, R. L., Endicott, J., & Robins, E. (1978). Research diagnostic criteria: Rationale and reliability. *Archives of General Psychiatry, 35*, 773.
- Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics*. Boston, MA: Pearson Education.
- Turner, C. F., Ku, L., Rogers, S. M., Lindberg, L. D., Pleck, J. H., & Sonenstein, F. L. (1998). Adolescent sexual behavior, drug use, and violence: Increased reporting with computer survey technology. *Science, 280*, 867–873.
- Tzelgov, J., & Henik, A. (1991). Suppression situations in psychological research: Definitions, implications, and applications. *Psychological Bulletin, 109*, 524–536.
- Van Orden, K. A., Cukrowicz, K. C., Witte, T. K., & Joiner, T. E. (2012). Thwarted belongingness and perceived burdensomeness: Construct validity and psychometric properties of the Interpersonal Needs Questionnaire. *Psychological Assessment, 24*, 197–215.
- Van Orden, K. A., Lynam, M. E., Hollar, D., & Joiner, T. E. (2006). Perceived burdensomeness as an indicator of suicidal symptoms. *Cognitive Therapy and Research, 30*, 457–467.
- Van Orden, K. A., Witte, T. K., Cukrowicz, K. C., Braithwaite, S. R., Selby, E. A., & Joiner, T. E. (2010). The interpersonal theory of suicide. *Psychological Review, 117*, 575–600.
- Van Orden, K. A., Witte, T. K., Gordon, K. H., Bender, T. W., & Joiner, T. E. (2008). Suicidal desire and the capability for suicide: Tests of the interpersonal-psychological theory of suicidal behavior among adults. *Journal of Consulting and Clinical Psychology, 76*, 72–83.
- Wilcox, H. C., Arria, A. M., Caldeira, K. M., Vincent, K. B., Pinchevsky, G. M., & O'Grady, K. E. (2010). Prevalence and predictors of persistent suicide ideation, plans, and attempts during college. *Journal of Affective Disorders, 127*, 287–294.
- Zich, J. M., Attkisson, C. C., & Greenfield, T. K. (1990). Screening for depression in primary care clinics: The CES-D and the BDI. *International Journal of Psychiatry in Medicine, 20*, 259–277.

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