



Evaluating the Interpersonal Needs Questionnaire: Comparison of the Reliability, Factor Structure, and Predictive Validity across Five Versions

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Five versions of the Interpersonal Needs Questionnaire (INQ), a self-report measure of perceived burdensomeness and thwarted belongingness, have been used in recent studies (including 10-, 12-, 15-, 18-, and 25-items). Findings regarding the associations between perceived burdensomeness, thwarted belongingness, and suicidal ideation using different versions have been mixed, potentially due to differences in measurement scales. This study evaluated factor structure, internal consistency, and concurrent predictive validity of these five versions in three samples. Samples 1 and 2 were comprised of 449 and 218 undergraduates, respectively; Sample 3 included 114 adolescent psychiatric inpatients. All versions demonstrated acceptable internal consistency. The 10-item version and 15-item version demonstrated the best, most consistent model fit in confirmatory factor analyses. Both perceived burdensomeness and thwarted belongingness consistently predicted concurrent suicidal ideation on the 10-item INQ only. Future research should consider using the 15-item or 10-item versions.

The interpersonal-psychological theory of suicide (IPTS; sometimes referred to as the interpersonal theory of suicide; Joiner, 2005; Van Orden et al., 2010) proposes that

suicide occurs in the presence of two factors, the acquired capacity to enact lethal self-injury and the desire for death, neither of which is sufficient in isolation for an individual to die by suicide. The acquired capacity to enact lethal self-injury is a learned ability to overcome fears associated with pain and death acquired via repeated exposure to painful and provocative events. The desire for death is an individual's wish to end his or her own life and is roughly equivalent to the common definition of suicidal ideation (Van Orden, Witte, Gordon, Bender, & Joiner, 2008). According to the IPTS, the desire for death is comprised of two factors: perceived burdensomeness and a sense of thwarted belongingness. *Perceived burdensomeness* is the belief that "others would be better off without me." *Thwarted*

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belongingness is a perception of a lack of interpersonal connections or the belief that one does not belong. The IPTS asserts that perceived burdensomeness, thwarted belongingness, and the interaction between them predict the desire for death.

The Interpersonal Needs Questionnaire (INQ) was developed to assess perceived burdensomeness and thwarted belongingness. To our knowledge, five different versions of the INQ have been used in published research, beginning with the original 25-item version (e.g., Anestis, Bagge, Tull, & Joiner, 2011; Anestis & Joiner, 2011; Van Orden, 2009). Each of the subsequent, shorter versions has drawn a subset of items from the INQ-25. These include an 18-item version that has been used primarily with older adult and college student samples (e.g., Davidson, Wingate, Grant, Judah, & Mills, 2011; Marty, Segal, Coolidge, & Klebe, 2012; Monteith, Menefree, Pettit, Smitherman, & Vincent, 2013; Rasmussen & Wingate, 2011; Wong, Koo, Tran, Chiu, & Mok, 2011); a 15-item version, which was recently introduced as an empirically derived refinement of the INQ-25 (INQ-15; e.g., Hill & Pettit, 2013; Van Orden, Cukrowicz, Witte, & Joiner, 2012); a 12-item version that has been used in a variety of samples (e.g., Davidson, Wingate, Rasmussen, & Slish, 2009; Freedenthal, Lamis, Osman, Kahlo, & Gutierrez, 2011; Hill & Pettit, 2012; Lamis & Lester, 2012; Merchant, 2010; Van Orden et al., 2008); and a 10-item version that has been used predominantly with military samples (e.g., Bryan, 2011; Bryan, Clemans, & Hernandez, 2012; Bryan, Hernandez, Allison, & Clemans, 2013; Bryan, Morrow, Anestis, & Joiner, 2010). Studies have demonstrated some empirical support for the reliability and validity of each version of the INQ (Bryan, 2011; Freedenthal et al., 2011; Marty et al., 2012; Van Orden, 2009; Van Orden et al., 2012). For the INQ-25 and INQ-15, there is clear documentation in the empirical literature regarding how the items were selected. For the remaining versions, it is unclear how the items included in those versions were

selected from the larger 25-item scale. To date, no study has compared the psychometric properties and predictive validity of the different versions within the same sample. It is important to investigate potential differences in psychometric performance across versions of the INQ to ensure that researchers use the most psychometrically sound measure available.

Furthermore, a number of discrepant findings have been reported with regard to the predictive effects of perceived burdensomeness and thwarted belongingness on concurrent suicide-related behaviors. It is important to determine whether these discrepant findings may be due to measurement artifact (i.e., a result of different versions of the INQ being used in each study), as this literature may guide refinement of the IPTS and development of preventive interventions based on the principles of the IPTS. For example, when using the INQ-25 with a sample of adult outpatients, perceived burdensomeness was a significant independent predictor of concurrent suicidal ideation, but thwarted belongingness was not, controlling for gender, depressive symptoms, and negative urgency (Anestis & Joiner, 2011). This finding has been corroborated in studies with the INQ-18 in samples of Asian American college students (Wong et al., 2011) and military veterans (Monteith et al., 2013), in the INQ-12 among samples of college students (Hill & Pettit, 2012; Van Orden et al., 2008), Black adolescents (Merchant, 2010), and college women (Lamis & Lester, 2012), and in the INQ-10 in a sample of military personnel (Bryan et al., 2012).

In contrast, Lamis and Malone (2011) found that both perceived burdensomeness and thwarted belongingness significantly predicted concurrent suicidal ideation using the INQ-12 in a college student sample. Using the INQ-15, Van Orden et al. (2012) found that both subscales independently predicted the presence and severity of suicidal ideation concurrently in a clinical sample of adults and prospectively in a sample of undergraduates. Using the INQ-10 among a

sample of military personnel, Bryan, Morrow and colleagues (2010) found that neither perceived burdensomeness nor thwarted belongingness was significantly associated with a measure of past suicide-related behaviors after controlling for demographic factors and positive and negative affect. Still another study of military personnel found that thwarted belongingness, but not perceived burdensomeness, was significantly correlated with a measure of suicidality using the INQ-10 (Bryan et al., 2013). Thus, whereas perceived burdensomeness has been significantly associated with suicidal ideation in most studies, results regarding thwarted belongingness are less consistent.

There are several possible sources of these inconsistent findings, including differences in sample characteristics (e.g., age, gender, race, and ethnicity; severity of the clinical population), different approaches to the measurement of suicide-related behaviors, or differences in the measurement of perceived burdensomeness and thwarted belongingness across versions of the INQ. To examine the possibility that different versions of the INQ may influence the outcomes of testing the hypotheses of the IPTS, this study examined multiple versions of the scale within the same samples to allow for comparison of results across versions, while suicidal ideation scores and sample composition remain constant.

Differences in the predictive validity of the INQ as a result of measurement artifact have both practical and theoretical implications. In addition to testing hypotheses derived from the IPTS and guiding refinement of the IPTS, development of prevention programs for suicide-related behaviors should focus on the most salient risk factors for suicide and suicidal ideation. Discrepancies in the literature leave unclear whether perceived burdensomeness, thwarted belongingness, or both might prove the most promising targets for suicide prevention programs drawing on the IPTS model.

This study evaluated five versions of the INQ with regard to factor structure (via confirmatory factor analyses and comparison

of fit across versions), internal consistency reliability (Cronbach's alphas), and concurrent predictive validity (predicting suicidal ideation), to identify the version (or versions) with the best psychometric properties for use in future research and clinical applications. Due to its rigorous development as an empirically derived refinement of the INQ-25 (see Van Orden et al., 2012), we hypothesized that the INQ-15 would demonstrate adequate psychometric properties with regard to factor structure, internal consistency, and concurrent predictive validity. Based on the findings of Van Orden et al. (2012), we also hypothesized that the INQ-25 would demonstrate less than adequate psychometric properties and less satisfactory psychometric properties as compared to the INQ-15. Regarding the remaining INQ versions, we expected adequate psychometric performance based on their performance in past studies, but no specific hypotheses were made regarding their performance in comparison with the other versions due to the lack of documentation regarding their item selection. Based on previous literature, we hypothesized that perceived burdensomeness, but not thwarted belongingness, would significantly and independently predict concurrent suicidal ideation for the INQ-25, INQ-18, and INQ-12 and that both perceived burdensomeness and thwarted belongingness would be significant predictors of concurrent suicidal ideation for the INQ-15. No specific hypotheses were made for the INQ-10, as no prior published tests of the INQ-10 reported on the associations between IPTS factors and suicidal ideation without controlling for several other variables.

METHOD

Sample 1

Participants. Participants were 449 college students from an undergraduate psychology participant pool at a large university in south Florida who took part in a study of mood and well-being. Participants

were required to be at least 18 years of age. Complete data on the study measures were available for 446 individuals. The mean age of participants was 20.40 years ($SD = 4.39$ years) with 95% between the ages of 18 and 28 years. Participants were predominantly female (72.9%) and Hispanic (70.6%). Participants self-identified their race as: White (73.5%), African American (18.7%), Asian (4.9%), Native American or Alaskan Native (2.9%), Native Hawaiian or Pacific Islander (0.4%), and other (4.3%). Percentages for racial self-identification sum to greater than 100% because participants were able to select multiple responses when identifying their race.

Measures

Thwarted Belongingness and Perceived Burdensomeness. The 25-item version of the Interpersonal Needs Questionnaire (Van Orden, 2009) was used to assess thwarted belongingness and perceived burdensomeness. Each of the 18-, 15-, 12-, and 10-item versions was computed as a subset of these 25 items. Items are rated via self-report on a 7-point Likert scale ranging from 1 (*not at all true for me*) to 7 (*very true for me*), and composite scores are computed as mean scores across each subscale, such that scores range from 1 to 7. Examples of perceived burdensomeness items common to all five versions include, "These days, the people in my life would be happier without me" and "These days, I think I make things worse for the people in my life." Examples of items assessing thwarted belongingness on all five versions include, "These days, I feel disconnected from other people" and "These days, I am close to other people (reverse scored)." As this measure was the focus of the current study, further data on the psychometric properties of the INQ are provided in the results.

Suicidal Ideation. The Adult Suicidal Ideation Questionnaire (ASIQ; Reynolds, 1991) was used to assess the frequency of thoughts about suicide in the past month.

The ASIQ contains 25 items, assessed via self-report, rated on a 7-point scale from 0 (*never*) to 6 (*almost every day*), and total scores are computed as the sum of all 25 items. Psychometric evaluations of the ASIQ have demonstrated excellent reliability and validity among adults and college students (Pettit et al., 2009; Reynolds, 1991). Internal consistency was excellent, $\alpha = .94$. In sample 1, suicidal ideation was on average mild ($M = 7.15$, $SD = 10.98$, median = 3.00); a score of 14 has been shown to differentiate suicide attempters from controls (Osman et al., 1999).

Sample 2

Participants. Participants were 218 college students from an undergraduate psychology participant pool at a large university in south Florida who took part in a study of mood and well-being distinct from that reported in sample 1. Participants were required to be at least 18 years of age. Participants were drawn from a larger sample of 1,070 students who completed a measure of depressive symptoms. Those who endorsed elevated depressive symptoms (a score on the Center for Epidemiological Studies–Depression scale of greater than or equal to 20; Radloff, 1977) were invited to return for an assessment 1 week later. Of those invited ($n = 262$), 83.2% ($n = 218$) returned and completed the assessment, at which point the measures included in the current analysis were completed. Complete data were available for all 218 individuals. Individuals who self-identified as African American were significantly more likely than those who did not to return for the second assessment. Participants who returned for the second visit were not significantly different from those who did not return on any other clinical variable or demographic variable.

The mean age of participants was 20.53 years ($SD = 4.41$ years), with 95% between the ages of 18 and 28 years. Participants were predominantly female (78.2%) and Hispanic (72.9%). Participants

self-identified their race as: White (62.7%), African American (18.7%), Asian (6.7%), Native American or Alaskan Native (2.1%), Native Hawaiian or Pacific Islander (0.5%), and other (13.0%). Percentages for racial self-identification sum to greater than 100% because participants were able to select multiple responses when identifying their race.

Measures. Measures were the same as those used in sample 1. The internal consistency of the ASIQ in sample 2 was excellent, $\alpha = .97$. In sample 2, suicidal ideation was on average mild to moderate ($M = 13.95$, $SD = 20.30$, median = 7.00; Osman et al., 1999).

Sample 3

Participants. Participants were 124 adolescents from an inpatient psychiatric unit. Consecutive admissions to the 16-bed adolescent unit of an urban county psychiatric hospital in the southwestern United States were approached for parental consent and adolescent assent. The average length of stay on the psychiatric unit is 7 days. Inclusion criteria were English fluency, age between 12 and 17, voluntary admission to the hospital, and psychiatrist-determined capacity to provide assent to participate in research (i.e., to understand the nature of the research project, including potential risks and benefits of participation). Adolescents with severe psychosis, intellectual disability, and those who posed a physical danger to research assistants were determined not to have adequate capacity. Complete data were available for 114 participants. The mean age of participants was 14.87 years ($SD = 1.38$ years, range 13–17 years). Participants were predominantly female (64.9%), and identified their race and ethnicity as Hispanic (41.2%), Black (23.7%), White (22.8%), Southeast Asian (2.6%), and multiracial (7.9%). Two adolescents (1.8%) did not report their race/ethnicity.

Measures. Measures included the INQ and the Modified Scale for Suicidal Ide-

ation (MSSI; Miller, Norman, Bishop, & Dow, 1986). The MSSI was used to assess participants' recent suicidal ideation. The MSSI contains 18 interviewer-rated items scored from 0 to 3, with higher scores indicating greater suicidal ideation. Support for the consistency, interrater reliability, and factor structure of the MSSI has been demonstrated in adolescent samples (Pettit et al., 2009). In sample 3, suicidal ideation was, on average, severe ($M = 19.12$, $SD = 13.52$, Median = 22.00; Pettit et al., 2009).

Data Analysis

Prior to analysis, the data were examined for multivariate outliers by examining leverage indices for each individual and defining an outlier as a leverage score four times greater than the mean leverage. Six outliers were detected in sample 1, one outlier was detected in sample 2, and no outliers were detected in sample 3. Analyses were conducted both with and without outliers included in the data and conclusions remained the same in all instances. The results presented here include the outliers. Due to violations of the assumption of normality, analyses were conducted using an estimator (MLR) robust to violations of normality based on the Huber-White algorithm in MPlus version 6.12 (Muthen & Muthen, 2007).

To examine the fit of the factor models, several global fit indices were used, including the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). Good model fit is indicated by RMSEA values of .06 or less, SRMR values of .08 or less (Hu & Bentler, 1999), and CFI and TLI values close to .95 or greater, although values in the range of .90–.95 were considered acceptable fit, especially in the presence of good fit for other global fit indices (Brown, 2006). Given the small sample size in sample 3 and the association between fit statistics and sample size (Marsh, Balla, & McDonald, 1988), it was

expected that models evaluated in sample 3 would demonstrate less than excellent fit, but show a pattern of results similar to those in samples 1 and 2. Parameter estimates were also examined for Heywood cases (or offending estimates); none were present. In all cases, models were statistically over-identified.

RESULTS

Confirmatory Factor Analyses

Table 1 provides the items present in each of the five versions of the INQ. For each version of the INQ, a two-factor solution was assessed, reflecting perceived burdensomeness and thwarted belongingness factors and consistent with the literature to date. Items were set to load onto their hypothesized factor, with the factors allowed to correlate. Similar to the work of Van Orden et al. (2012) and due to consistently high modification indices across versions and samples, a pair of correlated residuals was included for each scale (items 1 and 3 on the perceived burdensomeness scales and items 20 and 21 on the thwarted belongingness scales). Indices of fit for the models are presented in Table 2.

In sample 1, correlations between the perceived burdensomeness factor and the thwarted belongingness scales ranged from .52 to .72, indicating moderately to strongly correlated yet distinct factors, and providing further evidence in support of the appropriateness of the two-factor solutions. As the different versions were non-nested models with a different number of indicators in each, comparison of fit between the different versions could not be conducted via chi-squared difference tests or comparison of AIC and BIC values. Thus, comparison of fit was conducted via inspection of global indices of model fit, with regard to the suggested acceptable values for each index, which provided a rough estimate of comparative fit. As can be seen in Table 2, the INQ-25 and INQ-18 met few criteria for

acceptable model fit. The INQ-15, INQ-12, and INQ-10 met criteria for acceptable fit for all global indices of fit.

In sample 2, correlations between the perceived burdensomeness factor and the thwarted belongingness scales ranged from .42 to .65, indicating moderately to strongly correlated yet distinct factors. The INQ-25 and INQ-18 did not meet any criteria for acceptable model fit (see Table 2). The INQ-15 met criteria for acceptable fit. The INQ-12 met few criteria for acceptable fit. The INQ-10 met standards for acceptable model fit for the majority of fit indices.

In sample 3, correlations between perceived burdensomeness factor and thwarted belongingness scales ranged from .51 to .71, indicating moderately to strongly correlated yet distinct factors. The INQ-25 and INQ-18 did not meet any criteria for acceptable model fit (see Table 2). The INQ-15 met criteria for acceptable fit for two indices. The INQ-12 did not meet any criteria for acceptable model fit. The INQ-10 met acceptable model fit for one index.

Internal Consistency

To examine the internal consistency of each of the subscales, Cronbach's coefficient alphas were generated for each subscale in each sample (presented in Table 2). In all samples, all perceived burdensomeness and thwarted belongingness subscales demonstrated good internal consistency (α 's ranged from .81 to .88 for sample 1, from .81 to .90 for sample 2, and from .75 to .90 for sample 3).

Concurrent Predictive Validity

To examine the concurrent predictive validity of each of the five versions of the INQ, regression models were tested using robust maximum likelihood procedures. Results of the regression models are presented in Table 3. In each, perceived burdensomeness and thwarted belongingness were entered simultaneously as predictors of concurrent suicidal ideation.

TABLE 1
Items Included in Each Version of the INQ

Item	INQ-25	INQ-18	INQ-15	INQ-12	INQ-10
Perceived burdensomeness items					
1. These days, the people in my life would be better off if I were gone	X	X	X	X	X
2. These days, I think I give back to society	X				
3. These days, the people in my life would be happier without me	X	X	X	X	X
4. These days, I think I have failed the people in my life	X	X		X	
5. These days, I think people in my life would miss me if I went away	X				
6. These days, I think I am a burden on society	X	X	X		
7. These days, I think I am an asset to the people in my life	X				
8. These days, I think my ideas, skills, or energy make a difference	X				
9. These days, I think my death would be a relief to the people in my life	X		X		X
10. These days, I think I contribute to the well-being of the people in my life	X	X		X	
11. These days, I feel like a burden on the people in my life	X	X		X	
12. These days, I think the people in my life wish they could be rid of me	X	X	X	X	X
13. These days, I think I contribute to my community	X				
14. These days, I think I make things worse for the people in my life	X	X	X	X	X
15. These days, I think I matter to the people in my life	X	X			
Thwarted belongingness items					
16. These days, other people care about me	X	X	X	X	
17. These days, I feel like I belong	X	X	X		X
18. These days, I rarely interact with people who care about me	X	X	X		
19. These days, I am fortunate to have many caring and supportive friends	X	X	X		X
20. These days, I feel disconnected from other people	X	X	X	X	X
21. These days, I often feel like an outsider in social gatherings	X	X	X		X
22. These days, I feel that there are people I can turn to in times of need	X	X	X	X	
23. These days, I feel unwelcome in most social situations	X				
24. These days, I am close to other people	X	X	X	X	X
25. These days, I have at least one satisfying interaction every day	X	X	X	X	

TABLE 2
Global Fit Indices, Internal Consistencies, and Correlations Between Scales

	X ²	RMSEA	CFI	TLI	SRMR	Internal consistency		Correlation of PB and TB
						PB	TB	
“Good fit” indicated by:		≤.06	≥.95	≥.95	≤.08			
“Acceptable fit” indicated by:			≥.90	≥.90				
Sample 1								
INQ-25	946.35***	.08	.80	.78	.08	.86	.88	72.00***
INQ-18	385.29***	.07	.89	.87	.06	.85	.87	.70***
INQ-15	151.91***	.04	.96	.95	.05	.85	.87	.57***
INQ-12	122.02***	.06	.94	.92	.07	.85	.81	.63***
INQ-10	26.93	.00	1.00	1.01	.03	.84	.84	.52***
Sample 2								
INQ-25	1218.98***	.13	.67	.64	.11	.90	.82	.65***
INQ-18	485.45***	.11	.82	.79	.10	.89	.81	.57***
INQ-15	195.21***	.08	.93	.91	.06	.90	.81	.42***
INQ-12	159.80***	.10	.90	.87	.09	.87	.85	.57***
INQ-10	57.65**	.06	.97	.95	.04	.90	.83	.44***
Sample 3								
INQ-25	705.81***	.12	.66	.62	.14	.89	.84	.71***
INQ-18	285.15***	.10	.81	.78	.14	.84	.83	.61***
INQ-15	150.38***	.08	.91	.89	.11	.90	.83	.52***
INQ-12	122.59***	.11	.85	.81	.12	.88	.75	.51***
INQ-10	71.54***	.10	.91	.88	.11	.90	.80	.57***

Note. INQ, Interpersonal Needs Questionnaire; RMSEA, root mean square error of approximation; CFI, Comparative Fit Index; TLI, Tucker-Lewis Index; SRMR, standardized root mean square residual; PB, perceived burdensomeness; TB, thwarted belongingness. Internal consistencies are Cronbach's α 's. Bold values indicate acceptable model fit.

** $p < .01$; *** $p < .001$.

In sample 1, the models accounted for between 33.7% and 41.1% of the variance in suicidal ideation scores. Both perceived burdensomeness and thwarted belongingness were significant independent predictors of concurrent suicidal ideation for the INQ-10 and INQ-15. In the regression models for the INQ-12, INQ-18, and INQ-25, only perceived burdensomeness, not thwarted belongingness, was a significant independent predictor of concurrent suicidal ideation. Consistent with the IPTS, additional regression models were generated that included perceived burdensomeness, thwarted belongingness, and their interaction term predicting concurrent suicidal ideation. The interaction term of perceived burdensomeness and thwarted belonging-

ness was not a statistically significant predictor of concurrent suicidal ideation in any of the models.

In sample 2, the models accounted for between 49.7% and 58.8% of the variance in suicidal ideation scores. Both perceived burdensomeness and thwarted belongingness were significant independent predictors of concurrent suicidal ideation for the INQ-10, INQ-12, and INQ-15. In the regression models for the INQ-18 and INQ-25, only perceived burdensomeness, not thwarted belongingness, was a significant independent predictor of concurrent suicidal ideation. The interaction between perceived burdensomeness and thwarted belongingness was a significant predictor of concurrent suicidal ideation in each of the models.

TABLE 3
Regression Models of Perceived Burdensomeness and Thwarted Belongingness Predicting Suicidal Ideation

Sample 1					Sample 2					Sample 3				
Model	Est.	SE	t	p	Model	Est.	SE	t	p	Model	Est.	SE	t	p
<i>INQ-25</i> ($R^2 = 0.372$)					<i>INQ-25</i> (adj. $R^2 = 0.497$)					<i>INQ-25</i> (adj. $R^2 = 0.358$)				
PB	8.04	1.31	6.16	<.001	PB	12.23	1.12	10.35	<.001	PB	0.33	0.07	4.66	<.001
TB	0.67	0.54	1.24	.22	TB	1.06	0.84	1.26	.21	TB	0.12	0.11	1.09	.28
<i>INQ-18</i> ($R^2 = 0.411$)					<i>INQ-18</i> (adj. $R^2 = 0.551$)					<i>INQ-18</i> (adj. $R^2 = 0.379$)				
PB	8.91	1.35	6.58	<.001	PB	11.80	0.94	12.63	<.001	PB	0.52	0.10	5.35	<.001
TB	0.25	0.52	0.47	.64	TB	0.98	0.71	1.37	.17	TB	0.15	0.10	1.48	.14
<i>INQ-15</i> ($R^2 = 0.337$)					<i>INQ-15</i> (adj. $R^2 = 0.588$)					<i>INQ-15</i> (adj. $R^2 = 0.392$)				
PB	8.94	0.81	11.05	<.001	PB	11.47	0.83	13.90	<.001	PB	0.56	0.12	4.79	<.001
TB	1.71	0.420	4.03	<.001	TB	2.52	0.61	4.10	<.001	TB	0.19	0.10	1.84	.07
<i>INQ-12</i> ($R^2 = 0.398$)					<i>INQ-12</i> (adj. $R^2 = 0.525$)					<i>INQ-12</i> (adj. $R^2 = 0.380$)				
PB	8.45	1.24	6.82	<.001	PB	10.58	0.91	11.57	<.001	PB	0.60	0.10	5.90	<.001
TB	0.22	0.45	0.50	.62	TB	1.54	0.76	2.03	.04	TB	0.26	0.16	1.62	.11
<i>INQ-10</i> ($R^2 = 0.379$)					<i>INQ-10</i> (adj. $R^2 = 0.558$)					<i>INQ-10</i> (adj. $R^2 = 0.381$)				
PB	8.12	1.56	5.20	<.001	PB	10.41	0.83	12.49	<.001	PB	0.70	0.13	5.33	<.001
TB	1.62	0.40	4.08	<.001	TB	2.86	0.66	4.37	<.001	TB	0.31	0.15	1.99	<.05

Note. INQ, Interpersonal Needs Questionnaire; PB, perceived burdensomeness scale; TB, thwarted belongingness scale. All regression models included an intercept term, which was significant ($p < .001$) in all models, all R^2 values are adjusted.

In sample 3, the models accounted for between 35.8% and 39.2% of the variance in suicidal ideation scores. Both perceived burdensomeness and thwarted belongingness were significant independent predictors of concurrent suicidal ideation for the INQ-10. In the regression models for the INQ-12, INQ-15, INQ-18, and INQ-25, only perceived burdensomeness, not thwarted belongingness, was a significant independent predictor of concurrent suicidal ideation. The interaction between perceived burdensomeness and thwarted belongingness was not a significant predictor of concurrent suicidal ideation in any of the models.

DISCUSSION

The present study provides the first evaluation, to our knowledge, of five versions of the INQ simultaneously within the same samples. The factor structure, internal consistency, and concurrent predictive validity of each of the five INQ versions were evaluated to (a) identify those versions with optimal overall psychometric properties to encourage their future use, and (b) assist researchers who seek to aggregate findings or explain discrepant results across studies.

With regard to factor structure, the INQ-25 and INQ-18 met few, if any, criteria for acceptable model fit in any sample, whereas the INQ-12 met criteria for acceptable fit in sample 1 but not in samples 2 or 3. The INQ-15 and INQ-10 met criteria for acceptable fit in samples 1 and 2, with close to acceptable fit in sample 3. Of note, it was expected that models evaluated in sample 3 would demonstrate less than excellent fit, due to the small sample size. Thus, the INQ-15 and INQ-10 most consistently demonstrated factorial validity, providing evidence in support of their continued use.

With regard to internal consistency, both subscales of the INQ demonstrated acceptable to good internal consistency

across all five versions in all samples. No single version appeared to demonstrate stronger or weaker internal consistency than any of the others. The internal consistencies of the different versions fail to suggest any basis for recommending particular versions of the INQ over others.

With regard to concurrent predictive validity, perceived burdensomeness and thwarted belongingness consistently were independent and significant predictors of concurrent suicidal ideation only for the INQ-10. For each of the other four versions of the INQ, perceived burdensomeness consistently and significantly predicted concurrent suicidal ideation, but thwarted belongingness was not a consistently significant predictor of suicidal ideation. The interaction between perceived burdensomeness and thwarted belongingness was not a statistically significant predictor of concurrent suicidal ideation when using any of the versions of the INQ in samples 1 and 3. In contrast, the interaction was a statistically significant predictor of concurrent suicidal ideation across all versions of the INQ in sample 2.

Implications for Interpreting Research on the IPTS

The absence of consistent support for thwarted belongingness as a significant predictor of concurrent suicidal ideation for all versions except the INQ-10 does not align with the IPTS. It is, however, consistent with the preponderance of previous empirical reports using the INQ-12 (Hill & Pettit, 2012; Merchant, 2010; Van Orden et al., 2008), INQ-18 (Monteith et al., 2013; Wong et al., 2011), and INQ-25 (Anestis & Joiner, 2011), in which thwarted belongingness did not significantly predict suicide-related behaviors. It is possible that contradictory results across studies that used different versions of the INQ may be partially explained by differences in measurement of thwarted belongingness or perceived burdensomeness constructs across versions of the INQ. If contradictory results are a

product of measurement differences, careful consideration of both the theoretical and operational definitions of perceived burdensomeness and thwarted belongingness is needed. Measuring different aspects of thwarted belongingness or perceived burdensomeness may influence outcomes in tests of the hypotheses of the IPTS. Further exploration of facets or domains of these subscales is needed and may inform future development of the IPTS.

The null finding for the interaction of perceived burdensomeness and thwarted belongingness predicting suicidal ideation in samples 1 and 3 is similar to findings of Anestis and Joiner (2011) and Bryan, Morrow et al. (2010). It contrasts, however, with findings of a significant interaction effect when using the INQ-18 among Asian American college students (Wong et al. (2011) and the INQ-12 among college students (Van Orden et al., 2008). The findings of Wong et al. (2011) and Van Orden et al. (2008) are consistent with the results of sample 2, in which the interaction between perceived burdensomeness and thwarted belongingness was a significant predictor of concurrent suicidal ideation across versions. Further research is needed to explore reasons for this inconsistency and to identify the circumstances under which the interaction significantly predicts suicidal ideation. The fact that the discrepant findings on the interaction effect arose across samples and not across versions of the INQ highlights the possibility that sampling strategy also may influence outcomes in tests of the hypotheses of the IPTS.

Limitations

The results of this study should be viewed within the context of its limitations. First, this study used data from two samples of college students and one sample of adolescent psychiatric inpatients. The college student participants in samples 1 and 2 were predominantly female and of Hispanic ethnicity, potentially limiting the generalizability of the results. Furthermore, direct

comparisons across samples are inappropriate, as the samples differed on several key aspects, including race/ethnicity, age (adolescents vs. college students), severity of suicidal thoughts, and the method of measurement of suicidal ideation. Additional research is needed to address these limitations and examine the performance of the INQ in a variety of samples and with various outcome measures. For example, samples 1 and 2 used the Adult Suicidal Ideation Questionnaire, but sample 3 used the Modified Scale for Suicidal Ideation. While others have used these same measures (e.g., Garza & Pettit, 2010; Hill & Pettit, 2013), a number of studies have used the INQ with other measures of suicide-related outcomes, including the Suicidal Behaviors Questionnaire-Revised (e.g., Bryan, Cukrowicz et al. 2010; Bryan et al., 2012, 2013) and the Beck Scale for Suicide Ideation (Van Orden et al., 2012). This abundance of outcome measures provides an additional challenge to integrating findings across studies as they may measure different aspects of suicidal thoughts and behaviors (e.g., active vs. passive ideation, suicidal ideation vs. suicide attempt vs. a combined measure).

Furthermore, the five versions of the INQ were drawn from responses to the INQ-25. Thus, the current data did not account for the possible influence of question order effects (e.g., consecutive questions may be answered more similarly than nonconsecutive questions). The data were also cross-sectional, thus the predictive validity of the INQ in regard to suicidal ideation was evaluated concurrently, rather than prospectively. Future research should consider the prospective predictive validity of the INQ.

Conclusions and Recommendations for Selection of a Measure

Each of the five versions of the INQ demonstrated acceptable to good internal consistency for both the perceived burdensomeness and thwarted belongingness

subscales. Only the INQ-15 and INQ-10 consistently demonstrated acceptable model fit. The INQ-10 also may help reduce participant or patient burden in situations where time is limited and brevity is valued. It is recommended that future research use the INQ-15 or INQ-10. Different versions of the INQ led to different conclusions

regarding the association between thwarted belongingness and concurrent suicidal ideation. This may help explain the conflicting results present in the extant literature. Further examination of the constructs being measured by the INQ subscales is warranted.

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