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Main Predictions of the Interpersonal-Psychological Theory of Suicidal Behavior: Empirical Tests in Two Samples of Young Adults

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Abstract

The interpersonal-psychological theory of suicidal behavior (Joiner, 2005) makes two overarching predictions: 1) that perceptions of burdening others and of social alienation combine to instill the desire for death; and 2) that individuals will not act on the desire for death unless they have developed the capability to do so – a capability that develops through exposure and thus habituation to painful and/or fearsome experiences, and which is posited by the theory to be necessary to overcome powerful self-preservation pressures. Two studies test these predictions. In Study 1, the interaction of (low) family social support (cf. social alienation or low belonging) and feeling like one does not matter (cf. perceived burdensomeness) predicted current suicidal ideation, beyond depression indices. In Study 2, the three-way interaction between a measure of low belonging, a measure of perceived burdensomeness, and lifetime number of suicide attempts (viewed as a strong predictor of the level of acquired capability for suicide) predicted current suicide attempt (vs. ideation) among a clinical sample of suicidal young adults, again beyond depression indices and other key covariates. Implications for the understanding, treatment, and prevention of suicidal behavior are discussed.

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Main Predictions of the Interpersonal-Psychological Theory of Suicidal Behavior: Empirical Tests in Two Samples of Young Adults

The interpersonal-psychological theory of suicidal behavior (Joiner, 2005) proposes that an individual will not die by suicide unless s/he has both the desire to die by suicide as well as the ability to do so. What is the desire for suicide, and what are its component parts? What is the ability to die by suicide and in whom and how does it develop?

In answer to the first question of who desires suicide, the theory asserts that when people hold two specific psychological states in their minds simultaneously, and when they do so for long enough, they develop the desire for death. The two psychological states are *perceived burdensomeness* and *a sense of low belongingness or social alienation*. In answer to the second question regarding capability for suicide, self-preservation is a powerful enough instinct that few can overcome it by force of will. The few who can have developed a fearlessness of pain, injury, and death, which, according to the theory, they acquire through a process of repeatedly experiencing painful and otherwise provocative events, often through previous self-injury, but also through other experiences (e.g., repeated accidental injuries; numerous physical fights; occupations like physician and front-line soldier in which exposure to pain and injury, either directly or vicariously, is common).

What is the extant empirical and other evidence that supports this conceptualization? Some of it is indirect, though a growing body of direct empirical findings is accruing. In the following sections, evidence and concepts regarding each of the theory's three main components are reviewed.

Perceived Burdensomeness

Perceived burdensomeness is the view that one's existence burdens family, friends, and/or society. This view produces the idea that "my death will be worth more than my life to family, friends, society, etc." – a view, it is important to emphasize, that represents a potentially fatal *misperception*. Past research, though not designed to test the interpersonal-psychological theory, nonetheless has documented an association between higher levels of perceived burdensomeness and suicidal ideation. DeCatanzaro (1995), for instance, found that perceived burdensomeness toward family was correlated with suicidal ideation among community participants and high-suicide-risk groups. Direct tests of the theory have been supportive as well. In two studies of suicide notes, Joiner et al. (2002) showed that raters detected more expressions of burdensomeness: 1) in the notes of people who had died by suicide vs. notes from those who intended to die but survived; and 2) in the notes of those who died by violent means vs. those who died by less violent means. In a study of psychotherapy outpatients, Van Orden, Lynam, Hollar, and Joiner (2006) showed that a measure of perceived burdensomeness was a robust predictor of suicide attempt status and of current suicidal ideation, even controlling for powerful suicide-related covariates like hopelessness.

Low Belonging/Social Alienation

A low sense of belongingness is the experience that one is alienated from others, not an integral part of a family, circle of friends, or other valued group. As with the research base on perceived burdensomeness, there is abundant evidence that this factor is implicated in suicidal behavior, though relatively little of this evidence derives from direct tests of the interpersonal-psychological theory. Indeed, a persuasive case can be made that, of all the risk factors for suicidal behavior, ranging from the molecular to the cultural levels, the strongest and most uniform support has emerged for indices related to social isolation (e.g., Boardman, Grimbaldeston, Handley, Jones, & Willmott, 1999). The connection between belonging (or its absence) and suicidality has been established for a number of diverse populations, including

young adolescents, college students, elderly individuals, and psychiatric inpatients (Roberts, Roberts, & Chen, 1998; Bonner & Rich, 1987; Osgood & Brant, 1990; Prinstein et al., 2000). Furthermore, suicide rates go down during times of celebration (when people pull together to celebrate; Joiner, Hollar, & Van Orden, 2006) *and* during times of hardship or tragedy (when people pull together to commiserate; President Kennedy's assassination; Biller, 1977). With regard to studies framed as direct tests of this aspect of the interpersonal-psychological theory, Conner, Britton, Sworts, and Joiner (2007) evaluated 131 methadone maintenance patients, and demonstrated that low feelings of belongingness predicted lifetime history of suicide attempts. As expected, in a fairly stringent test of specificity, this association was specific to suicidal behavior; belongingness was unrelated to unintentional overdoses. This specific association held even after a rigorous accounting for demographic characteristics, correlates of suicidal behavior, and other interpersonal variables.

Acquired Ability to Enact Lethal Self-Injury

While feelings of burdensomeness and low belongingness may instill a desire for suicide, they are not sufficient to ensure that desire will lead to a suicide attempt. Indeed, in order for this to occur, the theory suggests a third element must be present: namely, the acquired ability for lethal self-injury. This aspect of the theory suggests that the body is generally not designed to cooperate with its own early demise; therefore, suicide entails a fight with self-preservation motives. According to the theory, having fought this battle repeatedly and in different domains instills the capacity to stare down the self-preservation instinct—should an individual develop the desire to.

The basis for this proposition rests primarily on the principles of opponent-process theory, which suggests that with repeated exposure to an affective stimulus, the reaction to that stimulus shifts over time such that the stimulus loses its ability to elicit the original response and, instead, the opposite response is strengthened (Solomon, 1980). In light of this, it is hypothesized that the capability for suicide is acquired largely through repeated exposure to painful or fearsome experiences. This results in habituation and, in turn, a higher tolerance for pain and a sense of fearlessness in the face of death. Acquired capability is viewed as a continuous construct, accumulating over time with repeated exposure to salient experiences and influenced by the nature of those experiences such that more painful and provocative experiences will confer greater capacity for suicide.

A clear implication of this is that past suicidal behavior will habituate individuals to the pain and fear of self-injury, making future suicidality, on average, more likely. Indeed, a history of suicide attempts has been found to be a strong predictor of future suicidal behavior including death by suicide (Joiner et al., 2005; Brown, Beck, Steer, & Grisham, 2000). Moreover, Joiner and colleagues (2005) have found that individuals with past suicide attempts experienced more serious forms of future suicidality, as compared to others who did not have a history of suicidality and, crucially, this association was not accounted for by other variables (e.g., mood disorder status, personality disorder status, family history variables). Relatedly, it has also been found that individuals with a history of suicide attempts evidence higher pain tolerance in general (Orbach et al., 1997). Also, in a direct test of acquired capability, Van Orden, Witte, Gordon, Bender, and Joiner (2008) used a scale designed to tap the construct, and showed that number of past suicide attempts significantly predicted levels of acquired capability in a sample of clinical outpatients. The highest levels of acquired capability were reported by individuals with multiple past attempts, as the theory would predict.

Yet, acquiring the capacity for suicide is not limited to prior suicidal behavior—it can also be acquired through repeated experience with other painful and fear-inducing behaviors (e.g., non-suicidal self-injury, self-starvation, physical abuse, etc.). For instance, in the case of non-suicidal self-injury, prior research has suggested that the likelihood of suicide attempts is

greater in individuals who have a longer history of self-injury, use a greater number of methods, and report absence of physical pain during self-injury–all characteristics that are suggestive of habituation and tolerance (Nock, Joiner, Gordon, Richardson, & Prinstein, 2006).

Lastly, aside from direct exposure, the theory also posits that even exposure to others' pain and injury may produce the capacity for suicide. Physicians fit this hypothesis, evidencing high suicide rates despite many protective factors (Hawton, Clements, Sakarovitch, Simkin, & Deeks, 2001).

The Interactive Nature of the Theory

Thus far we have described each component of the theory in isolation, providing evidence for the independent effects of perceived burdensomeness, failed belongingness and acquired capability on levels of suicidality. We have not yet explored the interactive nature of theory, which posits a three-way interaction between these components. Particularly, the theory suggests that the *joint* occurrence of perceived burdensomeness and failed belongingness is sufficient to produce the desire to die, and that this desire translates into lethal or near-lethal behavior *only* in the presence of the acquired capacity for lethality.

Evidence on the interactive nature of the theory is therefore needed, and it is the purpose of the current effort to provide such evidence. To date, the only data that bear on the interactive aspects of the model were provided in two studies by Van Orden et al. (2008). In the first study on undergraduates, they showed that the statistical interaction between (high) burdensomeness and (low) belonging predicted current suicidal ideation; this occurred beyond important covariates, like depressive symptoms. A second study on psychotherapy outpatients also provided evidence for a statistical interaction between scores on an acquired capability measure and an index of perceived burdensomeness, such that acquired capability in the presence of high levels of perceived burdensomeness predicted clinician ratings of suicide risk—again, above and beyond the contribution of other risk factors (i.e., depression scores, gender, and age).

To date, no study has examined any aspect of the interpersonal-psychological theory in a representative community sample. Additionally, no study to date has tested the theory's overarching hypothesis, which proposes a three-way interaction between acquired capability, failed belongingness and perceived burdensomeness—specifically, that high levels of perceived burdensomeness will combine with low levels of belongingness to instill a desire for suicide and that this desire will only be acted upon in the presence of an acquired capacity for engaging in lethal self-injury. The current studies address these issues. Study 1 builds on Van Orden et al.'s (2008) finding that burdensomeness and low belonging interact to predict suicidal ideation, testing this aspect of the model with different measures in a large, diverse, and representative community sample of young people. Study 2 examines whether acquired capacity, perceived burdensomeness, and low belonging interact as hypothesized to predict suicide attempt status in a clinical sample of young adults.

Study 1

Study 1 examines the question: "who wants to die by suicide?" and tests the hypothesis that the joint presence of failed belongingness and perceived burdensomeness predicts suicidal ideation. Supportive results would corroborate this portion of the interpersonal-psychological theory, would replicate the findings of Van Orden et al. (2008), and would extend Van Orden et al.'s results to a large, diverse, and representative sample using distinct measures, thus further supporting the theory's construct validity.

Method

Participants—The sample consists of 815 individuals (438 females and 377 males), ranging from 19 to 26 years of age at the time of interviews and assessments used in the current paper. All participants endorsed either/both of the sadness and/or the anhedonia symptoms of major depression in a structured interview (described in more detail below) and thus were not "skipped out" of the interview and were administered the items on suicidality, a focus of the current report. These 815 participants represent a subsample of a larger sample of 1763 with complete data on all study variables, the other 948 of whom endorsed neither the sadness nor the anhedonia symptom of major depression and thus were not assessed on other symptoms including suicidality.

Several points bear emphasis regarding this issue. First, all analyses were re-run using the entire sample of 1763 with values corresponding to no suicidality inserted for the 948 participants who denied sadness and anhedonia. All effects were in the same direction and of stronger magnitude in the full sample of 1763 than in the subsample of 815; here, we report results for the subsample, because their data required no imputation for missing data points, and because the lower effect sizes in this subsample probably represent conservative estimates. Second, the subsample of 815 were similar to the larger sample with regard to ethnicity and age (reported on below), but were not similar with regard to gender. The larger sample had a somewhat higher percentage of men than women (53% vs. 47%), whereas the subsample, all of whom had at least one depressive symptom, had a somewhat higher percentage of women than men (54% vs. 46%). Given the well-known gender differences in depression, this pattern was as expected. Third, we re-ran all analyses in the subsample of 815 with gender as a covariate, and the direction, magnitude, and significance of results were highly similar. Finally, the subsample of 815 participants can be viewed as clinically relevant, in light of the facts that they each reported at least one depressive symptom and that subclinical depressive symptoms have been shown to represent a significant health problem in their own right (Judd, 1997).

The study from which this sample was drawn builds on a previous investigation of mostly male participants based in the Miami-Dade public school system (Vega & Gil, 1998). All 48 of the county's public middle schools and all 25 public high schools and alternative schools participated in the previous investigation. The original sample, consisting of 9,763 males and 669 females expected to enter the 6^{th} or 7^{th} grade in 1990, was configured to reflect the ethnic composition of all middle schools in the county. From this sample, a random sample of 1,264 male and all 669 female participants were selected for follow-up. To supplement the smaller sample of females, the Miami-Dade county sixth and seventh grade class roster from the year of initial data collection was employed as the sampling pool. Random samples were drawn within each of four ethnic groups (African-American, Non-Hispanic White, Cuban Hispanic, non-Cuban Hispanic), such that 25 percent of the more than 900 additions fell within each ethnic category. Overall, 70.1 percent of those searched for were successfully interviewed. By far the greatest loss (41.8 percent) occurred among the new sample of females who had no previous involvement in the study. Although a significant number of the target sample had left the area for college or other reasons, 76.4 percent of those previously studied were interviewed. Although the lowest refusal rate (5.1%) occurred among African Americans, this combined with the highest rate of "not found" (21.7%) for a slightly lower follow-up success rate of 72.3 percent.

Comparisons of those interviewed with the random sample drawn from the original study population revealed no statistically significant differences on a wide array of early adolescent behaviors and family characteristics that are likely to be relevant to mental health and substance use risks. Comparisons were also made with respect to school drop out. Among those interviewed, 20.5 percent reported that they had dropped out of high school. This corresponds closely with rates reported by the school board on the same student cohort of 21.1 percent for

males and 15.2 percent for females (Dade County School Board, 2000). These comparisons and the 76.4 percent follow-up success rate indicate that the sample is reasonably representative of the population from which it was drawn. In contrast, the 58.2 percent success rate among the supplementary sample of new girls was found to be associated with a significant bias with respect to parental socioeconomic status. To correct for this bias, female participants were differentially weighted in all analyses to achieve a distribution on socioeconomic status that approximates that observed for male participants. Because roughly equal numbers of non-Hispanic whites, Cubans, other Hispanics, and African Americans were sampled, the data were also weighted to population values with respect to ethnicity and gender. These weightings made no difference in terms of effects reported below; we thus report unweighted data.

The ethnic breakdown of the 815 participants was as follows: 22.3% African-American; 26.1% Non-Hispanic White; 45.3% Hispanic; 2.9% Black Hispanic; 3.3% other. The average age of the sample was 20.02 (SD = 0.95).

Measures

Mattering: We utilized Rosenberg's five item scale to assess perceptions of mattering, a similar construct to the interpersonal-psychological theory's perceived burdensomeness. Items inquire about how respondents think others feel about them. They include, for example, "How important do you feel you are to other people?" and "How much do other people depend on you?" Response categories include not at all (1), a little (2), somewhat (3), and a lot (4). Consistent with prior assessment of this scale (DeForge & Barclay 1997), the measure is internally reliable, with an alpha of .72 for this sample, and consistent alphas were observed within ethnic groups. Like all other variables in this report, higher scores indicate a worse state of affairs – in this case, a lesser sense of mattering.

Family Social Support: Studies indicate that among adolescents and young adults, family support is a stronger predictor of suicide attempt status than peer support or more general measures of social support (Flouri & Buchanan, 2002; Morano, Cisler, & Lemerond, 1993). Thus, the family may be an especially important source of belonging for young people, that when failed, increases risk for suicidal ideation. Therefore, for the current study, we chose to measure family social support using a modified and shortened version of the Provisions for Social Relations Scale. Information on the reliability and construct validity of this measure is reported in prior studies (Turner et al., 1983; Turner & Marino, 1994). Respondents were asked 14 questions regarding whether they (1) strongly agree; (2) agree; (3) neither agree nor disagree; (4) disagree; or (5) strongly disagree that their relatives are willing to listen to or talk about their worries and problems, and that they feel loved and cared for by their families. An index of *family social support* was formed from the sum of these questions (α =.87).

Suicidal Ideation and Six-Month and Lifetime Major Depression: Data on current suicidal ideation, which was specified as ideation within "the last month," and six-month and lifetime occurrence of major depression were obtained through computer assisted personal interviews that allowed estimation of DSM-IV diagnoses. The basic instrument was the Michigan Composite International Diagnostic Interview (CIDI) that was employed in the NCS (Kessler, McGonagle, Zhao, & Nelson, 1994). The CIDI is a fully structured interview, based substantially on the Diagnostic Interview Schedule (DIS; Robins, Helzer, Croughan, & Ratcliff, 1981) and is designed to be administered by non-clinicians trained in its use (Robins, Wing, Wittchen, & Helzer, 1988; World Health Organization, 1990). Evidence for the validity of Michigan CIDI diagnostic estimates, evaluated against Structured Clinical re-interviews (Spitzer, Williams, Gibbon, & First, 1990), have been reported for most NCS disorders, including mood disorders (Blazer, Kessler, McGonagle, & Swartz, 1994).

Three suicide items, each scored dichotomously (zero or one), comprised the suicidality index. The items were "did you think a lot about death?," "did you feel so low you thought a lot about committing suicide?," and "did you make a plan as to how you might do it?" Possible scores on the summed index range from 0 to 3; these items cohere adequately (Kuder-Richardson Formula 20 [KR-20] = .74; Kuder & Richardson, 1937).[1]

Procedures—Following a letter to the individuals selected for participation informing them of the study, and a telephone call to invite participation, personal interviews were conducted from 1997 to 2000. The majority of the interviews were conducted in-person in the participants' homes, although 30 percent were conducted by telephone with the assistance of mailed response booklets. Subsequent analyses found no significant differences in the likelihood of reporting the presence or absence of psychiatric complaints by interviewing method (Barrett & Turner, 2005), which is consistent with previous research indicating that in-person and phone interviews yield comparable data (Aktan, Calkins, Ribisl, Kroliczak, & Kasim, 1997; Midanek, Hines, Greenfield, & Rogers, 1999; Rohde, Lewinsohn, & Seeley, 1997).

Data-Analytic Strategy—We used a hierarchical, multiple regression approach, predicting participants' suicidal ideation. Lifetime and six-month major depression were entered first as covariates, so as to anticipate and address the criticism that effects are merely due to depression (important, in that predictors and outcome could all be viewed as just part of a depressive syndrome); next, mattering and family social support were entered; finally, most relevant to the study's main hypothesis, the two-way interaction between mattering and family social support was entered.[2]

Results and Discussion

Preliminary analyses—Means, standard deviations, and intercorrelations for all variables are presented in Table 1. As expected, mattering and family social support were positively and significantly correlated, though not to the degree that multicollinearity in the regression analyses was a major concern. As expected, both mattering and family social support were significantly correlated with suicidal ideation as well as with both depression indices. The percentage of participants reporting some level of suicidal ideation (i.e., scores greater than 0) was relatively high (37.5%), as were the 6-month and lifetime depression prevalence rates. These rates are as expected given that everyone in the sample endorsed at least one depressive symptom, as well as the fact that these participants were born in approximately 1980, and this cohort has been shown to have higher rates of depression than those born earlier (Kessler & Walters, 1998).

[1]We also considered the possibility that a hierarchical structure might exist among the three items used to assess suicidal ideation. To address this possibility, scores were recalculated using three hierarchical approaches. First, we rank-ordered each item such that endorsing suicide plans was weighted more heavily than endorsing suicidal thoughts and thoughts about death, respectively. Then, an 8-point scale was developed as an index of the number and severity of items endorsed (e.g., denying all items would result in a score of 0 and endorsing every item positively would result in a 7). In the second approach, having suicidal plans was given precedence over all other responses; therefore, endorsing suicide plans resulted in a higher score than if plans were not endorsed, regardless of the total number of items endorsed. The final approach again weighted suicide plans over suicide ideation and thoughts of death, respectively. However, in this conceptualization, higher-ranked items were only counted if lower-ranked items were endorsed. Therefore, thoughts of death must always have been endorsed in order to obtain a score greater than 0. Using each of these three approaches, analyses were re-run. Findings were highly consistent with the results presented above using the original scale.

[2]We acknowledge that some concern might arise from using linear multiple regression on the skewed, zero-inflated suicidal ideation data. To address the skew, a square root transformation was used, decreasing the skew from 1.38 to 0.79; results remained consistent with those found originally. Furthermore, a logistic regression was also conducted in which suicidal ideation was treated as a dichotomous variable such that individuals who endorsed "death ideation," "suicide thoughts," or "suicide plans" were assigned a "1" and individuals who did not were assigned a "0." While results were in line with those of the linear multiple regression analysis, effects were attenuated. Since we argue that is more appropriate to conceptualize suicidal ideation as a continuous variable, we hesitate to use this approach since dichotomizing a continuous variable would considerably reduce information value and statistical power.

Mattering, Family Social Support, and Their Interaction as Predictors of Suicidal Ideation—A regression equation was constructed with suicidal ideation as the dependent variable. To statistically control for six-month and lifetime depression rates, these variables were entered into the equation in the first step. Main effects of mattering and family social support were entered in the second step. Finally, the two-way interaction of mattering and family social support, the crucial test of our main hypothesis, was entered in the last step.

In step 1, a model containing 6-month and lifetime depression rates significantly predicted suicidal ideation ($F(2, 812) = 82.43$, $p < .05$), with the 6-month variable marginally, and the lifetime variable, significantly, related to suicidal ideation. In step 2, a model containing the main effects of mattering and family social support significantly predicted current suicidal ideation beyond the covariates ($F(2, 810) = 17.31$, $p < .05$; see Table 2). Mattering marginally predicted suicidal ideation (*partial correlation [pr]* = .06, $t(810) = 1.75$, $p < .10$), and family social support was a significant predictor of suicidal ideation ($pr = .17$, $t(810) = 4.77$, $p < .05$). Crucial to our hypothesis, in step three, the interaction of mattering and family social support predicted suicidal ideation once all other variables had been entered ($pr = .08$, $t(809) = 2.15$, $p < .05$). Neither gender nor ethnicity significantly moderated these effects.

To examine the form of the interaction, we followed the recommendations of Cohen, Cohen, West, and Aiken (2003) and plotted the regression line (with suicidal ideation as the dependent variable) as a function of levels of both mattering and family social support. Low levels were depicted as 1.5 standard deviations below the mean, medium levels were depicted as equal to the mean, and high levels were depicted as 1.5 standard deviations above the mean. As seen in Figure 1, the form of the interaction was as expected, with those low in mattering and low in family social support reporting the highest levels of suicidal ideation. Thus, in line with prediction, the combined presence of an index related to failed belongingness and one related to perceived burdensomeness may be especially pernicious with regards to the development of suicidal ideation.

Several limitations are important to consider when interpreting these findings, including the cross-sectional design, the use of proxy measures for belonging and burdensomeness, and the small effect sizes. First, employing a cross-sectional design prevents inferences from being made regarding the temporal relationship of predictors to outcome. Additionally, insofar as concerns may be raised about the proxy measures for belonging and burdensomeness, we recognize that the relationship between the constructs is not exact. In particular, the use of "mattering" as a proxy for burdensomeness may represent an issue, because it can be interpreted in two ways. First, it can be seen as a measure of how much of an influence or effect one has in another's life—in this instance, low mattering would therefore be equivalent to not having an influence or being ineffective and, thus, would be an appropriate proxy for burdensomeness. On the other hand, it can also be viewed as an indication of how close or connected one is to another, which may be interpreted as a measure of belonging. We doubt this latter view because: a) the correlation between mattering and social support in this study was .34, suggesting that mattering does not overlap highly with a measure that clearly is in the belongingness domain; and b) it does not accord particularly well with explaining why we obtained the predicted two-way interaction. Nevertheless, further study should focus on using measures that clearly differentiate and directly measure the constructs of burdensomeness and belonging. Indeed, the study we report next did just that.

The limitations of this study, however, are somewhat offset by its strengths. These include obtaining the predicted effects, not only in general, but also across gender and ethnicity, in a reasonably large and representative sample. This occurred even when controlling for powerful depression covariates, a fact that contradicts the view that the study's effects were merely due to depression. Yet, despite this, there remains a final key theory-related limitation of this study

that should be addressed: while Study 1 did allow a test of a key aspect of the interpersonal-psychological theory on suicidal ideation, it did not afford a test of the *entire* theoretical framework.

Study 2

Study 1 tested and corroborated an important component of the interpersonal-psychological theory, namely, that indices related to perceived burdensomeness and failed belonging would interact to predict suicidal ideation. Study 2 attempts something more comprehensive still as the first test to date of the theory's main overarching claim that the elements of suicidal ideation – perceived burdensomeness and low belonging – interact with the theory's third main construct, acquired capacity for lethal self-injury, to predict serious suicidal behavior. More specifically, the theory hypothesizes that the simultaneous presence of low belonging and perceived burdensomeness will not result in suicide attempts in the absence of the capability for engaging in suicidal behavior. We assess this hypothesis by examining whether the 3-way interaction between perceived burdensomeness, low belonging, and lifetime number of suicide attempts (which, according to the interpersonal-psychological theory, strongly influences level of acquired capability for suicide) predicts recent suicide attempt (versus suicidal ideation) in a clinical sample of young adults referred for serious suicidality.

Method

Participants—Participants for this study included 313 individuals (257 men [82%]; 56 women), evaluated as they entered a study on the efficacy of treatments for suicidal young adults (Rudd, Joiner, & Rajab, 1996). All participants were referred for severe suicidality (i.e., recent attempt, or ideation serious enough to warrant immediate evaluation for hospitalization) from two outpatient clinics, a 20-bed inpatient facility, and an emergency room, all affiliated with a major U.S. Army Medical Center. Approximately 40% of the sample had a diagnosis of major depressive disorder, about 15% had a bipolar spectrum diagnosis, around 13% had anxiety disorders, and about 5% had been diagnosed with a schizophrenia spectrum disorder. Nearly 20% of the sample had a co-morbid diagnosis of PTSD. Co-morbid substance use disorders were about equally as frequent. Overall, there was a high rate of comorbidity within the sample with the total number of diagnoses averaging around three. Average age was 22.17 (SD = 2.76). Sixty percent were Non-Hispanic White; 25.3% were African-American; 10.5% were Hispanic; 1.5% were Native American; 1.2% were Asian-American or Pacific Islander; ethnicity was not classified for the remaining 1%. Forty-four percent were single; 37% were married; 10% were separated; 7% were divorced; 1% were widowed. Age, marital status (married vs. not) and ethnicity (Non-Hispanic White vs. not) were used as covariates in the analysis described later, because each is a demographic correlate of suicidality (such that older, non-married, and Non-Hispanic White people, respectively, are at higher risk; McIntosh, 2002).

All patients provided full, informed, and written consent for research participation. All later received rigorous treatment (either a problem-solving treatment as described by Rudd, Joiner, & Rajab, 2000, or treatment-as-usual [often a few days of inpatient psychiatry then outpatient antidepressant medicines plus supportive therapy]).

Procedures—Assessments were conducted by clinical staff (two licensed doctoral-level psychologists, three licensed master's level professionals, and one advanced-level doctoral student). All staff were thoroughly trained and carefully monitored (see Rudd et al., 1996 for more information on procedures). The following measures were completed at the study's baseline session.

Measures

Psychosocial History: This interviewer-rated form assessed basic demographic information, personal history of suicide attempts, as well as family psychiatric background. Of particular interest in the present context, the form included a question on the number of previous suicide attempts. Participants in this sample had a mean number of 1.28 lifetime suicide attempts (SD = 3.62; range was from 0 to 50). The form also included assessment of whether entry into the study was occasioned by a recent suicide attempt (n = 125) or by serious ideation (n =188); this variable – recent attempt vs. ideation – serves as the dependent variable in the logistic regression analyses described below. Importantly, the most recent suicide attempt was not included in the lifetime suicide attempt total.

The form also asked about family history of suicide, depression, and bipolar disorder. These variables were used as covariates in regression analyses described below (as were others, also described below).

Negative Life Events (LES-Neg; Sarason, Johnson, & Siegel, 1978): The LES-Neg is a 57-item self-report measure of the occurrence of life stress. Items were rated on a four-point scale from 0 to 3. Events included on the scale are those that are less susceptible to reporting biases in that they are severe and salient (e.g., being arrested, illness or accident requiring hospitalization).

Burdensomeness and Belongingness Indices Derived from the Suicide Probability Scale: (SPS; Cull & Gill, 1988). The SPS is a 36-item, self-report measure of constructs related to suicidality. Items were rated on a 4-point non-weighted scale ranging from 0 (“none or a little of the time”) to 3 (“most or all of the time”). Several SPS items contain content clearly related to the constructs of perceived burdensomeness and belonging, and we used these items to construct measures thereof.

Regarding perceived burdensomeness, we used SPS items 6 (“I feel there is much I can do which is worthwhile”), 15 (“I feel I am not able to do many things well”), 17 (“I think that no one will miss me when I am gone”), and 24 (“I feel people would be better off if I were dead”). Coefficient alpha in this sample was .71, and it is of note that the two items with purest content related to perceived burdensomeness (i.e., “no one will miss me when I am gone” and “people would be better off if I were dead”) were the two strongest items according to item-total correlations. Regarding validity, face validity is adequate as reflected by item content, and the correlations between this SPS measure of burdensomeness and indices of depressive symptoms and hopelessness are very similar to those obtained in other samples using a validated measure of perceived burdensomeness (the Interpersonal Needs Questionnaire [INQ]; Van Orden et al., 2008). In an unselected sample of undergraduates (N = 88; Witte & Joiner, 2008) these SPS items were moderately correlated with the INQ burdensomeness subscale (r = .56, p < .001) and were less correlated with the INQ belongingness subscale (r = .28, p < .01). Using Cohen and Cohen’s t-test for comparing dependent r’s (Cohen & Cohen, 1983, p. 56–57), we determined that the correlation between the SPS burdensomeness items and INQ burdensomeness items was significantly stronger than the relationship between the SPS burdensomeness items and the INQ belongingness items (t = 3.38, df = 85, p < .01).

Regarding belongingness, we used SPS items 2 (“I feel many people care for me deeply”), 9 (“I feel isolated from people”), 10 (“I feel people appreciate the real me”), 12 (“I feel so lonely I cannot stand it”), and 23 (“I feel I don't have many friends I can count on”). Coefficient alpha in this sample was .76. Regarding validity, face validity is adequate as reflected by item content, and the correlations between this SPS measure of belonging and indices of depressive symptoms and hopelessness are very similar to those obtained in other samples using a validated measure of belonging (the Interpersonal Needs Questionnaire; Van Orden et al.,

2008). In an unselected sample of undergraduates (N = 88; Witte & Joiner, 2008) these SPS items were moderately correlated with the INQ belongingness subscale (r = .52, p < .001) and were less correlated with the INQ burdensomeness subscale (r = .30, p < .01). Again, Cohen and Cohen's t-test for comparing dependent correlations confirmed that the SPS belongingness subscale was significantly more associated with INQ belongingness than it was with INQ burdensomeness (t = 2.57, df = 85, p < .05).

A principal axis factor analysis forcing two factors, with oblique rotation, produced the expected pattern of loadings. For the burdensomeness factor, the highest loading was .70 for the item *I feel people would be better off if I were dead*. For the belongingness factor, the highest loading was .87 for the item *I feel many people care for me deeply*.

Diagnoses: Current and past diagnoses were assigned using a computerized version of the National Institute of Mental Health Diagnostic Interview Schedule (DIS), DSM-III-R version (see Blouin, Perez, & Blouin, 1988 for reliability data on computerized DIS). For the present study, we defined a past episode as one that occurred previous to assessment and had remitted. We have discussed standard administration procedures, as well as reliability and validity for the current study, in previous publications (e.g., Rudd et al., 1996). In addition, Metalsky (1989) used the computerized DIS and obtained the following reliability statistics for the diagnosis of Major Depression, using trained interviewers for comparison: Sensitivity = 83.3%; Specificity = 92.3%; Kappa = .82. Diagnoses of past and current major depression and bipolar disorder were used as covariates.

Millon Clinical Multiaxial Inventory Borderline Personality Disorder subscale: (MCMI; Millon, 1983). The original MCMI is a 175-item, true-false inventory designed for use with psychiatric patients. It contains numerous scales falling into two main categories corresponding to DSM's Axes I and II. For the present purposes, we focused on the MCMI subscale for borderline personality disorder, and used it as a covariate. The reliability and validity of the scale appears to be adequate (e.g., Craig, 1997; Millon, 1994). In the validation sample, KR-20 for this scale was .92. Congruence of various versions of the MCMI scales has been adequate (e.g., Marlowe, Festinger, Kirby, Rubenstein, & Platt, 1998).

Beck Depression Inventory: (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh 1961). The BDI is a 21-item self-report inventory of depressive symptoms. Each item is rated on a 0 to 3 scale; inventory scores thus may range from 0 to 63. The BDI includes one item (item 9) that directly assesses suicidal ideation; this item was included in the composite BDI scores. (Importantly, analyses were also run omitting this item and results were highly similar to those presented below.) The BDI is a reliable and well-validated measure of depressive symptomatology (Beck, Steer, & Garbin, 1988). The BDI was used as a covariate.

Beck Hopelessness Scale: (BHS; Beck, Weissman, Lester, & Trexler, 1974). The BHS includes 20 true-false items that assess pessimistic and hopeless cognitions (e.g., "I look forward to the future with hope and enthusiasm" [reversed]). The scale's reliability and validity have been supported (e.g., see Metalsky, Joiner, Hardin, & Abramson, 1993). The BHS was used as a covariate.

Data-Analytic Strategy—Our main data-analytic approach involved a logistic regression equation to examine the relation of the three-way interaction between SPS burdensomeness, SPS belonging, and lifetime number of suicide attempts to a variable reflecting whether or not the participants' recent suicidal crisis involved a suicide attempt. The following demonstrated correlates of suicidal behavior were controlled in the logistic regression analysis: demographic variables of age, marital status (married vs. not), and ethnicity (Non-Hispanic White vs. not); family history of suicide, depression, and bipolar disorder; current and past diagnoses of

depression and bipolar disorder; and scores on indices of depression, hopelessness, and borderline personality symptoms.

Results and Discussion

Means, standard deviations, and intercorrelations for all variables are presented in Table 3. Notably, symptom scores are elevated (e.g., BDI Mean = 19.59, SD = 11.96), as are rates of current and past depression, as would be expected. Further, all symptom scores are intercorrelated, also in line with expectation.

Does the 3-Way Interaction Between Perceived Burdensomeness, Low Belonging, and Lifetime Number of Suicide Attempts Predict Current Suicide Attempt Status?—In a logistic regression equation controlling for age, gender, marital status, and ethnicity, family history of suicide, depression, and bipolar disorder, current and past diagnoses of depression and bipolar disorder, and current depressive symptoms, hopelessness, and borderline personality disorder features, we used SPS burdensomeness, SPS belonging, lifetime number of attempts, and the 2-way interactions and the 3-way interaction between them, as predictors of whether or not participants' recent suicidal crisis involved a suicide attempt. Results are depicted in Table 4. The possibility of multicollinearity was also examined, given that current depressive symptoms and hopelessness scores were highly correlated with each other as well as SPS burdensomeness and belonging scores. To examine this possibility, analyses were also conducted omitting BDI and BHS scores as covariates. Results were highly consistent with those presented in Table 4.

Many of the effects displayed in the Table are notable (e.g., the main effect of lifetime number of suicide attempts on current suicide attempt status was strong, consistent with past research as well as with a tenet of the interpersonal-psychological theory), but we focus here on two findings in particular. First, the interpersonal-psychological theory does *not* predict that the two-way interaction will predict suicide attempt (the focus of this study), but rather, suicidal ideation (the focus of Study 1). Thus, in this context, the non-significant two-way interaction ($p = .15$ before entry of the three-way interaction) between SPS burdensomeness and SPS belonging is noteworthy.

Second, and crucial to the aims of the current study and to the interpersonal-psychological theory, the three-way interaction between SPS perceived burdensomeness, SPS low belonging, and lifetime number of suicide attempts predicted current suicide attempt status (Wald coefficient = 8.57, $p < .01$). Table 4 shows that the strength of this effect was similar to those for other traditionally strong predictors, such as the main effect for family history of suicide.

This test of the three-way interaction was the primary *inferential* test of Study 2, and the *p*-value is highlighted accordingly. Follow-up analyses, presented next, are *descriptive* derivatives of the interaction, and thus we present the *p*-values not inferentially but descriptively; in this way they highlight that the form of the interaction was in line with expectation. We also provide exponentiated beta (Exp[B]), which is an index of effect size.

Explication of the form of this interaction was conducted by examining the SPS burdensomeness by SPS belonging interaction in two groups: Those with no or 1 past attempt, and those with 2 or more past attempts (i.e., multiple attempters; this approach was guided by past work showing that multiple attempters are a distinct group in important ways; Rudd et al., 1996). The same extensive set of covariates was again used in all follow-up analyses. The pattern of results was as expected, with no evidence of an effect in non-multiple attempters (Wald = 0.22, Exp[B] = 1.00, $p = .64$) and evidence of a marginally significant effect in multiple attempters (Wald = 3.00, Exp[B] = 1.07, $p = .08$). Within the multiple attempter group, we performed a median split on the SPS belongingness index, and examined SPS burdensomeness

as a predictor of attempt status. As expected, SPS burdensomeness was a stronger predictor of attempt status in multiple attempters reporting high belongingness (Wald = 2.74, p = .17, Exp [B] = 1.51) than in multiple attempters reporting low belongingness (Wald = 0.14, p = .71, Exp [B] = .92).

This study is the first to test the interpersonal-psychological theory's key prediction that three variables – acquired capacity for suicidal behavior, perceived burdensomeness, and low belongingness – interact to predict suicidal behavior. Results supported this prediction. Still, some limitations should be considered in interpreting our findings. As in Study 1, this study's design was cross-sectional, and, furthermore, only lifetime number of suicide attempts was used as a measure of acquired capacity (whereas the theory asserts that past attempts represent just one source of acquired capacity). We were also unable to control for age during prior suicide attempts (although we did control for current age). Past attempts may have occurred longer ago for some participants than others (and acquired capacity could potentially have faded more for these individuals). Given the young age of our sample (mean of approximately 22 years), it seems unlikely that controlling for this variable would have had a large impact on our results, as most attempts likely occurred during a similar time frame for the participants. These limitations were offset somewhat by the study's strengths, including that predicted effects were obtained regarding a three-way interaction, in a relevant and relatively severe clinical sample. As in Study 1, predictions were supported even when controlling for an extensive list of powerful covariates.

General Discussion

The interpersonal-psychological theory of suicidal behavior (Joiner, 2005) proposes that an individual will not die by suicide unless he/she has both the desire and the capability to do so. The theory specifies that suicidal ideation results from the joint presence of two emotionally painful psychological states—low belongingness and perceived burdensomeness—and that acquired capability for suicide results from exposure and attendant habituation to the pain and fear involved in physical self-harm. Results of two studies presented here were consistent with this view.

Study 1 tested the prediction that the interaction of low family support (cf. low belongingness) and low mattering to others (cf. perceived burdensomeness) would predict severity of suicidal ideation. Results were consistent with this prediction and indicated that individuals with low levels of both family support and mattering to others experienced the most severe levels of suicidal ideation. Notably, both six-month and lifetime histories of depression were included as covariates, indicating that the theory's variables predicted suicidal ideation above and beyond the contribution of depression. These findings, consistent with the theory, suggest that when people hold two psychological states in their minds simultaneously—low belongingness and perceived burdensomeness—dangerous forms of suicidal ideation are likely to emerge.

Results of Study 1 (i.e., a significant interaction between indices of low belonging and perceived burdensomeness in the prediction of suicidal ideation) are consistent with previous findings (Van Orden et al., 2008) and build upon these findings due to strengths of the current study's sample and methods. Strengths of Study 1 include: 1) the use of an ethnically diverse sample, which supports the generalizability of the results; 2) the covariance of lifetime and six-month histories of major depressive disorder, which supports the specificity of the results (i.e., results are not merely due to depression); 3) the use of scales to measure low belongingness and perceived burdensomeness designed by research groups other than our own (i.e., effects are not dependent on the Interpersonal Needs Questionnaire used by Van Orden et al., 2008), which supports the construct validity of our results.

Study 2 tested the linchpin hypothesis of the interpersonal-psychological theory, namely, that the outcome of lethal or near-lethal suicidal behavior depends on the joint presence of low belongingness, perceived burdensomeness, and acquired capability for suicide. Results were in line with predictions and indicated that the three-way interaction of low belongingness, perceived burdensomeness, and levels of acquired capability (measured by number of past suicide attempts) predicted whether or not participants' suicidal crises involved suicide attempts versus suicidal ideation. Results indicated that the combination of high levels of both failed belongingness and perceived burdensomeness was most likely to translate into suicide attempts in the presence of higher levels of acquired capability (indicated by greater numbers of past attempts). Results were obtained above and beyond the contribution of numerous documented risk factors for suicidal behavior, including depression, hopelessness, and borderline personality disorder features. In line with the theory, these results suggest that individuals experiencing both low belongingness and perceived burdensomeness are most likely to act on suicidal ideation (i.e., attempt suicide) in the presence of the acquired capability to overcome self-preservation motives and to engage in suicidal behavior.

Interestingly, in a recent study conducted by Huth-Bocks, Kerr, Ivey, Kramer, and King (2007), the SPS outperformed measures of suicidal ideation, depression, and hopelessness (namely, the Suicidal Ideation Questionnaire-Junior, Reynolds Adolescent Depression Scale, and Beck Hopelessness Scale) in predicting future suicidal ideation and attempts in a sample of hospitalized adolescents. According to Huth-Bocks and colleagues, this may be because the SPS assesses a broad range of constructs theoretically related to suicidality. We would suggest, given the present findings and in light of the interpersonal-psychological theory, the roles of belonging and burdensomeness, in particular, might be the key constructs being assessed that may partially account for the SPS's strong predictive validity.

Strengths of Study 2 include the use of a sample with severe suicidal symptoms and a dependent measure that allowed for a rigorous test of the theory (i.e., differentiating between severe suicidal ideation/planning and suicide attempts). Results of Study 2 are consistent with previous findings (Van Orden et al., 2008) and extend previous findings by including all three components of the theory (i.e., low belonging, perceived burdensomeness, and acquired capability). This is the first study to test the three-way interaction between all three components of the theory and to include suicide attempts as an outcome; thus, the current study represents the most rigorous test thus far of the hypothesis that serious suicidal behavior (i.e., lethal or near lethal suicide attempts) is more likely when an individual simultaneously experiences failed belongingness, perceived burdensomeness, and acquired capability for lethal self-injury. Given the difficulty in predicting suicidal behavior due to the low base rates of non-lethal and lethal suicide attempts, theoretical advances that allow for the generation of increasingly precise predictions are especially useful. Results of the current studies suggest that the interpersonal-psychological theory represents one such theoretical advance, as it may improve the field's precision in the prediction of suicidal behavior.

The current studies, while consistent with the interpersonal-psychological theory, were limited by several factors that suggest directions for future research. As stated above, all of our results are cross-sectional, which was also a limitation of the Van Orden et al. (2008) studies. The interpersonal-psychological theory specifically predicts that acquired capability, perceived burdensomeness, and low belongingness are all jointly necessary and sufficient proximal *causes* of serious suicidal behavior. Although the current study does provide evidence of these constructs as non-spurious correlates of suicidal behavior (i.e., we controlled for key variables, such as depressive symptoms, family history of suicide, other mood disorders, etc.), the case for causality is weakened without evidence for temporal precedence. Our results provide a firm foundation for future work that aims to examine this three-way interaction longitudinally.

Another limitation is our use of proxy variables for some of the constructs (e.g., past attempts for acquired capability). For the current studies, we did not have access to measures specifically designed to assess the interpersonal-psychological theory's constructs. However, as mentioned above, results conformed to predictions using measures other than the Interpersonal Needs Questionnaire (Van Orden et al., 2008) and the Acquired Capability Scale (Van Orden et al., 2008), indicating that previous findings are not specific to measures designed by our laboratory and thereby supporting the construct validity of the theory. However, our use of past suicide attempts as an indicator of acquired capability in Study 2 warrants attention as a direction for future research. The interpersonal-psychological theory specifies that acquired capability for lethal self-injury is the proposed mechanism for the documented link between past and future suicidal behavior (e.g., Joiner et al., 2005). As such, the number of past attempts is not a "pure" measure of acquired capability, although it remains a potent predictor of the presence of the acquired capability. This stems from the proposition that, according to the theory, there exists a plethora of possible pathways that may increase the level of acquired capability for suicide —past suicide attempts is just one. Furthermore, even within the domain of suicide attempts alone, not all attempts will have an equal effect on the level acquired capacity, given that suicide attempts will vary on important parameters such as intent, means, and severity of outcome. Future research is needed to disentangle the complex relations between suicide attempts, acquired capacity, and future episodes of suicidal behavior.

Relatedly, Study 2 was also limited by the lack of information available on prior combat exposure, which, in conjunction with past suicide attempts, might have resulted in a better approximation of the level of acquired capability in the sample. Indeed, according to the theory, combat exposure would certainly be a potential source for habituating to painful and provocative experiences and, consequently, acquiring the capability to enact lethal self-injury. Given its salience to acquired capability, future studies using similar populations to examine this construct should include measures of prior experiences in combat.

An additional limitation—and direction for future research—involves our examination of non-lethal suicidal behavior (i.e., attempts, ideation) rather than death by suicide. The interpersonal-psychological theory, unlike many other theories of suicidal behavior, is unique in that it attempts to differentiate individuals likely to engage in lethal or near-lethal suicide attempts from those who desire suicide or make low-lethality attempts. Thus, the ultimate goal of this theory is to prevent death by suicide by determining more sensitive and specific predictors of it. Studies examining failed belongingness, perceived burdensomeness, acquired capability, and death by suicide are needed to fully test the theory.

A final limitation involves relatively small effect sizes. Although our effect sizes are, in some cases, small, our results conformed to stringent, a priori hypotheses, persisted after controlling for numerous, clinically relevant variables, and were similar in some cases to effects for variables with traditionally strong effects.

In closing, we consider clinical implications of our findings as well as future directions for research on clinical applications of the interpersonal-psychological theory. Results of Study 2 —that the three-way interaction of low belonging, perceived burdensomeness, and acquired capability significantly predicted suicide attempt status—suggest that it would be advisable for clinicians to be cognizant of their patients' levels of belongingness, burdensomeness, and acquired capability (especially previous suicide attempts), as this knowledge may aid clinicians in the task of suicide risk assessment. Regarding low belongingness, clinicians should assess the degree to which patients feel connected to—and cared about—by others, being especially alert for instances in which belonging is completely absent. Patients can be asked if they have someone to call when they are upset, if they live alone, how often they see friends, etc. Regarding perceived burdensomeness, clinicians can pose the following to patients:

"Sometimes my patients tell me they think, 'the people in my life would be better off I was gone.' Do you ever think that?" To further assess these two constructs clinicians may wish to administer questions from the Suicide Probability Scale (Cull & Gill, 1988), which was used to assess levels of burdensomeness and belongingness in Study 2, or the Interpersonal Needs Questionnaire (Van Orden et al., 2008).

We suggested above that studies demonstrating the temporal precedence of low belongingness, perceived burdensomeness, and acquired capability are needed to corroborate the hypothesis of the theory that these constructs are proximal causes of serious suicidal behavior. A clinically relevant method to examine temporal precedence involves examining mechanisms of change in therapeutic interventions for suicidal behavior. For example, studies could examine the hypothesis that targeting low belongingness and perceived burdensomeness in therapy will lead to reductions in suicidal ideation. Such interventions could use a cognitive therapy approach; for example, targeting the potentially fatal cognitive distortion, "my death will be worth more than my life to family, friends, society, etc." (cf., perceived burdensomeness). Interventions could also take a behavioral approach and encourage suicidal patients to engage in activities likely to foster social connections as well as activities that involve helping others (Linehan's [1993] Dialectical Behavior Therapy Skills Training Manual lists 176 pleasant activities that are helpful in this regard). If reductions in suicidal ideation following these interventions are found to be due to alleviations in low belongingness and perceived burdensomeness, these findings would support the causal role of the theory's constructs, as well as the utility of addressing these constructs in interventions for suicidal behavior.

In support of these clinical applications of the theory, the only intervention that has been shown in a randomized controlled trial to be effective in preventing deaths by suicide is an outreach intervention that involved mailing letters expressing concern to high-risk individuals who refused further treatment after hospitalization (Motto & Bostrom, 2001). Although not directly tested by Motto and Bostrom (2001), it may well be that increasing belongingness is the mechanism whereby the intervention prevented deaths by suicide; indeed, it was Motto and Bostrom's view that this was so. Our results regarding the interactive nature of the theory are consistent with the (potentially) life-saving role of increasing belongingness in this intervention and suggest that altering even just one of the three constructs (i.e., low belonging, perceived burdensomeness, or acquired capability) may substantially reduce risk for suicide.

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References

Aktan GB, Calkins RF, Ribisl KM, Kroliczak A, Kasim RM. Test-retest reliability of psychoactive substance abuse and dependence diagnoses in telephone interviews using a modified diagnostic interview schedule-substance abuse module. American Journal of Drug and Alcohol Abuse 1997;23:229–248. [PubMed: 9143636]

Barrett AE, Turner RJ. Family structure and mental health: The mediating effects of socioeconomic status, family process and social stress. Journal of Health and Social Behavior 2005;46:156–169. [PubMed: 16028455]

Beck AT, Steer RA, Garbin MG. Psychometric properties of the Beck Depression Inventory: Twenty-five years of evaluation. Clinical Psychology Review 1988;8:77–100.

Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J. An inventory for measuring depression. Archives of General Psychiatry 1961;4:561–571. [PubMed: 13688369]

Beck AT, Weissman A, Lester D, Trexler L. The measurement of pessimism: The Hopelessness Scale. Journal of Consulting and Clinical Psychology 1974;42:861–865. [PubMed: 4436473]

Biller OA. Suicide related to the assassination of President John F. Kennedy. Suicide and Life Threatening Behavior 1977;7:40–44. [PubMed: 349785]

Blazer DG, Kessler RC, McGonagle KA, Swartz MS. The prevalence and distribution of major depression in a national community sample: The National Comorbidity Survey. American Journal of Psychiatry 1994;151:979–986. [PubMed: 8010383]

Blouin AG, Perez EL, Blouin JH. Computerized administration of the Diagnostic Interview Schedule. Psychiatry Research 1988;23:335–344. [PubMed: 3387505]

Boardman AP, Grimbaldeston AH, Handley C, Jones PW, Willmott S. The North Staffordshire suicide study: a case-control study of suicide in one health district. Psychological Medicine 1999;29:27–33. [PubMed: 10077291]

Bonner RL, Rich AR. Toward a predictive model of suicidal ideation and behavior: Some preliminary data in college students. Suicide & Life-Threatening Behavior 1987;17:50–63. [PubMed: 3590271]

Brown G, Beck AT, Steer R, Grisham J. Risk factors for suicide in psychiatric outpatients: A 20-year prospective study. Journal of Consulting and Clinical Psychology 2000;68:371–377. [PubMed: 10883553]

Cohen, J. Statistical power analysis for the behavioral sciences. Hillsdale, NJ: Lawrence Erlbaum Associates; 1988.

Cohen, J.; Cohen, P. Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences. 2nd Ed.. Hillsdale, NJ: Erlbaum; 1983.

Cohen, J.; Cohen, P.; West, SG.; Aiken, LS. Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences. 3rd Edition. Mahwah, NJ: Lawrence Erlbaum Associates; 2003.

Conner K, Britton P, Sworts L, Joiner T. Suicide attempts among individuals with opiate dependence: The critical role of felt belonging. Addictive Behaviors 2007;32:1395–1404. [PubMed: 17097813]

Craig RJ. Sensitivity of MCMI-III scales T (drugs) and B (alcohol) in detecting substance abuse. Substance Use and Misuse 1997;32:1385–1393. [PubMed: 9286006]

Cull, JG.; Gill, WS. The suicide probability scale. Los Angeles: Western Psychological Services; 1988.

DeCatanzaro D. Reproductive status, family interactions, and suicidal ideation: Surveys of the general public and high-risk groups. Ethology & Sociobiology 1995;16:385–394.

DeForge BR, Barclay DM. The internal reliability of a general mattering scale in homeless men. Psychological Reports 1997;80:429–430. [PubMed: 9129362]

Flouri E, Buchanan A. The protective role of parental involvement in adolescent suicide. Crisis: The Journal of Crisis Intervention and Suicide Prevention 2001;23:17–22.

Hershberger SL, Pilkington NW, D'Augelli AR. Predictors of suicide attempts among gay, lesbian, and bisexual youth. Journal of Adolescent Research 1997;12:477–497.

Hawton K, Clements A, Sakarovitch C, Simkin S, Deeks JJ. Suicide in doctors: A study of risk according to gender, seniority, and specialty in medical practitioners in England and Wales, 1979–1995. Journal of Epidemiology and Community Health 2001;55:296–300. [PubMed: 11297646]

Hoyer G, Lund E. Suicide among women related to number of children in marriage. Archives of General Psychiatry 1993;50:134–137. [PubMed: 8427553]

Huth-Bocks A, Kerr D, Ivey A, Kramer A, King C. Assessment of psychiatrically hospitalized adolescents: Self-report instruments as predictors of suicidal thoughts and behavior. Journal of the American Academy of Child and Adolescent Psychiatry 2007;46:387–395. [PubMed: 17314725]

Joiner, TE. Why people die by suicide. Cambridge, MA: Harvard University Press; 2005.

Joiner TE, Conwell Y, Fitzpatrick KK, Witte TK, Schmidt NB, Berlim MT, et al. Four studies on how past and current suicidality relate even when "everything but the kitchen sink" is covaried. Journal of Abnormal Psychology 2005;114:291–303. [PubMed: 15869359]

Joiner TE Jr, Hollar D, Van Orden KA. On Buckeyes, Gators, Super Bowl Sunday, and the Miracle on Ice: "Pulling Together" is associated with lower suicide rates. Journal of Social and Clinical Psychology 2006;25:180–196.

Joiner T, Pettit JW, Walker RL, Voelz ZR, Cruz J, Rudd MD, et al. Perceived burdensomeness and suicidality: Two studies on the suicide notes of those attempting and those completing suicide. Journal of Social & Clinical Psychology 2002;21:531–545.

Joiner TE, Steer RA, Brown G, Beck AT, Pettit JW, Rudd MD. Worst-point suicidal plans: A dimension of suicidality predictive of past attempts and eventual death by suicide. Behaviour Research and Therapy 2003;41:1469–1480. [PubMed: 14583414]

Judd LL. The clinical course of unipolar major depressive disorders. Archives of General Psychiatry 1997;54:989–991. [PubMed: 9366654]

Kessler RC, McGonagle KA, Zhao S, Nelson CB. Lifetime and 12-month prevalence of DSM-III-R psychiatric disorders in the United States: Results from the national comorbidity study. Archives of General Psychiatry 1994;51:8–19. [PubMed: 8279933]

Kessler RC, Walters EE. Epidemiology of DSM-III-R major depression and minor depression among adolescents and young adults in the national comorbidity survey. Depression and Anxiety 1998;7:3–14. [PubMed: 9592628]

Kuder GF, Richardson MW. The theory of the estimation of test reliability. Psychometrika 1937;2:151–160.

Linehan, MM. Skills Training Manual for Treating Borderline Personality Disorder. New York: Guilford; 1993.

Marlowe DB, Festinger DS, Kirby KC, Rubenstein DF, Platt JJ. Congruence of the MCMI-II and MCMI-III in cocaine dependence. Journal of Personality Assessment 1998;71:15–28. [PubMed: 9807228]

McIntosh, JL. U.S.A. statistics for the year 1999: Overheads and a presentation guide. Washington, D.C: American Association of Suicidology; 2002.

Metalsky GI. Reliability of Computerized Diagnostic Schedule: Major Depression. 1989 Unpublished data.

Metalsky GI, Joiner TE, Hardin TS, Abramson LY. Depressive reactions to failure in a naturalistic setting: A test of the hopelessness and self-esteem theories of depression. Journal of Abnormal Psychology 1993;102:101–109. [PubMed: 8436686]

Midanek L, Hines AM, Greenfield TK, Rogers JD. Face-to-face versus telephone interviews: Using cognitive methods to assess alcohol survey questions. Contemporary Drug Problems 1999;26:673–693.

Millon, T. Millon Clinical Multiaxial Inventory. Minneapolis, MN: Interpretive Scoring Systems; 1983.

Millon, T. Personality disorders: Conceptual distinctions and classification issues. In: Costa, PT.; Widiger, TA., editors. Personality Disorders and the Five-Factor Model of Personality. Washington, D.C: American Psychological Association; 1994. p. 279-301.

Morano CD, Cisler RA, Lemerond J. Risk factors for adolescent suicidal behavior: Loss, insufficient familiar support, and hopelessness. Adolescence 1993;28:851–865. [PubMed: 8266839]

Motto JA, Bostrom AG. A randomized controlled trial of postcrisis suicide prevention. Psychiatric Services 2001;52:828–833. [PubMed: 11376235]

Nock M, Joiner T, Gordon K, Lloyd-Richardson E, Prinstein M. Non-suicidal self-injury: Diagnostic correlates and relation to suicide attempts. Psychiatry Research 2006;144:65–72. [PubMed: 16887199]

Orbach I, Mikulincer M, King R, Cohen D, Stein D. Thresholds and tolerance of physical pain in suicidal and nonsuicidal adolescents. Journal of Consulting and Clinical Psychology 1997;65:646–652. [PubMed: 9256566]

Osgood NJ, Brant BA. Suicidal behavior in long-term care facilities. Suicide & Life-Threatening Behavior 1990;20:113–122. [PubMed: 2117308]

Prinstein M, Boergrs J, Spirito A, Little T, et al. Peer functioning, family dysfunction and psychological symptoms in a risk factor model for adolescent inpatients' suicidal ideation severity. Journal of Clinical Child Psychology 2000;29(3):392–405. [PubMed: 10969423]

Roberts RE, Roberts CR, Chen YR. Suicidal thinking among adolescents with a history of attempted suicide. Journal of the American Academy of Child & Adolescent Psychiatry 1998;37:1294–1300. 12. [PubMed: 9847502]

Robins LN, Wing J, Wittchen HU, Helzer JE. The composite international diagnostic interview: An epidemiologic instrument suitable for use in conjunction with different diagnostic systems and in different cultures. Archives of General Psychiatry 1998;45:1069–1077. [PubMed: 2848472]

Rohde P, Lewinsohn PM, Seeley JR. Comparability of telephone and face-to-face interviews in assessing axis I and II disorders. American Journal of Psychiatry 1997;154:1593–1598. [PubMed: 9356570]

Rudd MD, Joiner TE, Rajab MH. Relationships among suicide ideators, attemptors, and multiple attemptors in a young-adult sample. Journal of Abnormal Psychology 1996;105:541–550. [PubMed: 8952187]

Rudd, MD.; Joiner, TE.; Rajab, MH. Treating suicidal behavior. New York: Guilford: 2000.

Sarason I, Johnson J, Siegel J. Assessing the impact of life changes: Development of the Life Experiences Survey. Journal of Consulting and Clinical Psychology 1978;46:932–946. [PubMed: 701572]

Solomon RL. The opponent-process theory of acquired motivation: The costs of pleasure and benefits of pain. American Psychologist 1980;35:691–712. [PubMed: 7416563]

Spitzer, RK.; Williams, JBW.; Gibbon, M.; First, MB. User's Guide for the Structured Clinical Interview for DSM-III-R: SCID. Washington, D.C: American Psychiatric Association; 1990.

Tomassini C, Juel K, Holm NV, Skytthe A, Christensen K. Risk of suicide in twins: 51 year follow up study. British Medical Journal 2003;327:373–374. [PubMed: 12919989]

Turner, RJ.; B.Frankel, BG.; Levin, DM. Social support: Conceptualization, measurement and implications for mental health. In: Greenley, J., editor. Community and Mental Health. Greenwich, CT: JAI Press; 1983. p. 67-110.

Turner JR, Marino F. Social support and social structure: A descriptive epidemiology. Journal of Health and Social Behavior 1994;35:193–212. [PubMed: 7983334]

Van Orden KA, Lynam ME, Hollar D, Joiner TE Jr. Perceived Burdensomeness as an Indicator of Suicidal Symptoms. Cognitive Therapy and Research 2006;30:457–467.

Van Orden KA, Witte TK, Gordon KH, Bender TW, Joiner TE. Suicidal desire and the capability for suicide: Tests of the interpersonal-psychological theory of suicidal behavior among adults. Journal of Consulting and Clinical Psychology 2008;76:72–83. [PubMed: 18229985]

Vega, WA.; Gil, AG. Longitudinal Research in the Social and Behavioral Sciences: An Interdisciplinary Series. New York: Plenum Press; 1998. Drug use and ethnicity in early adolescence.

Witte TK, Joiner TE. [Convergent Validity of SPS items]. 2008 Unpublished raw data.

World Health Organization. Composite International Diagnostic Interview. 1990. Retrieved on February 13, 2008, from http://www.hcp.med.harvard.edu/wmhcidi/about.php

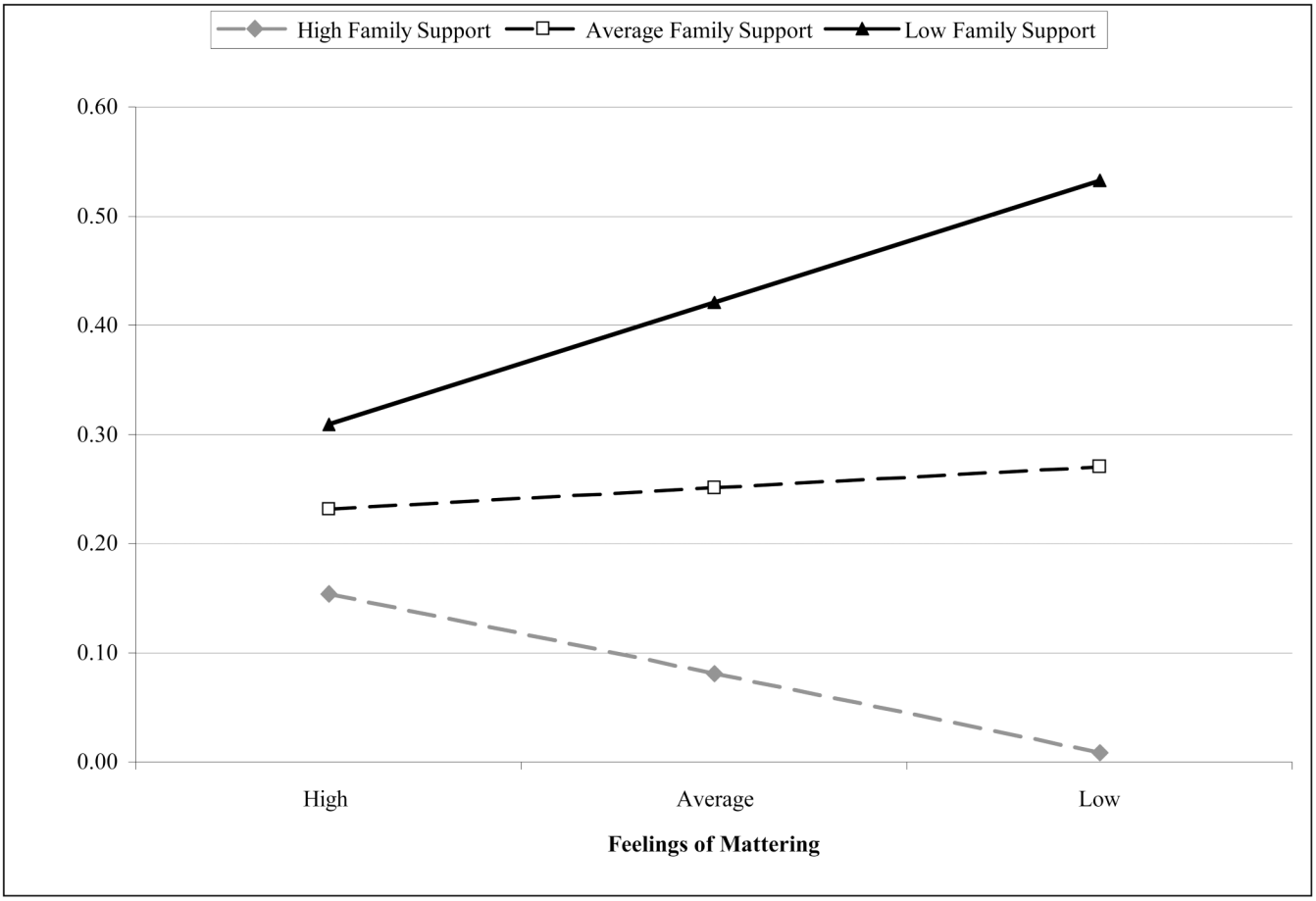

Figure 1.
Study 1: Interaction of Mattering and Family Social Support in the Prediction of suicidal ideation

Table 1

Means and Standard Deviations for, and Intercorrelations Between, All Measures for Study 1 (N = 815)

	1	2	3	4	5
1. Lifetime Depression	--				
2. Depression Last 6 Months	.62**	--			
3. Mattering	.12**	.16*	--		
4. Family Support	.14**	.15**	.34**	--	
5. Suicidal Ideation	.40**	.29**	.16**	.23**	--
MEAN	.38	.19	8.20	31.90	.63
SD	.49	.39	2.40	9.79	.96

Note. The correlations between Mattering and Family Support and Suicidal Ideation are positive because higher scores on all of these variables indicate more severe problems in those areas.

Table 2

Hierarchical Multiple Regression Equation Predicting Current Suicidal Ideation in Study 1 (N = 815)

	Predictors Entered in Set	*F* for set	R^2	*t* for Predictors	df	β	*p*
1		82.07	.17		812		<.01
	Lifetime Depression			1.76		.07	.08
	Depression in Last 6 Months			8.92		.36	.001
2		15.67	.20		810		<.01
	Low Family Support			4.77		.16	.001
	Low Mattering			1.75		.06	.08
3		4.62	.20		809		.03
	Low Support × Low Mattering			2.15		.34	.03

Note. High scores on Low Family Support and Low Mattering are indicative of lower family support and lower mattering.

Table 3

Means and Standard Deviations for, and Intercorrelations Between, All Measures for Study 2 (N = 313)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Age	--																
2. Gender	.02	--															
3. Family Suicide	.11	−.06	--														
4. Family Depression	.02	−.05	.34**	--													
5. Family Manic	.02	−.11*	.12*	.24**	--												
6. LES Neg	−.02	−.01	.13*	.17*	.02	--											
7. BDI Total	.01	−.12*	.18*	.18*	.02	.36**	--										
8. BHS Total	.05	−.04	.16*	.15*	.05	.26**	.75**	--									
9. MCMI Borderline	−.07	.04	.12*	.34**	.11*	.25**	.36**	.31**	--								
10. Past Manic	−.16*	.01	.06	.12*	.05	.16*	.16*	.15*	.19**	--							
11. Current Manic	−.03	.04	.06	.10	.06	.16*	.11	.05	.09	.41**	--						
12. Past Depression	.14*	−.09	.05	.12*	.13*	.06	.16*	.16*	.01	−.25**	−.21**	--					
13. Current Depression	.12*	−.09	.06	.05	.05	.18*	.24**	.22*	.08	−.36**	−.34**	.63**	--				
14. Suicide Attempts	−.05	−.01	.07	.01	.03	.06	.10	.11	.08	.06	.01	.13*	.09	--			
15. Burdensomeness	−.01	−.07	.14*	.11*	.02	.17*	.61**	.68**	.27**	.16*	.01	.13*	.20**	.19**	--		
16. Belongingness	.05	.05	.14*	.18*	.04	.21**	.65**	.63**	.28**	.16*	.04	.22**	.24**	.12*	.71**	--	
17. Current Suicide Attempt	.00	−.05	.04	−.08	.03	.11	−.03	−.10	−.07	−.05	−.07	.01	.02	.18**	.01	−.05	--
MEAN	22.20	--	.12	.22	.04	18.50	19.60	8.80	70.0	1.15	1.13	1.26	1.40	1.30	8.50	13.60	.40
SD	2.80	--	.33	.42	.20	11.60	11.96	6.40	16.05	.35	.34	.44	.49	3.60	3.50	5.06	.49

Table 4

Study 2: Logistic Regression Equation Predicting Current Suicide Attempt (N = 313)

Predictors	***B***	***S.E.***	***Wald***	***p***	**Exp(B)**
Entered in Set					
Step 1					
Age	.004	.045	.007	.93	1.00
Gender	−.304	.317	.916	.34	.738
Family Suicide	.522	.416	1.573	.21	1.69
Family Depression	−.504	.348	2.097	.15	.604
Family Manic	.465	.663	.492	.48	1.59
LES Neg	.026	.012	4.769	.03	1.03
BDI	.006	.017	.139	.71	1.01
BHS	−.052	.030	3.007	.08	.949
MCMI Borderline	−.008	.008	.982	.32	.992
Past Manic	−.136	.417	.106	.75	.873
Current Manic	−.511	.429	1.42	.23	.600
Past Depression	−.061	.371	.027	.87	.935
Current Depression	−.123	.353	.121	.73	.884
Step 2					
Suicide Attempts (SA)	1.352	.204	43.96	.001	3.87
Burdensomeness (BUR)	.036	.064	.313	.57	1.03
Belongingness	−.016	.044	.123	.73	.985
Step 3					
BURxBELONG	.007	.009	.638	.43	1.01
BELONGxSA	−.02	.056	.125	.724	.980
BURxSA	.06	.076	.612	.434	1.06
Step 4					
BELONGxBURxSA	.615	1.73	8.57	.003	1.85

Note. The above statistics are presented when the variables were first entered into the model at each step.