A Short-Term, Prospective Test of the Interpersonal–Psychological Theory of Suicidal Ideation in an Adolescent Clinical Sample

ADAM BRYANT MILLER, PHD, CHRISTIANNE ESPOSITO-SMYTHERS, PHD, AND RICHARD N. LEICHTWEIS, PHD

The present prospective study tested a portion of the interpersonal–psychological theory of suicide (IPTS) in an adolescent clinical sample. Participants were 143 adolescents consecutively admitted to a partial hospitalization program who completed assessments at intake and discharge from the program. Results partially supported the IPTS and suggest that (1) perceived burden-someness may be an important socially based cognition for understanding concurrent risk for suicidal ideation (SI); (2) thwarted belongingness affects depression symptom severity over time, which indirectly predicts SI over a short follow-up time frame; and (3) the IPTS constructs may function differently in a high-risk clinical adolescent sample, compared to adults, although findings are preliminary.

In recent years, there has been a concerted effort among researchers to increase scientific knowledge in the area of adolescent suicide. Given that suicide is currently the third leading cause of death for adolescents, improving our knowledge of factors that contribute to the desire for death is imperative to address this public health crisis. Data from the 2013 Youth Risk Behavior Survey (YRBS; Kann et al., 2014) suggest that almost 17% of high school students in the United States seriously considered attempting suicide in the past year. Several studies have demonstrated that severity (frequency and specificity) of suicidal ideation (SI) predicts subsequent suicide attempts across community samples (Reinherz, Tanner, Berger, Beardslee, & Fitzmaurice, 2006) and clinical (Huth-Bocks, Kerr, Ivey, Kramer, & King, 2007; Prinstein et al., 2008). Research aimed at improving our understanding of the development of SI may aid in suicide intervention efforts.

THEORIES OF SUICIDE

A number of risk factors for suicide have been identified and tested in prior research (Hawton, Saunders, & O’Connor,
2012). Many of these risk factors map onto portions of classic and contemporary theories of suicide. One such factor includes the importance of social relationships. Indeed, Durkheim (1897) and Durkheim and Simpson (1951) classified suicide as stemming from social causes, including isolation, altruism, and anger/frustration. Similarly, Shneidman (1993) stated that suicide is driven by a desire to escape psychological pain or “psychache.” At least one cause of this psychache is a lack of nurturing interpersonal relationships. Specific to adolescents, the cognitive behavioral theory of suicide (Spirito, Esposito-Smythers, Weismoore, & Miller, 2012) suggests that “predisposed” adolescents (i.e., those with psychiatric disorders) turn to suicide as a means to cope with severe negative affective arousal, cognitive distortion (e.g., catastrophizing), and maladaptive behavior (e.g., substance use), triggered by a significant stressor. Many times, this significant stressor is interpersonal in nature. Components of this latter theory have received support in the adolescent suicide literature (Miller & Esposito-Smythers, 2013). Together, while theories differ with regard to the most important mechanism in explaining suicide risk, multiple theories include interpersonal relationships as a nontrivial component.

Interpersonal–Psychological Theory of Suicide

The interpersonal–psychological theory of suicide (IPTS), in particular, places a heavy emphasis on interpersonal relationships as a key component in the development of SI (Joiner et al., 2009; Van Orden et al., 2010). According to the IPTS, the desire for death arises from the confluence of perceived burdensomeness and thwarted belongingness. Thwarted belongingness refers to feelings of alienation from friends, family, or other valued social contacts. Perceived burdensomeness refers to the belief that one is highly ineffective and incompetent and that this incompetence negatively affects other people. While both of these socially based cognitions are posited to lead to SI, Joiner and colleagues state that it is the interaction of these two constructs that lead to the greatest severity of SI. When these two cognitions are paired with the ability to enact lethal self-injury (i.e., acquired capability), an individual is at risk for suicide attempts and completion (Van Orden, Witte, Gordon, Bender, & Joiner, 2008).

Literature reviews that examine the IPTS (Ribeiro & Joiner, 2009; Van Orden et al., 2010) suggest that there is strong support for perceived burdensomeness and thwarted belongingness as reliable predictors of SI across various adult samples (e.g., undergraduates, suicide attempters, suicide completers, drug addicted outpatients, and psychotherapy outpatients). Support has also been found in more recent research conducted with undergraduates, older adults, and military personnel (Van Orden, Cukrowicz, Witte, & Joiner, 2012). Specifically, higher levels of perceived burdensomeness and thwarted belongingness are positively associated with severity of SI. Further, individuals with greater (vs. lower) perceptions of thwarted belongingness and greater (vs. lower) perceived burdensomeness report the most severe levels of SI (Van Orden et al., 2012).

Recent scholarship continues to demonstrate robust support for the IPTS in adult samples. Christensen, Batterham, Soubelet, and Mackinnon (2013) used proxy measures of perceived burdensomeness and thwarted belongingness and found that higher levels of perceived burdensomeness and belongingness were associated with increased risk of SI in a community sample of 6,133 adults. They also found support for an interactive effect of burdensomeness and belongingness consistent with that of Van Orden et al. (2012). In a subset of this sample using the Interpersonal Needs Questionnaire, which is the measure designed to examine the central constructs of the IPTS, Christensen, Batterham, Mackinnon, Donker, and Soubelet (2014) found the same pattern of results. Further, they found that higher depression scores
were associated with higher perceived burdensomeness, but not thwarted belongingness. In a sample of 1,352 community adults recruited through an online study, higher perceived burdensomeness, but not thwarted belongingness, was associated with higher suicidal ideation scores. Further, there was a significant interaction of thwarted belongingness and perceived burdensomeness consistent with that predicted by IPTS theory (Batterham, Calear, & van Spijker, 2014). Notably, the IPTS constructs did not predict depression and anxiety symptoms, only SI, in this study. In an inpatient sample of 177 military veterans, higher perceived burdensomeness, higher thwarted belongingness, and their interaction were associated with SI over and above PTSD symptoms (Monteith, Menefee, Pettit, Leopoulos, & Vincent, 2013). Given the robust support for the IPTS across a variety of adult samples, it is reasonable to assume that this theory could also apply to the development of SI in adolescents.

**Application of IPTS to Adolescents**

Despite the rapidly accumulating support for the IPTS in adult samples, this theory has not been formally tested in an adolescent sample. However, there exists preliminary evidence across clinical and developmental literatures to suggest that this theory may apply equally well among youth. Adolescence is a developmental period characterized by rapid socioemotional development. One of the key developmental tasks of adolescence is the establishment of healthy interpersonal relationships and a sense of belonging (Collins & Steinberg, 2006). Many studies have examined the association between perceptions of social support and SI in adolescent samples, a construct closely associated with perceived belongingness. In a relatively recent review of the literature, King and Merchant (2008) conclude that there is strong support for the importance of interpersonal variables, including perceptions of support and connectedness with family and peers, in understanding risk for SI among adolescents. More recent cross-sectional and longitudinal work has also suggested that a lack of social support has a significant, robust relationship with adolescent SI even after controlling for numerous covariates, including age, sex, race/ethnicity (Babiss & Gangwisch, 2009; Bonanno & Hymel, 2010; Hetrick, Parker, Robinson, Hall, & Vance, 2012; Hill & Pettit, 2014), and psychiatric symptoms or diagnoses (Hetrick et al., 2012; Logan, Crosby, & Hamburger, 2011; Pettit, Green, Grover, Schatte, & Morgan, 2011). Greater social support also serves as a buffer against SI (Dupéré, Leventhal, & Lacourse, 2009; Winfree & Jiang, 2010). Although this literature does have some methodological limitations, including infrequent use of validated measures of SI (Bonanno & Hymel, 2010) and longitudinal designs (Babiss & Gangwisch, 2009), it offers potential evidence for the association between adolescent perceptions of social connectedness and SI.

Early research has also examined the association between expendability, a construct closely associated with perceived burdensomeness, and SI/SA in child and adolescent samples. It has been theorized that SI may arise when adolescents perceive that they are “expendable” family members (Sabbath, 1969). In other words, the adolescent may believe that he or she is expendable or a burden on his or her family, which may precipitate suicidal thinking. In a study that compared 16 suicidal youth to 16 behaviorally disturbed matched controls, suicidal youth were significantly more likely to perceive that they were unwanted by their parents (Rosenthal & Rosenthal, 1984). Similarly, Woznica and Shapiro (1990) found that suicidal adolescents rated themselves higher on a measure of expendability relative to their nonsuicidal peers. Given the close conceptual relationship with expendability, it is plausible that perceived burdensomeness may also be associated with suicidal ideation in an adolescent sample. This study is the first to use a validated measure of the actual constructs of
thwarted belongingness and perceived burdensomeness to formally test the IPTS in an adolescent sample. Another question that has been unexplored to date is whether other well-established risk factors for SI, such as depression severity, mediate the relationship between the IPTS constructs and suicide in this age group. Recent research conducted with adult samples has begun to expand on the IPTS by integrating other known risk factors for suicide into their examinations (Anestis & Joiner, 2011; Hill & Pettit, 2014; Kleiman, Liu, & Riskind, 2013). For example, using a short-term prospective study (6–8 weeks), Kleiman et al. (2013) found evidence that the IPTS constructs (measured at baseline) partially mediated the association between baseline depressive symptoms and suicidal ideation at follow-up in a sample of 299 undergraduates. Overall, these studies suggest that perceptions of thwarted belongingness and perceived burdensomeness partially mediate the relationship between depression and suicidal behavior in adult samples. However, it is equally plausible that these two constructs may influence the development of depression symptoms, which in turn, leads to SI. Depression severity is one of the strongest predictors of adolescent SI (O’Connor, Smyth, Ferguson, Ryan, & Mark, 2013), and interpersonal difficulties predict depression severity over time (Bosacki, Dane, & Marin, 2007). Thus, depression severity may be an important mediator of the association between these two IPTS constructs and SI.

HYPOTHESES

The primary purpose of this study was to evaluate a portion of the IPTS (Joiner, 2005) in a clinical adolescent sample. As discussed, no study to date has formally tested the IPTS in an adolescent sample. Further, very few studies have examined other factors that may mediate the association between perceptions of thwarted belongingness or burdensomeness and SI over time. In this study we examined these questions using both a cross-sectional and short-term (ca. 3- to 4-week follow-up) longitudinal research design. Given that SI has been shown to vary by sex (Nock et al., 2013) and depression severity (Goldston et al., 2009; O’Connor et al., 2013), these factors were statistically controlled in relevant analyses. Three hypotheses were formulated. The first two hypotheses offer a direct test of the SI portion of the IPTS in an attempt to replicate results found in adult samples. The third hypothesis takes into account the potential role of co-occurring depressive symptoms on the IPTS.

H1: Perceptions of high thwarted belongingness and burdensomeness would be independently associated with concurrent SI after controlling for depression symptom severity and biological sex. Further, burdensomeness would moderate the relationship between thwarted belongingness and SI. Specifically, individuals with the highest (vs. lowest) levels of these cognitions would report the highest levels of SI.

H2: Perceived burdensomeness, thwarted belongingness, and their interaction will predict SI over a short-term, prospective time frame (Time 2 [T2]) controlling for SI at Time 1 (T1), T2 depression symptom severity, and sex.

H3: T1 thwarted belongingness and T1 perceived burdensomeness will have strong direct effects on T2 SI, and these relationships would be partially mediated by T2 depression symptom severity.

METHODS

Participants

Participants were 143 adolescents (range 12–18 years, \( M = 15.38, SD = 1.43 \)) consecutively admitted to a partial hospital-
ization program (PHP) in an outpatient behavioral health facility in the mid-Atlantic area. The PHP is a short-term, crisis stabilization program emphasizing group treatment for adolescents. The behavioral health center from where participants were drawn is located in a large suburban area outside of a major city. The center is one of the largest providers of mental health services for children, adolescents, and families in this metropolitan area. The center accepts patients who are uninsured, privately insured, or on Medicaid. Patients generally present to the PHP with a variety of severe symptomatology including SI and suicidal behavior, self-harming behavior, school refusal, severe depression and anxiety, and/or externalizing behavior.

Study procedures were approved by the affiliated hospital and university internal review boards. As part of standard clinical care, patients and caregivers completed a clinical assessment battery designed to inform the patients’ treatment plan in the PHP. They were also asked for permission to include their de-identified, anonymous responses to the assessment battery in a clinical research data bank maintained by the behavioral health facility. Data for the current study were drawn from this clinical research data bank. A total of 156 patients were assessed over an 11-month period, and 143 (92%) patients and caregivers provided informed assent/consent to include their information in the clinical research data bank. Reasons for not consenting included privacy concerns (n = 7) and safety concerns (n = 1). Four patients did not specify a reason for not providing consent (n = 5). Patients and parents completed baseline assessments at the time of admission, and patients completed a discharge assessment on their last day in the program. All assessments were completed by trained clinical research staff who were uninvolved with the participants’ treatment.

Inclusion criteria for the current sample included the following: (1) English speaking adolescents (ages 12–18) and (2) at least one caregiver to provide consent. Exclusion criteria included (1) youth with current psychosis and (2) youth who were cognitively unable to provide assent. Participants were 64% female, and self-identified as approximately 81% White, 4% Black, 6% Asian, and 9% from other racial backgrounds. Approximately 8% of the sample identified themselves as Hispanic or Latino in ethnicity. Mean family income was between $80,000 and $90,000, with a range of 0-$10,000 to $100,000+.

Measures

Interpersonal Needs Questionnaire (INQ). The INQ was specifically developed to assess the constructs of thwarted belongingness and perceived burdensomeness included in the IPTS (Joiner et al., 2009). This study used the 18-item version of the INQ, which has excellent psychometric properties in adult samples (Van Orden et al., 2008). The burdensomeness (e.g., “These days I think I am a burden on society”) and the belongingness (e.g., “These days, I feel disconnected from other people”) subscales each include nine items. Participants are asked to rate the degree to which each statement is true for them using a 7-point Likert scale (1 = Not at all true for me to 7 = very true for me). Higher scores reflect a higher degree of perceived burdensomeness and thwarted belongingness. Internal reliabilities for the thwarted belongingness and perceived burdensomeness subscales in the current sample were acceptable (α = .85 and α = .92, respectively).

Youth Inventory-4 (YI-4). The YI-4 (Gadow et al., 2002) is a self-report rating scale that assesses symptoms of DSM-IV emotional and behavioral disorders in youths between 12 and 18 years old. The YI-4 has excellent psychometric properties and has shown strong reliability and convergent validity (Gadow et al., 2002). The YI-4 contains 120 items that assess symptoms of 18 disorders. The YI-4 yields symptom count scores that are summed to derive criteria for diagnosis (diagnostic model) or symptom severity scores (normative data model). Depression
symptom severity scores were used in tests of study hypotheses. Cronbach's alpha at T1 and T2 for the depression symptom severity scale was acceptable ($\alpha = .83$ and $\alpha = .86$, respectively).

**Suicide Ideation Questionnaire (SIQ).** The SIQ (Reynolds, 1988) is a self-report measure that assesses the degree to which junior high (grades 7–9; SIQ junior) and high school-aged (grades 10–12; SIQ Senior) adolescents report thoughts about suicide (e.g., “I thought about killing myself,” “I wished I were dead”) within the last month. The SIQ senior contains 30 items, and the SIQ junior has 15 items. Higher scores represent more severe SI. Internal consistency in a validation sample of 2,400 adolescents ($\alpha = .97$; Reynolds, 1988) and the current sample ($\alpha = .98$ T1, $\alpha = .96$ T2, SIQ senior; $\alpha = .86$ T1, $\alpha = .94$ T2, SIQ junior) was excellent. Raw scores on the SIQ senior and junior were mean centered to create a composite SIQ score comparable across all adolescents.  

**Data Analytic Strategy**

All analyses used the SPSS statistical package. Preliminary bivariate analyses were conducted to examine distributional assumptions for linear regression analyses. Covariates (e.g., sex) that were significantly correlated with SI were statically controlled in the main analyses. All continuous variables were normally distributed with skewness and kurtosis values $< 1.1$. With regard to multicollinearity, the variance inflation factor (VIF) and tolerance values for each predictor in our models were well within recommended levels (all VIFs $< 1.8$, all Tolerance values $> 0.6$). To test hypotheses 1 and 2, we conducted linear regression analyses controlling for sex and depression symptom severity. For hypothesis 1, T1 SIQ scores were regressed onto sex and depression symptom severity (Step 1), thwarted belongingness, perceived burdensomeness (Step 2), and their interaction (Step 3). For hypothesis 2, T2 SIQ scores were regressed onto sex, T2 depression symptom severity, SIQ T1 (Step 1), thwarted belongingness, perceived burdensomeness (Step 2), and their interaction (Step 3). Consistent with recommendations by Cohen, Cohen, West, and Aiken (2003), predictors were mean centered prior to forming their interaction term.

The mediation analysis to test hypothesis 3 was conducted with macros recommended by Hayes and Preacher (2013), and bootstrapping of indirect effects with 1,000 resamples consistent with recommendations by MacKinnon (2008). Mediation effects are evaluated with significance testing of both direct and indirect effects through multiple regression analyses. Direct effects represent the association of the independent variables with the outcome variables while accounting for the proposed mediating variable and any covariates ($c’$ path; Baron & Kenny, 1986). Indirect effects represent the effect of the predictor variable on the outcome variable via the proposed mediating variable ($a*b$ path). The Hayes and Preacher (2013) method provides a biased corrected significance test of the indirect ($a*b$) path through bootstrapping. The resulting 95% confidence interval provided for each indirect effect allows examination of whether the confidence interval contains 0. If the resulting interval does not contain 0, the indirect effect is significant at the .05 probability level.

**RESULTS**

**Descriptive Statistics**

Means and standard deviations of study variables were within the expected ranges for a clinical population (Table 1). The number of individuals whose self-reported symptoms
### TABLE 1
Bivariate Correlations and Descriptive Statistics

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Age</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>2. Sex</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>3. Depression symptoms T1</td>
<td>-.07</td>
<td>.40**</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>4. Depression symptoms T2</td>
<td>-.06</td>
<td>.20*</td>
<td>.64**</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>5. Suicidal ideation T1</td>
<td>-.12</td>
<td>.23**</td>
<td>.59**</td>
<td>.43**</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>6. Suicidal ideation T2</td>
<td>-.05</td>
<td>.15</td>
<td>.51**</td>
<td>.63**</td>
<td>.68**</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>7. Burdensomeness T1</td>
<td>-.07</td>
<td>.09</td>
<td>.57**</td>
<td>.36**</td>
<td>.65**</td>
<td>.42**</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>8. Belongingness T1</td>
<td>-.07</td>
<td>.07</td>
<td>.53**</td>
<td>.45**</td>
<td>.47**</td>
<td>.41**</td>
<td>.63**</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>9. Time in treatment</td>
<td>.07</td>
<td>-.01</td>
<td>-.01</td>
<td>-.06</td>
<td>-.05</td>
<td>-.12</td>
<td>-.04</td>
<td>.03</td>
<td>—</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>n</strong></td>
<td>143</td>
<td>143</td>
<td>143</td>
<td>128</td>
<td>142</td>
<td>126</td>
<td>141</td>
<td>141</td>
<td>127</td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td>15.38</td>
<td>15.44</td>
<td>11.80</td>
<td>.22</td>
<td>-.25</td>
<td>3.60</td>
<td>4.00</td>
<td>22.06</td>
<td>—</td>
</tr>
<tr>
<td><strong>Standard deviation</strong></td>
<td>1.43</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td><strong>Range</strong></td>
<td>12 to 18</td>
<td>2 to 26</td>
<td>0 to 23</td>
<td>-1.30 to 2.57</td>
<td>-1.30 to 2.80</td>
<td>1 to 7</td>
<td>1 to 7</td>
<td>1 to 48</td>
<td>—</td>
</tr>
</tbody>
</table>

*Note.* T1 = Time 1; T2 = Time 2; 49 males, 94 females; *p < .05; **p < .01; suicidal ideation scores are standardized.
met diagnostic threshold on the YSI-4 for DSM-IV TR disorders, as well as the number of self-reported lifetime history of suicide attempts and nonsuicidal self-injury, are reported in Table 2. A total of 143 individuals completed the T1 assessment at admission into the PHP program. A total of 127 individuals completed the T2 assessment (89% retention). Seventeen individuals did not complete the full discharge battery. Reasons for not completing the full discharge battery included withdrawal from the program against medical advice \( (n = 3) \), being psychiatrically hospitalized \( (n = 3) \), placement in long-term residential care \( (n = 4) \), and administrative or unexpected discharge from the program \( (n = 5) \). Independent samples \( t \) tests revealed that individuals who did not complete the T2 assessment did not significantly differ on T1 study variables compared to individuals who completed the discharge assessment. The average length of stay in the program was approximately 22 days (range 1–48, \( SD = 8.10 \)). At T1, approximately 59% of participants reported clinically significant SI (SIQ Jr. total score \( \geq 31 \); SIQ Sr. total score \( \geq 41 \)). At T2, approximately 35% of participants reported clinically significant SI.

TABLE 2
Number and Percentage of Individual’s Meeting Diagnostic Criteria Based on Self-Reported Symptoms and Behavior

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major depressive disorder</td>
<td>97</td>
<td>68</td>
</tr>
<tr>
<td>Generalized anxiety disorder</td>
<td>86</td>
<td>60</td>
</tr>
<tr>
<td>Disruptive behavior disorder</td>
<td>42</td>
<td>29</td>
</tr>
<tr>
<td>Substance abuse problems</td>
<td>47</td>
<td>32</td>
</tr>
<tr>
<td>Suicide attempt (lifetime)</td>
<td>43</td>
<td>30</td>
</tr>
<tr>
<td>Nonsuicidal self-injury (lifetime)</td>
<td>101</td>
<td>70</td>
</tr>
</tbody>
</table>

Note. For the disorders listed, the number presents cumulative self-reported symptoms resulting in meeting criteria for DSM-IV TR disorders; total \( N = 143 \).

Individuals who completed the SIQ junior versus senior did not significantly differ on any study variables.

Preliminary Bivariate Analyses

Pearson’s bivariate correlation coefficients \( (r) \) were computed to examine the relationships between SI (T1 and T2), demographic variables, time in treatment, depression symptom severity (T1 and T2), perceived burdensomeness, and thwarted belongingness. Adolescents who were female (vs. male) reported significantly higher SIQ scores at T1 and T2. Higher depression symptom severity was associated with higher T1 and T2 SIQ scores. Perceived burdensomeness and thwarted belongingness were positively correlated with each other and with SIQ scores at both T1 and T2. Neither age nor time in treatment was significantly correlated with study variables. All correlations were consistent with past research and in the expected direction.

Regression Analyses Testing Moderators

Hypothesis 1. The first cross-sectional linear regression analysis provided the traditional test of the SI portion of Joiner’s IPTS, with thwarted belongingness, perceived burdensomeness, and their interaction predicting T1 SI. Results revealed a unique effect of perceived burdensomeness after accounting for depression symptom severity and biological sex (Table 3). There was no unique effect of belongingness, and there was no significant interaction of the two IPTS constructs. This model accounted for about 50% of the variance in T1 SI.

Hypothesis 2. The second linear regression analysis provided a more conservative, prospective test of the IPTS. This analysis revealed that there was no unique effect of T1 perceived burdensomeness, thwarted belongingness, or their interaction on T2 SI, controlling for sex, T1 SI, and T2 depression symptom severity. Only T2 depression symptom severity and T1 SI were significantly associated with T2 SI (Table 3). This model
accounted for about 60% of the variance in T2 SI.

**Hypothesis 3.** In the third analysis, depression symptom severity at T2 (Figure 1) was examined as a potential mediator of the relationship between T1 perceived burdensomeness and thwarted belongingness, and T2 SI controlling for T1 SI and sex. There was an initial significant direct effect of T1 thwarted belongingness ($b = .11$, $p < .05$) on T2 SI accounting for T1 perceived burdensomeness. There was no direct effect of T1 perceived burdensomeness ($b = -.04$, $p = .50$) on T2 SI accounting for T1 thwarted belongingness.

As can be seen in Figure 1, the direct effect of T1 thwarted belongingness was reduced to nonsignificance when including T2 depression symptom severity as a mediator. T1 thwarted belongingness significantly predicted T2 depression symptom severity ($a$ path). There was a significant indirect effect of T1 thwarted belongingness on T2 SI (via T2 depression symptom severity), $a*b = .09$, 95% CI (0.03, 0.14) bootstrapped. T1 perceived burdensomeness did not predict T2 depression symptom severity ($a$ path) or T2 SI ($c'$ path). Further, the indirect effect of T1 perceived burdensomeness on T2 SI (via T2 depression symptom severity) was nonsignificant, $a*b = .01$, 95% CI ($-0.05$, 0.07). Overall, the final model accounted for about 79% of the variance in T2 SI.

Given that a history of self-harm (either nonsuicidal self-injury or prior suicide attempt) could impact study results, and a small percentage of the sample did not have this history (22%), we re-ran analyses with this latter group removed. The overall pattern of results was unchanged. Therefore, we report findings from the full sample. We also ran meditational analyses with burdensomeness and belongingness in the model independently. Results were unchanged, and we report the results from the full model.
DISCUSSION

While the IPTS has gained substantial support in the adult suicide literature, it has not been tested in an adolescent sample. This is the first study to formally examine whether perceptions of burdensomeness and thwarted belongingness, two socially based cognitions included in the IPTS (Joiner, 2005), predict SI in a clinical adolescent sample. In the present study, both thwarted belongingness and perceived burdensomeness were independently correlated with SI at the bivariate level. In multivariate analyses, perceived burdensomeness was positively associated with SI, even after controlling for depression symptom severity and sex, using a cross-sectional but not a longitudinal design. Perceptions of thwarted belongingness were not associated with SI either independently or in interaction with perceived burdensomeness after controlling for the same covariates. However, when major depressive disorder symptom severity was examined as a mediator of the association between these two socially based cognitions and SI using a short-term, prospective design, a significant indirect effect of thwarted belongingness on T2 SI (via T2 depression symptom severity), controlling for covariates (T1 SI and sex), was found. These findings add uniquely to theoretical literature on adolescent suicide and provide an initial test of the IPTS in an adolescent sample.

Traditional Test of the IPTS in Adolescents

In an effort to directly replicate the first formal test of the IPTS conducted in adults (Van Orden et al., 2008), the first set of analyses examined whether perceived burdensomeness, thwarted belongingness, and their interaction predicted concurrent SI. Significant bivariate correlations between perceived burdensomeness and thwarted belongingness on both initial and subsequent SI suggest that there is an important relationship between these two constructs and SI concurrently and over time. However, conservative multivariate cross-sectional analyses only offered partial support of the first hypothesis. Perceived burdensomeness was directly associated with concurrent SI, and no interaction with thwarted belongingness was found, after controlling for depression symptom severity and sex. Interestingly, this pattern of results changed in longitudinal analyses and failed to support our second hypothesis. Neither perceived burdensomeness,
thwarted belongingness, nor their interaction predicted future SI (T2 SI), after controlling for T2 depression symptom severity and sex. The only significant predictor of T2 SI was T1 SI, which is consistent with past research that suggests that prior SI is a strong predictor of future SI (Prinstein et al., 2008).

Cross-sectional study results are consistent with research conducted by Van Orden et al. (2008) who also found a direct association between perceived burdensomeness but not belongingness in a college student sample. However, they are not consistent with more recent cross-sectional and longitudinal research conducted with adults, which found a direct association between both socially based cognitions and concurrent SI (Kleiman et al., 2013; Monteith et al., 2013). The lack of an interaction between these two types of cognitions in the current sample is also inconsistent with prior studies which found that adults with high (vs. low) perceptions of thwarted belongingness and high (vs. low) perceptions of burdensomeness report the highest levels of SI (Monteith et al., 2013; Van Orden et al., 2012).

As is evident, tests of the traditional IPTS model in our clinical adolescent sample did not directly replicate most findings in the adult literature. Although we found initial bivariate relationships between thwarted belongingness and perceived burdensomeness with both T1 and T2 SI, only the effect of burdensomeness was retained in multivariate cross-sectional analyses and neither in multivariate longitudinal analyses. This is surprising given developmental research that suggests that the formation of strong interpersonal relationships in the context of rapid physical and emotional development during adolescence is needed for normative growth (Steinberg, 1987). However, difficulties in interpersonal relationships during adolescence have been shown to lead to many known risk factors for SI, including depression (Armsden, McCauley, Greenberg, Burke, & Mitchell, 1990; Bosacki et al., 2007; King & Merchant, 2008). Thus, it is possible that the association between perceptions of thwarted belongingness and perceived burdensomeness, and SI, is better explained through an association with depression, which was partially supported by the results of our longitudinal meditational analyses.

Test of a Mediation Model of the IPTS

In partial support of our third hypothesis, depression symptom severity was found to fully mediate the association between thwarted belongingness and T2 SI after controlling for T1 SI and sex. This suggests that lower levels of thwarted belongingness at baseline were associated with higher depression symptom severity, which in turn predicted higher SI at discharge from the treatment program. However, perceived burdensomeness did not significantly predict depression symptom severity or SI in this longitudinal mediation model.

It is important to consider the aforementioned results in the context of the study setting. Specifically, adolescents in the PHP program were involved in intensive stabilization over a short-term period. Our results suggest that on admission to the PHP program, knowing an adolescent’s level of perceived burdensomeness is most helpful in understanding SI in the past 30 days. To be eligible for the program, teens must be in a socioemotional or behavioral crisis (e.g., suicidal, school refusal), which often results in significant discord and strain within the family system. In this heightened emotional state, the perception that one is a burden on others appeared to be strongly linked to concurrent SI over and above other predictors, including sex and depression symptom severity. When considering short-term changes in SI severity, knowing an adolescent’s initial level of thwarted belongingness at admission, but not perceived burdensomeness, predicted changes in SI through depression severity. Adolescents with the highest levels of thwarted belongingness continued to demonstrate more severe SI, even after intensive intervention. Thus, perceptions of thwarted belongingness may be an important
target of treatment in severe clinical adolescent samples. While neither of these findings perfectly replicates the IPTS as it was originally theorized in adults, the IPTS constructs provide useful information for conceptualizing and understanding changes in SI severity in a unique clinical adolescent population.

**Limitations**

Results from the present study should be interpreted within the context of several limitations and methodological considerations. First, the current sample included clinically distressed adolescents in a PHP, the majority of whom had a history of self-harm. Although this is one of the highest risk groups for suicidal behavior and thus warrant significant attention, the results of this study should be considered context dependent until replicated with other clinical adolescent samples and relatively healthier community samples. In examinations with other clinical samples, it might also be of interest to examine whether results vary across youth with and without clinically significant depressive symptoms. Second, this sample was predominantly female, White, and socioeconomically advantaged. Results may not generalize to more heterogeneous samples. It would be worthwhile for future research to examine the IPTS across more racially and economically diverse adolescent samples. Third, although the short-term prospective design of the study followed an ecologically valid assessment schedule, future research would benefit from extending the time between follow-ups to examine potential long-term effects of the IPTS constructs on adolescent SI. Fourth, the sample size for the current study was relatively small and may have been underpowered to detect significant interactions. Future research with larger samples of adolescents would be beneficial. Fifth, the observed correlations in the current study were relatively high, suggesting that multicollinearity may have affected study results. However, these correlations were consistent with other studies that have examined the IPTS in adult samples with similarly measured constructs. It is possible that studies using different measurement techniques may yield less overlap in constructs. Sixth, the possibility that the distribution and characteristics of variables within this clinical sample account for the observed associations rather than the constructs they are presumed to measure cannot be ruled out. Also of note is that change in the IPTS constructs was not measured in the current study. Thus, we are unable to comment on whether or not treatment had an effect on a given adolescent's sense of belongingness and burdensomeness. This represents an important area for future research. Finally, this study represents an important first step in examining the SI portion of the IPTS in a clinical adolescent sample. Future research that incorporates suicide attempts and non-suicidal self-injury into longitudinal tests of the full IPTS model with adolescents is warranted.

**Clinical Implications**

This study holds important clinical implications. First, results highlight the importance of assessing for perceptions of burdensomeness and belongingness among clinically referred youth. These two constructs can be conceptualized as socially based cognitions, and thus, may be amenable to change through cognitive behavioral therapy as needed. Second, results suggest that short-term interventions for adolescents during a time of socioemotional crisis should address adolescent perceptions of burdensomeness when present. Family systems interventions and/or those that facilitate family communication and positive family interactions may help improve an adolescent's sense of importance to the family system, consistent with literature documenting the benefits of interventions with strong family components aimed at increasing family support for suicidal youth (Asarnow et al., 2011; Diamond et al., 2010; Esposito-Smythers, Spirito, Kahler, Hunt,
& Monti, 2011). Third, results suggest that over the course of a short treatment program, feelings of thwarted belongingness continue to influence depression symptom severity and SI. Cognitive behavioral therapy, family systems therapy, or interpersonal therapy for depressed adolescents may be particularly effective in addressing perceptions of thwarted belongingness.

REFERENCES


Gadow, K. D., Sprafkin, J., Carlson, G. A., Schneider, J., Nolan, E. E., Mattison, R.


Manuscript Received: July 25, 2014

Revision Accepted: August 4, 2015