

**A systematic review of the predictions of the Interpersonal-Psychological Theory of Suicidal Behaviour**

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## Abstract

**Context:** Since the development of the Interpersonal Psychological Theory (IPTS; Joiner, 2005), a growing body of literature has emerged testing different aspects of the theory across a range of populations. **Objective:** The aim of this review was to identify support for the IPTS, and critical gaps in the evidence base, by systematically reviewing current evidence testing the effects of thwarted belongingness, perceived burdensomeness, and acquired capability on suicide ideation and attempt. **Methods:** PsycInfo and PubMed databases were electronically searched for articles published between January 2005 and July 2015. Articles were included if they directly assessed the IPTS constructs as predictors of suicidal ideation or suicide attempt. **Results:** Fifty-eight articles reporting on 66 studies were identified. Contrary to expectations, the studies provided mixed evidence across the theory's main predictions. The effect of perceived burdensomeness on suicide ideation was the most tested and supported relationship. The theory's other predictions, particularly in terms of critical interaction effects, were less strongly supported. **Conclusions:** Future research focused on expanding the availability of valid measurement approaches for the interpersonal risk factors, and further elaborating upon their mixed relationships with suicide ideation and attempt across multiple populations is important to advance theoretical and clinical progress in the field.

**Keywords:** Interpersonal psychological theory; suicide, thwarted belongingness; perceived burdensomeness; acquired capability; systematic review

## **Introduction**

Suicide is a phenomenon that bears a significant public health impact worldwide. Each year it is estimated that approximately 800,000 people die by suicide, ranking it as the second leading cause of death in 15-29 year olds globally (WHO, 2014). Though preventable, suicidal thoughts and behaviours are complex phenomena influenced by several interacting factors, including personal, social, psychological, cultural, biological, and environmental (Goldston et al., 2009; King et al., 2001; Mann, 2003; O'Connor, 2011). As such, there is no singular underlying explanation as to why a person may attempt suicide, resulting in a highly contextual and varied picture of the barriers and facilitators to help seeking.

Recently, the Interpersonal Psychological Theory of Suicide (IPTS) (Joiner, 2005; Van Orden et al., 2010) was developed with the aim of providing a theoretical model of suicide behaviour. The theory consolidates a broad range of suicide risk factors, and provides testable predictions of who will develop desire for suicide (i.e., ideation), and from these, who will go on to attempt. As such, the theory holds much promise in regards to bettering our understanding of how certain suicide risk factors interact, and where prevention and intervention efforts may be best focused.

According to the IPTS, suicidal desire is caused by the simultaneous presence of two proximal, causal risk factors: (1) thwarted belongingness, (2) perceived burdensomeness, and hopelessness (i.e., “this will never change”) about these states (Joiner, 2005; Van Orden et al., 2010). Thwarted belongingness refers to the experience that one is alienated from friends, family, or other valued social circles. It is said to comprise of two facets, loneliness (i.e., “I feel disconnected from others”) and the absence of reciprocal care (i.e., “I have no one to turn to and I don’t support others”). It is viewed as a dynamic cognitive-affective state that is influenced by inter and intra-personal factors such as experiencing family conflict, living alone, possessing few social supports, and being prone to interpret others’ behaviour as

rejection (Van Orden et al., 2010). Perceived burdensomeness, on the other hand, refers to the view that one's existence is a burden on friends, family members, and/or society, and comprises of two facets, self-hate (i.e., "I hate myself") and feelings of liability (i.e., "my death is worth more than my life to others"). Like thwarted belongingness, perceived burdensomeness is conceptualised as a dynamic cognitive affect state, where risk factors such as homelessness, unemployment, physical illness, and feelings of low-self-esteem and being unwanted are said to contribute to its development (Van Orden et al., 2010). Though it is hypothesised that experiencing either perceived burdensomeness or thwarted belongingness alone will elicit passive suicidal ideation, it is their interaction coupled with the view that they are stable and unchanging (i.e., hopelessness) that will cause active suicidal desire.

The development from active suicidal desire to suicidal intent is said to only result through the presence of an additional third construct: (3) acquired capability. Acquired capability refers to one's ability to overcome the inherent drive for self-preservation and engage in lethal self-injury (Joiner, 2005). This is hypothesised as being possible due to a lowered fear of death resulting from repeated exposure and habituation to physically painful and/or fear-inducing experiences, and an elevated tolerance of physical pain. It is viewed as a continuous construct that accumulates over time, with risk factors such as family history of suicide, previous suicide attempt, exposure to combat, and childhood maltreatment contributing to its development (Ribeiro & Joiner, 2009; Van Orden et al., 2010). Thus, individuals who have high levels of all three constructs, thwarted belongingness, perceived burdensomeness, and acquired capability, are said to be at most risk for lethal suicidal behaviour, as they possess both the desire for and capability to attempt suicide. See Figure 1.

Since the development of the IPTS in 2005, a growing body of research has emerged testing different aspects of the theory across a range of populations. In 2009, an article on the current status and future directions of the IPTS stated that the theory has stood up to 20 direct

empirical tests, with results generally substantiating the theory's main predictions (Ribeiro & Joiner, 2009). Since then, two systematic reviews on the IPTS have been published, one reporting on the role of perceived burdensomeness on suicide-related behaviour within clinical samples (Hill & Pettit, 2014), and another examining support for the IPTS from studies published between 2002-2011 (Wachtel & Teismann, 2013).

In their systematic review of 27 empirical studies testing the association between perceived burdensomeness and suicide ideation, suicide attempts, or suicide within clinical samples, [Hill and Pettit \(2014\)](#) found perceived burdensomeness to have statistically significant bivariate associations with both suicide ideation and past suicide attempt. Perceived burdensomeness was also found to be a predictor of suicidal ideation beyond the effects of other well established risk factors, and played a role as both moderator and mediator between suicide-related behaviours and other risk and protective factors. The authors noted that the majority of studies conducted focused on the relationship between perceived burdensomeness and suicide ideation, with results highlighting the role of perceived burdensomeness as a potential route for suicide intervention in clinical populations. A limitation of this review, however, is that it focused exclusively on the role of perceived burdensomeness within clinical samples, to the exclusion of the theory's more critical interaction predictions and applicability within other sample types.

The other systematic review, by Wachtel and Teismann (2013), was more comprehensive, in that it reviewed the results of 29 studies (published between 2002-2011) that examined support for all three interpersonal risk factors in relation to suicide-related behaviours. The authors found perceived burdensomeness, thwarted belongingness, and acquired capability to be associated with different facets of suicidality, concluding that there was a lack of studies investigating the interrelation of the theory's constructs. However, this review was published solely in German with its findings being inaccessible to non-German

readers in the field. Additionally, the review was limited to articles published up to 2011, with a considerable proliferation of IPTS studies since that time.

Thus, the aim of the present review was to provide the first English systematic review of the full set of predictions of the IPTS across multiple populations. To assess the predictive power of the IPTS constructs independently of the contribution of other major suicide risk factors, the review focused specifically on the results of studies that adjusted for the presence of other IPTS variables (i.e., thwarted belongingness, perceived burdensomeness, and acquired capability) and/or mental health-related measures (e.g., depression, anxiety, hopelessness) to provide a rigorous test of these predictions. In doing so, the current review aims to identify whether empirical research supports the theory, and to highlight critical gaps in the evidence base by reviewing what populations and what aspects of the theory have been most tested and supported.

### **Methods**

On the 8<sup>th</sup> of July 2015, the Medline and PsycInfo databases were electronically searched for English-language, human, peer reviewed articles published from January 2005 up to July 2015 using the search terms: “Interpersonal psychological OR interpersonal-psychological OR Joiner\* OR thwarted belong\* OR perceived burden\* OR acquired capability AND suicid\*.” With limits imposed, 315 records were identified through database searching, and two additional articles from reference list searches. After duplicates were removed, 207 records were screened by the primary author for relevance to the systematic review. Sixty-three articles were excluded based on content (i.e., articles that were topically unrelated), and type of publication (i.e., review and scale development articles). The remaining 144 articles were considered for full-text review.

Full-text articles were coded by the primary author (JM) and one of three independent reviewers (PJB, ALC, JH). Potential discrepancies in double coding were resolved by

reaching a joint consensus between the two authors, or by assent of a third author where consensus could not be reached. Articles were included in the systematic review if they met all of the following criteria: (i) included a direct predictor measure of IPTS components (i.e., either thwarted belongingness, perceived burdensomeness, or acquired capability), (ii) included a direct outcome measure of suicidal thoughts or behaviours (i.e., either suicide ideation, attempt, or a composite measure), and (iii) reported on original, quantitative data. The exclusion criteria were as follows: (i) the study did not adjust for the presence of other IPTS variables/and or mental health-related measures, (ii) the article was not in English, (iii) no original data were reported, (iv) the study was a case-control design, (v) the study was qualitative, (vi) the study was not published after 2005, and (vii) the study was not published in a peer-reviewed journal. In the case where analysis was repeated on the same samples across articles, the most comprehensive and/or recent article was chosen for analysis, with the other being excluded.

In total, 58 articles, comprising of 66 studies, adhering to the inclusion and exclusion criteria were included in the present review (see Figure 2). Where sufficient data was available, effect size estimates were calculated based on formulas from “Practical Meta-analysis” by Lipsey and Wilson (2001). Odds Ratios were converted to Cohen’s *d* (Cohen, 1988) for comparability between continuous and dichotomous outcomes using formulas outlined by Hasselblad and Hedges (1995). According to Cohen (1988), an effect size of 0.20 is considered small, 0.50 moderate, and 0.80 large. Where an effect size was not calculable, analyses of results relied on number of tests significant, using an alpha level of  $p < 0.05$ . Due to the heterogeneity of the studies (range of settings), the lack of effect size data, and the insufficiency of available data on interaction effects, we were unable to conduct a meta-analysis.

## **Results**

A total of 66 studies were identified that tested the IPTS constructs in relation to suicide ideation or attempt (See Appendix A for study characteristics). In order to present the results categorically under either suicide ideation or suicide attempt, composite measures such as “suicide risk”, “suicide potential”, “suicide proneness”, “suicidal symptoms,” “suicide behaviour”, “future likelihood of behaviour”, and “suicidality” were classified under suicide ideation, as they all encompassed a measure of suicide ideation. Eleven studies were found to include a composite measure, operationalised by the measurement scale used. The most commonly used composite measurement scale was the 4-item Suicidal Behaviours Questionnaire Revised (SBQ-R; Osman et al., 2001). The SBQ-R comprises of 4 items that measure suicidal ideation and attempt (“Have you ever thought about or attempted to kill yourself”); suicide ideation in the past year (“How often have you thought about killing yourself in the past year”); communication of intent (“Have you ever told someone that you were going to commit suicide, or that you might do it”); and likelihood of future attempts (“How likely is it that you attempt suicide someday”). Other composite measures used were similar in that they comprised of items or subscales that combined current suicidal ideation, suicide plans and preparation, and communication or threats of suicide.

Across the 66 studies, 206 tests adjusted for the presence of other IPTS variables (i.e., thwarted belongingness, perceived burdensomeness, and acquired capability) and/or mental health-related measures (e.g., depression, anxiety, hopelessness). The largest number of tests was on the main effect of perceived burdensomeness on suicide ideation (33.4%), followed by thwarted belongingness on suicide ideation (22.6%). Tests on the main effect of acquired capability on suicide attempt (4.3%), and the two-way (5.8%) and three-way interactions (3.3%) proposed by the IPTS were scant in comparison. Table 1 summarises the results of the adjusted tests across the various IPTS constructs.

## **Suicide Ideation**



**IPTS critical interaction effect: Thwarted belongingness and perceived burdensomeness on suicide ideation.**

Twelve tests of the interaction between thwarted belongingness and perceived burdensomeness on suicide ideation were found, 8 (66.6%) of which were significant, and 4 (33.3%) non-significant. Significant study sample sizes ranged from 115 to 6133, with a mean of 1033.4, and median of 239. Non-significant study sample sizes ranged from 60 to 293, with a mean of 147, and median of 88. Only two studies reported an effect size, with effect sizes ranging from 0.46 to 0.61, with a mean of 0.53, considered a moderate effect.

The interaction of thwarted belongingness and perceived burdensomeness was found to predict suicide ideation across hospital, primary care, school, and community populations. In one of the largest studies testing this interaction in a community sample, Christensen, Batterham, Mackinnon, Donker, and Soubelet (2014) found that after adjusting for gender, age, and the IPTS main effects, the combination of high levels of thwarted belongingness and perceived burdensomeness significantly contributed to suicide ideation in a cross-sectional sample of 1,167 participants aged between 32-38 years old. This effect was also observed in studies that used proxy measures, such as social support (proxy for thwarted belongingness) and mattering (proxy for perceived burdensomeness). In their study on 815 young adults, Joiner et al. (2009) found that those low in both mattering and family social support reported the highest levels of suicidal ideation, controlling for the effects of six-month and lifetime histories of depression.

Some studies showed that the interaction between thwarted belongingness and perceived burdensomeness on suicide ideation was only significant at high levels of perceived burdensomeness (Van Orden, Witte, Gordon, Bender, & Joiner, 2008(1)), high levels of thwarted belongingness (Kleiman, Riskind, Stange, Hamilton, & Alloy, 2014; O'Keefe et al., 2014), or by age group (Christensen, Batterham, Soubelet, & Mackinnon,

2013). In their community-based study of 6,133 participants aged between 28 to 72 years of age, Christensen et al. (2013) found that the interaction between thwarted belongingness and perceived burdensomeness was significant in a model including the main effects of thwarted belongingness, perceived burdensomeness, hopelessness, and the two-way and three-way interactions between the constructs only when the analyses was stratified by age, as opposed to when analysed in the full sample. Here, the interaction between thwarted belongingness and perceived burdensomeness became non-significant in the full sample when the three-way interaction between thwarted belongingness, perceived burdensomeness, and hopelessness was included, suggesting that hopelessness plays an important role as a suicide risk factor. Studies reporting on this interaction effect were typically limited by cross-sectional designs and focus on samples with low base rates of suicidal ideation.

#### **IPTS main effect: Thwarted belongingness and suicidal ideation.**

Fifty-five tests were conducted on the effect of thwarted belongingness on suicide ideation. Of these, 22 (40%) were significant, and 33 (60%) were non-significant. Sample sizes among significant studies ranged from 38 to 6133, with a mean of 721.6, and median of 335. Non-significant study sample sizes ranged from 60 to 994, with a mean of 328.4, and median of 208. Only three studies reported an effect size, with effect sizes ranging from 0.49 to 0.74, with a median of 0.57, considered a moderate effect.

Thwarted belongingness was found to predict suicide ideation, suicide risk, and suicidality across the mental health clinic, primary care, school, community, and detainee populations. One study conducted on a sample of 129 undergraduates found that thwarted belongingness contributed to 6% of the variance in suicide ideation (Davidson, Wingate, Rasmussen, & Slish, 2009). The effect of thwarted belongingness on suicide ideation was also reflected in studies using proxy measures, such as distress in interpersonal relations (Wilson, Kowal, Henderson, McWilliams, & Peloquin, 2013), detachment/estrangement

(Davis, Witte, & Weathers, 2014), family belongingness (Ploskonka & Servaty-Seib, 2015), social support (Christensen et al., 2013), social relations (Joiner et al., 2009(1)), and interpersonal conflict and belongingness (You, Van Orden, & Conner, 2011). Some of the studies used proxy measures because they undertook secondary analysis of an existing dataset, and thus had to examine the IPTS interpersonal risk factors as post-hoc constructs. Others did so to compare different facets of thwarted belongingness. For instance, Ploskonka and Servaty-Seib (2015) explored the relationship between three domains of belongingness (family, peer, and academic institution) and suicide ideation in a sample of 249 undergraduates. They found that the only domain that significantly contributed to suicide ideation was family belongingness, suggesting that it may be one of the most important sources of belongingness.

In regards to the non-significant tests, many studies that included measurements of both perceived burdensomeness and thwarted belongingness found that only perceived burdensomeness was a significant predictor of suicide ideation within hospital, mental health clinic, and school settings. In one undergraduate sample, the effect of thwarted belongingness on suicide ideation became non-significant after adjusting for depressive symptoms (Hill & Pettit, 2013). Additionally, in an online sample, thwarted belongingness was only significant after accounting for mediation by hopelessness (Kim & Yang, 2015).

#### **IPTS main effect: Perceived burdensomeness and suicidal ideation.**

Sixty-nine tests were conducted on the effect of perceived burdensomeness on suicide ideation. Of these, 57 (82.6%) were significant, and 12 (17.3%) were not significant. Significant study sample sizes ranged from 47 to 6133, with a mean of 419.6, and median of 245. Non-significant study sample sizes ranged from 38 to 815, with a mean of 286.8, and median of 205. Only six studies reported an effect size, with effect sizes ranging from 0.61 to 12.60, with a median of 1.42, considered a large effect.

Perceived burdensomeness was found to predict suicide ideation and suicide risk across the hospital, mental health clinic, primary care, school, community, and online populations. Some of the studies indicated that perceived burdensomeness contributed substantial additional variance (36% and 41%) to suicide ideation, above and beyond the contribution of depressive symptoms and hopelessness (Davidson et al., 2009; Van Orden, Lynam, Hollar, & Joiner, 2006). However, these studies were limited by their cross-sectional design and use of primarily Caucasian samples. The effect of perceived burdensomeness on suicide ideation was also reflected in studies using proxy measures, such as whether people's lives would be positively impacted by one's death (Kanzler, Bryan, McGeary, & Morrow, 2012). For instance, in a sample of 103 patients experiencing chronic pain recruited from a mental health out-patient clinic Kanzler et al. (2012) found perceived burdensomeness to be the sole predictor of suicidal ideation, even after controlling for age, gender, depressive symptoms, and pain severity. However, this study was limited by its use of a non-validated single-item assessment for perceived burdensomeness and low base rate of suicidal ideation.

Most of the studies that did not find a significant effect for perceived burdensomeness on suicide ideation also found no significant effects for other IPTS variables and covariates. For example, perceived burdensomeness alongside the three-way interaction of thwarted belongingness, perceived burdensomeness and hopelessness (Cukrowicz, Jahn, Graham, Poindexter, & Williams, 2013), and the three-way interaction of direct combat exposure, depression, PTSD, and hopelessness (Bryan, Ray-Sannerud, Morrow, & Etienne, 2013(b)) did not significantly predict suicide ideation in the mental health clinic and primary care settings. These studies were limited by their cross-sectional design and lack of power to detect moderate effect sizes.

### **Acquired capability and suicide ideation.**

There were 21 tests of the relationship between acquired capability and suicide ideation, with 12 found to be (57.1%) significant, and 9 (42.8%) non-significant. Significant study sample sizes ranged from 38 to 1208, with a mean of 324.4, and median of 168. Non-significant study sample sizes ranged from 55 to 1167, with a mean of 374.5, and median of 327.5. No effect size data was available. Acquired capability was found to predict suicide ideation, suicide risk, suicide potential, suicidal symptoms, and suicidality across the mental health clinic, school, and community populations (including military and detainee samples). It has been found to explain a significant portion of variance in suicidal ideation beyond the contribution of prior suicide attempt, stress, depression, and hopelessness in a military sample (Shelef, Levi-Belz, & Fruchter, 2014), and in one study using an undergraduate sample, contributed to 4% of the variance in suicide ideation (Davidson et al., 2009). In one of the few studies conducted on acquired capability conducted outside of the United States, Shelef et al. (2014) found that in a sample of 168 soldiers recruited from the Israel Defence Forces, suicide attempters were found to have significantly higher levels of dissociation and acquired capability compared to psychologically treated and healthy control groups, where depression and acquired capability were found to explain a significant portion of variance in suicide ideation.

### **Suicide Attempt**

#### **IPTS full model: Three-way interaction of thwarted belongingness, perceived burdensomeness, and acquired capability on suicide attempt.**

Seven tests of the interaction between thwarted belongingness, perceived burdensomeness, and acquired capability on suicide attempt were found, 3 (42.8%) of which were significant, and 4 (57.1%) non-significant. Significant study sample sizes ranged from 313 to 6133, with a mean of 2312.6, and median of 492. Non-significant study sample sizes

ranged from 181 to 376, with a mean of 278.5. Only one study reported an effect size, that of 1.01, considered a large effect.

In a cross-sectional study of 313 patients recruited from outpatient and inpatient facilities affiliated with a major U.S. Army medical centre (one of the first studies to assess the full model) the three-way interaction of thwarted belongingness, perceived burdensomeness, and lifetime number of suicide attempts (proxy for acquired capability) was found to predict recent suicide attempt and current suicide status controlling for the covariates of depression, hopelessness, and borderline personality disorder symptoms (Joiner et al., 2009(2)). It was noted that the strength of this effect was similar to other traditionally strong predictors such as family history of suicide. However, like many of the other studies, this study was limited by its cross sectional design and use of proxy measures to assess the IPTS constructs. For instance, lifetime number of suicide attempts was used as a proxy for acquired capability, neglecting other experiences of physically painful or fear-inducing experiences which also contribute to the development of acquired capability.

In another cross-sectional study conducted on 492 patients seeking treatment at a mental health clinic, Anestis and Joiner (2011) found that the three-way interaction predicted participant's lifetime number of suicide attempts, controlling for depression and participant sex. In one of the largest studies on the full model, the interaction between suicide ideation and acquired capability, but not the main effect of acquired capability, was found to predict suicide attempt in a community sample of 1,167 adults (Christensen et al., 2014).

A non-significant effect for the three-way interaction was observed in in-patient settings. For instance, Monteith, Menefee, Pettit, Leopoulos, and Vincent (2013) found that only the two-way interactions of perceived burdensomeness and acquired capability, and thwarted belongingness and acquired capability predicted suicide attempt cross-sectionally.

Here, the only variable that was found to distinguish participants who reported no suicide attempts in the past from those who reported one suicide attempt was recent suicidal ideation.

### **IPTS main effect: Acquired capability and suicide attempt.**

Nine tests were conducted on the effect of acquired capability on suicide attempt. Of these, 5 (55.5%) were significant, and 4 (44.4%) were non-significant. Significant study sample sizes ranged from 44 to 376, with a mean of 177.7, and median of 145.5. Non-significant study sample sizes ranged from 52 to 6133, with a mean of 1659.2, and median of 226. Only three studies reported an effect size, with effect sizes ranging from 0.51 to 1.09, with a median of 0.76, considered a moderate to large effect.

Acquired capability was tested across the hospital, mental health clinic, community, and detainee populations. In one of the three longitudinal studies included in the review, baseline history of suicide attempt (a proxy for acquired capability) was found to predict suicide attempt at 12 months after hospitalisation in an in-patient, primarily Caucasian hospital sample (Czyz, Berona, & King, 2015). Another study conducted in the UK by Ireland and York (2012) found that in a sample of 191 detainees, engagement in a range of self-damaging behaviours (proxy for acquired capability) significantly predicted self-injurious behaviour (proxy for suicide attempt) cross-sectionally.

Of the non-significant studies, acquired capability was found to not be significantly associated with past suicide attempt, nor differentiate individuals in the suicidal behaviour group from individuals in the non-suicidal behaviour groups. One cross-sectional study conducted in a community sample, found that the main effect of acquired capability was only a significant predictor among the middle-aged (44-48) age group (Christensen et al., 2013).

### **Thwarted belongingness and suicide attempt.**

Eleven tests were conducted on the effect of thwarted belongingness on suicide attempt. Of these, 4 (36.3%) were significant, and 7 (63.7%) non-significant. Significant study sample sizes ranged from 131 to 1167, with a mean of 704. Non-significant study sample sizes ranged from 181 to 6133, with a mean of 1185, and median of 376. Only three studies reported an effect size, with effect sizes ranging from 0.51 to 0.89, with a median of 0.54, considered a moderate effect.

Thwarted belongingness was found to predict suicide attempt in studies set in hospital, mental health clinic, school, and community populations. In one cross-sectional study of 131 patients in treatment for opiate dependence, Conner, Britton, Sworts, and Joiner (2007) found that in a model including the effects of drug use severity, aggression, depression, hopelessness, thwarted belongingness, and perceived burdensomeness, only scores on belonging were associated with lower probability of having a history of attempted suicide. The effect of thwarted belongingness on suicide attempt was also reflected in studies using proxy measures such as belongingness (reverse proxy) (You et al., 2011) in a sample of 814 patients in a substance use treatment program.

### **Perceived burdensomeness and suicide attempt.**

There were 13 tests of the relationship between perceived burdensomeness and suicide attempt, 3 (23%) significant, and 10 (76.9%) non-significant. Significant study sample sizes ranged from 215 to 1167, with an average of 554.2, and median of 417.5. Non-significant study sample sizes ranged from 52 to 6133, with an average of 1110.1, and median of 313. Only two studies reported an effect size, with effect sizes ranging from 0.52 to 1.70, with a median of 1.11, considered a large effect. The significant studies were conducted in mental health clinic and community populations. For instance, in a cross-sectional study of 215 mental health out-patients, Hawkins et al. (2014) found that perceived burdensomeness



was significantly associated with past suicide attempt, adjusting for depression, although effect sizes were small. In another cross-sectional study, perceived burdensomeness significantly predicted suicide plans/attempts, alongside thwarted belongingness and acquired capability, adjusting for gender, age, and the two-way interaction between thwarted belongingness and perceived burdensomeness in a sample of 1,167 community-based participants (Christensen et al., 2014).

## **Alternative Relationships**

### **Mediation & moderation effects**

When undertaking the systematic review, the authors came across many studies that tested the effect of thwarted belongingness, perceived burdensomeness, and acquired capability as mediators across the hospital, primary care, mental health clinic, school, and community settings. The following factors were found to significantly mediate the relationship between constructs of the IPTS and suicidal ideation or behaviours:

- Thwarted belongingness: attachment security, agreeableness, parental displacement
- Perceived burdensomeness: anger, depression, post traumatic disorder symptoms, childhood emotional abuse, sexual orientation victimisation, sexual identity, body mass index, negative cognitive style, maladaptive perfectionism, basic need satisfaction
- Both thwarted belongingness and perceived burdensomeness: neuroticism, extraversion, forgiveness of self and others, family discrepancy, discrimination
- Acquired capability: over-exercise

### **Other two-way interactions.**

Other two-way interactions amongst the IPTS risk factors were found to be significant in the literature. These were conducted across the hospital, mental health clinic, school, and community settings and included the interactions between thwarted belongingness and

acquired capability in predicting suicidality, current risk for suicide, and suicide attempt; perceived burdensomeness with individuals' reproductive potential, health, and romantic relationship satisfaction in predicting suicide ideation; thwarted belongingness and optimism, and perceived burdensomeness and optimism in predicting suicide ideation; and acquired capability with agitation, and over-arousal on suicidality and suicidal symptoms.

### **Other three and four-way interactions.**

Other significant three and four-way interactions amongst the IPTS risk factors were reported in the literature. These were conducted across the mental health clinic, school, and community settings and included: the three-way interaction of thwarted belongingness, perceived burdensomeness, and acquired capability on suicide ideation; the three-way interaction of age, combat exposure, and belongingness on suicide ideation; and the four-way interaction of thwarted belongingness, perceived burdensomeness, acquired capability and negative urgency on suicide attempt.

## **Discussion**

### **Overview of the Support for the Interpersonal Psychological Theory of Suicide's Main Predictions**

The current review aimed to systematically examine current evidence testing the effects of thwarted belongingness, perceived burdensomeness, and acquired capability on suicide ideation and attempt. Contrary to our expectations, the studies provided mixed support across the theory's main predictions. The main effect of perceived burdensomeness on suicide ideation was the most tested and supported relationship, with over three-quarters (82.6%) of the studies found to be significant across hospital, mental health clinic, primary care, school, community, and online populations. It was found to contribute a considerably larger amount of variance (36% to 41%) in suicide ideation compared to the contribution of thwarted belongingness, and in some cases overrode thwarted belongingness as the only

significant effect. The main effect of thwarted belongingness on suicide ideation, on the other hand, though found to be significant across a range of settings, was tested less frequently than perceived burdensomeness, and was less supported, with over half (60%) the tests being non-significant due to the stronger effects of perceived burdensomeness and other covariates. In cases where it was found to be significant, thwarted belongingness seemed to contribute a smaller amount of variance in suicide ideation (6%) compared to perceived burdensomeness, and had a moderate median effect size, compared to the large median effect size reported for perceived burdensomeness. Contrary to the IPTS prediction that thwarted belongingness and perceived burdensomeness would be specific to suicide desire, approximately a third of the tests of thwarted belongingness on suicide attempt, and a quarter of perceived burdensomeness on attempt were significant, with a moderate median effect size for the former, and a large median effect size for the latter.

In comparison to the main effects of perceived burdensomeness and thwarted belongingness, the main effect of acquired capability on suicide attempt was tested considerably less, with results providing only partial support. Just over half of the studies found a significant effect for acquired capability on suicide attempt across hospital, mental health clinic, and community populations, with a moderate to large median effect size. Additionally, contrary to the theory's predictions of acquired capability being specific to suicide attempt, half of the tests on acquired capability and suicide ideation were significant. However, it is important to note that this percentage may have been influenced by the re-classification of composite outcomes under suicide ideation.

Studies testing the IPTS predictions regarding the interaction effects were scant in comparison to those testing the main effects of thwarted belongingness and perceived burdensomeness, and showed mixed results. Two thirds (66.6%) of the tests on the interaction between thwarted belongingness and perceived burdensomeness in predicting suicide

ideation were found to be significant, with a moderate mean effect size. The specificity of their interaction contributing to suicide ideation only was supported by the literature. Moreover, only three (42.8%) out of the seven tests on the interaction between thwarted belongingness, perceived burdensomeness, and acquired capability on suicide attempt were significant, with over half of the tests on the full model found to be non-significant across the hospital, mental health clinic, and community populations. However, given that these non-significant effects were found in studies with sample sizes ranging from 181 to 376, these findings may be the product of too many low-powered studies to detect an effect for the full IPTS model, as a large effect size was found in one of the significant studies. Nevertheless, studies that did identify significant interaction effects tended to have similar sample sizes compared to those that did not find an effect.

Overall, these results suggest that, at this point in time, the IPTS may not be as clearly defined nor supported as initially thought. Some of the conflicting findings across thwarted belongingness, acquired capability, and the two-way, and three-way interactions provoke a number of questions, including: (a) whether the interpersonal risk factors have different relationships on suicide ideation and attempt than stipulated by the theory (i.e., alternative interactions), (b) whether the measures commonly used across the studies adequately capture the constructs, (c) whether the theory is only accurate in predicting suicidal outcomes for a subset of suicidal individuals, and (d) whether there are other crucial variables that may help to better predict suicide ideation and attempt, which are not accounted for in the theory. In relation to (a), it may be that perceived burdensomeness is a more robust interpersonal risk factor for suicide ideation, in comparison to thwarted belongingness, which seems to also have associations with suicide attempt. However, in relation to (b), it may be the case that the measures used to assess thwarted belongingness, particularly the thwarted belongingness subscale on the Interpersonal Needs Questionnaire (INQ; Van Orden, Cukrowicz, Witte, &

Joiner, 2012), do not fully capture the construct. This is an issue that has been raised by other researchers who have observed thwarted belongingness to have non-significant effects on suicide ideation when measured directly, as opposed to when measured using a proxy (Bryan, Clemans, & Hernandez, 2012). As research may privilege testing the relationship of perceived burdensomeness over thwarted belongingness, due to the conflicting findings of the latter, future research could look at validating broader proxy measures for thwarted belongingness, and examining what components may be missing from existing measures in order to balance out the evidence base.

In relation to (c), whether the theory predicts suicidal outcomes for a subset of individuals, recent work using latent class analysis indicates that there are subclasses of individuals experiencing suicide ideation or attempt who display different symptom patterns and risk trajectories over time (Logan, Hall, & Karch, 2011). As suicidality is a heterogeneous outcome, it may be the case that the theory has more explanatory power for certain subsets of individuals. For example, in the case of acquired capability, studies that found a non-significant effect for the role of acquired capability on suicide attempt tended to have larger sample sizes (i.e., had greater statistical power) than those which found a significant effect. This suggests that other factors, such as sample characteristics and study setting may play a role in detecting a relationship. Future research testing the IPTS risk factors across different sub-sets of individuals would help to further specify the generalizability and explanatory strength of the IPTS predictions.

In relation to (d), whether there are other crucial variables of interest not accounted for in the theory, studies have begun to examine the integration of the IPTS with other models of depression and suicide-related behaviour, such as Hopelessness Theory (HT; Abramson, Metalsky, & Alloy, 1989) and the weakest link theory of suicidal ideation (Kleiman, Law, & Anestis, 2014; Kleiman, Riskind, et al., 2014). Research is also being conducted on

counterpart theories, such as the Integrated Motivational-Volitional Model of Suicidal Behaviour (IMV; O'Connor, 2011), which builds upon the IPTS through the incorporation of thwarted belongingness, perceived burdensomeness, and acquired capability as moderators with other constructs, such as defeat and humiliation appraisals and entrapment; the work of which is essential to furthering theoretical endeavours within the field.

In relation to clinical implications, these remain unclear due to the disparity in the number of studies focusing on the different IPTS constructs, and in particular, the lack of studies testing the critical interaction effects. Though work has been undertaken to outline how the IPTS can be used as a framework for identifying pernicious risk factors and tailoring assessments and interventions to address these factors (Stellrecht et al., 2006), further research elucidating the strength of the critical interaction predictions is needed to aid in the development of interventions that are able to specifically target the IPTS constructs to reduce suicidal ideation and suicide attempt. On a preliminary note, the results of the systematic review suggest that intervention-based efforts focused on identifying and decreasing levels of perceived burdensomeness in patients may be a more potent pathway for minimising risk of suicide-related behaviour compared to that of thwarted belongingness. There is also evidence suggesting that interventions based on reducing levels of the three interpersonal risk factors may act to reduce different aspects of suicide-related behaviour than initially stated by the IPTS, the pathways of which could be influenced by additional presenting risk or protective factors. Here, given the focus of the theory on identifying interpersonal risk factors, patients may feel more comfortable talking about feelings of belonging and burden with a clinician, as opposed to discussing suicidal behaviours. Focusing clinical discussions on risk factors, rather than suicidal behaviours, may help to increase engagement with clinical services and circumvent the potential stigma of discussing suicide (Calear, Batterham, & Christensen, 2014; Gulliver, Griffiths, & Christensen, 2010). This interpersonal focus may also promote

clinician empathy by highlighting the clinician's role as an important source of social support in the suicide risk factor framework, and could provide flow-on effects in improving the therapeutic alliance and patient outcomes (Baldwin, Wampold, & Imel, 2007; Lambert & Barley, 2001).

## **Strengths and Limitations**

### **Study strengths and limitations.**

A major strength of the studies included in the current review was that they examined the IPTS across a large range of settings, and were not limited to testing the theory's main predictions. Many explored other interactions between the IPTS interpersonal risk factors and related constructs, contributing to our understanding of how distal risk factors influence suicide-related behaviour through the IPTS proximal risk factors. However, many studies were limited by their cross-sectional design (63 out of 66), largely relying on retrospective reporting of suicidal ideation or behaviours), use of undergraduate samples with a low level of suicide ideation and attempt that were primarily Caucasian and female, use of self-report measures, evaluation of suicide ideation only (where suicide attempt was often underpowered), small sample sizes, and in some cases, small effect sizes for significant findings. Additionally, though the present review provides coverage of four additional years of publications on the IPTS, the same limitations regarding the lack of studies investigating the interrelation of the theory's constructs remain from previous systematic reviews. More high powered studies testing these critical interactions are needed to more comprehensively evaluate support for the theory.

### **Systematic review strengths and limitations.**

To our knowledge, this is the first systematic review on the IPTS that examines the English-language literature on validation studies covering the full theory across multiple

populations. By specifically analysing the results of studies that adjusted for the presence of other IPTS variables and/or mental health-related measures, the review was able to robustly examine the strength of the theory's predictions. Additionally, the inclusion of studies using proxy measures of the IPTS variables highlighted alternative measurement pathways that may aid in better operationalisation of the IPTS constructs.

Although comprehensive, a limitation of the present review was that it did not include articles that used non-standard terminology, nor articles published in languages other than English. The reclassification of suicide composite measures as suicide ideation, though helping to clarify the IPTS risk factor relationships with either suicide ideation or attempt, may also have inadvertently obscured more complex discussion of concurrent suicide-related behaviours. Here, it is important to note that the suicide composite measures that were reclassified as suicide ideation may not have been directly comparable, and should thus be interpreted with caution. Additionally, due to the lack of available data reported by the reviewed studies, the review relied primarily on summarising the results of significance tests, as opposed to effect sizes, limiting estimation of the magnitude of the relationships across studies. Moreover, when effect sizes were reported, Odds Ratios were converted to Cohen's *d* for comparability between continuous and dichotomous outcomes, which relied on the assumptions about the underlying distributions. Lastly, due to the comprehensiveness of the review, resulting in heterogeneity of studies, and the lack of reporting of effect size data, we were unable to conduct a meta-analysis.

## **Conclusions**

The review indicates that the relationship between perceived burdensomeness and thwarted belongingness on suicide ideation, and their interaction with acquired capability on suicide attempt appears to be less straightforward than originally stated in the IPTS. There is a need for more high powered studies examining the two-way and three-way interactions of



the theory's constructs, use of longitudinal designs, and further tests of alternative interaction and mediation effects identified by some studies, highlighting potential for re-thinking the relationships as predicted by the IPTS. Future research focused on expanding the availability of valid measurement approaches for the interpersonal risk factors, and further elaborating upon their mixed relationships with suicide ideation and attempt across multiple populations is important to advance both theoretical and clinical progress in the field.

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## Tables

**Table 1**

Statistical significance of the effects of IPTS constructs on suicide ideation and attempt, based on adjusted tests (N = 206)

	No. tests included	% Significant adjusted	% Not significant adjusted
TB on SI	55	22 (40%)	33 (60%)
TB on SA	11	4 (36.3%)	7 (63.6%)
PB on SI	69	57 (82.6%)	12 (17.3%)
PB on SA	13	3 (23%)	10 (76.9%)
AC on SI	21	12 (57.1%)	9 (42.8%)
AC on SA	9	5 (55.5%)	4 (44.4%)
TB × PB on SI	12	8 (66.6%)	4 (33.3%)
TB × PB on SA	9	0 (0%)	9 (100%)
TB × PB × AC on SA	7	3 (42.8%)	4 (57.1%)

*Note.* TB = Thwarted Belongingness, PB = Perceived Burdensomeness, AC = Acquired

Capability, SI = Suicide Ideation, SA = Suicide Attempt, × = interaction.



## Figures

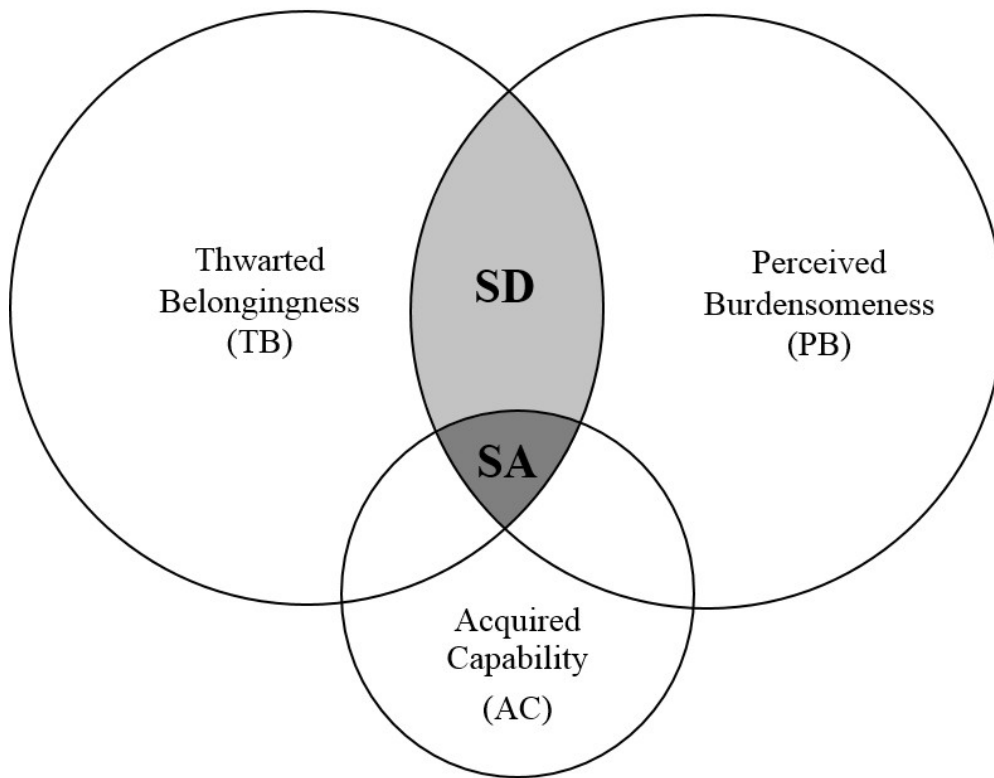


Figure 1. The Interpersonal Psychological Theory of Suicide.

Note. SD = Suicide Desire, SA = Suicide Attempt

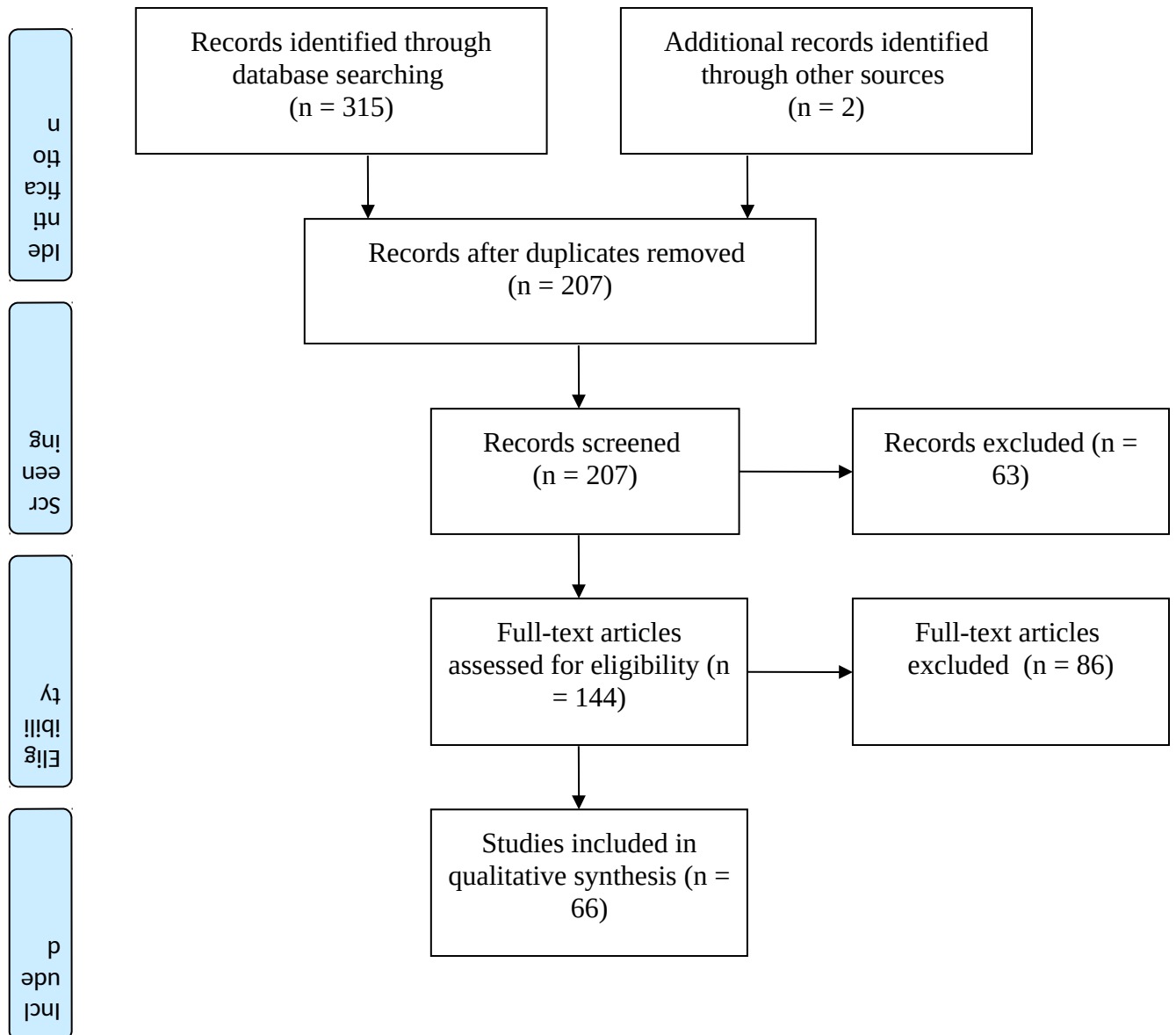


Figure 2. PRISMA flow diagram for studies included and excluded from the systematic review.

Appendix A  
Study characteristics and the support / non-support of the Interpersonal Psychological Theory of Suicide (N = 66)

Author	Year	Country	IPTS constructs	Outcome	Study design	N	Sub-pop	Age	% F	IPTS supported?	
Hospital (in-patient), n = 5											
Conner, K. R.	2007	U.S.A	TB, PB	SA	CS	131	Clinical	41.8 (9.6)	52.7%	Partially	
Joiner, T. E.	2009 (2)	U.S.A	TB×PB, TB×AC, TB×PB×AC	SA	CS	313	Clinical & Military	22.1 (2.7)	18%	Yes	
Monteith, L. L.	2013	U.S.A	TB, PB, TB×PB, PB×AC, TB×AC,	SI, SA	CS	181	Clinical & Military	38.1 (10.8)	51.8%	Partially	
Kene, P.	2014	U.S.A	TB×PB×AC AC	SA	CS	100	Clinical	35.8 (11.4)	37%	Yes	
Czyz, E. K.	2015	U.S.A	TB, PB, AC, TB×PB, TB×AC, PB×AC,	SA	L	376	Adolescents	15.59 (1.31)	72%	No	
Mental health clinic (out-patient), n = 15											
			TB×PB×AC								

Author	Year	Country	IPTS constructs	Outcome	Study design	N	Sub-pop	Age	% F	IPTS supported?
Van Orden, K. A.	2006	U.S.A	PB	SI, SA	CS	343	Clinical	26.5 (9.3)	55%	Yes
Van Orden, K. A.	2008 (3)	U.S.A	PB, AC, PB×AC	Suicide risk	CS	153	Clinical	26.2 (9.3)	54.2%	Partially
Garza, M. J.	2010	U.S.A	PB	SI	CS	61	Specific ethnic group	34.5 (12.0)	100%	Yes
Anestis, M. D.	2011	U.S.A	TB×PB×AC	SA	CS	492	Clinical	26.9 (10.3)	55.1%	Yes
Wong, J. Y.	2011	U.S.A	TB, PB, TB×PB	SI	CS	293	Specific ethnic group	19.1 (2.5)	66.5%	Partially
You, S.	2011	U.S.A	TB	SI, SA	CS	814	Clinical	39 (11.3)	28%	Yes
Bryan, C. J.	2012 (1)	U.S.A	TB, PB, AC, PB×AC	Suicidality	CS	137	Military	28.1 (7.4)	6.3%	Partially
Bryan, C. J.	2012 (2)	U.S.A	TB, PB, AC, PB×AC	Suicidality	CS	55	Clinical &	28.4 (8.2)	12.1%	Partially
Kanzler, K. E.	2012	U.S.A	PB	SI	CS	103	Military No sub-pop	41.91 (13.4)	65.2%	Yes
Bryan, C. J.	2013 (a2)	U.S.A	TB, PB, AC	Suicide risk	CS	219	Military	27.8 (7.4)	8.2%	Yes
Bryan, C. J.	2013 (c)	U.S.A	PB	SI	CS	97	Clinical &	34.1 (8.6)	39.2%	No

Author	Year	Country	IPTS constructs	Outcome	Study design	N	Sub-pop	Age	% F	IPTS supported?
Military										
Davidson, C. L.	2013	U.S.A	TB, PB TB×PB	SI	CS	60	Clinical	26.1 (9.6)	61.6%	Partially
Wilson, K. G.	2013	Canada	TB, PB	SI	CS	303	Clinical	47.4 (10.2)	62.3%	Yes
Hawkins, K. A.	2014	U.S.A	TB, PB, AC	SI, SA	CS	215	Clinical	26.47 (10.0)	65.4%	Partially
Ribeiro, J. D.	2014	U.S.A	AC	Suicidal	CS	527	Clinical	27.7 (10.6)	59.2%	Yes
symptoms										
Primary Care, n = 4										
Cukrowicz, K. C.	2011 (2)	U.S.A	PB	SI	CS	105	Older adults	70.8 (7.6)	74.2%	Yes
Jahn, D. R.	2011	U.S.A	PB	SI	CS	106	Older adults	70.9 (7.6)	74.3%	Yes
Cukrowicz, K. C.	2013	U.S.A	TB, PB, TB×PB	SI	CS	239	Older adults	72.4 (6.9)	60.3%	Partially
Nsamang, S.A.	2013	U.S.A	TB, PB	Suicidal	CS	101	Other	42.1 (12.8)	71%	Yes
behaviour										
School / University, n = 27										
Van Orden, K. A.	2008 (1)	U.S.A	TB, PB, TB×PB	SI	CS	309	No sub-pop	19 (2.3)	74%	Partially
Brown, M. R.	2009 (1)	U.S.A	PB	SI, SA	CS	170	Other	19 (NR)	75.2%	Yes
Brown, M. R.	2009 (2)	U.S.A	PB	SI, SA	CS	181	Other	19 (NR)	62.9%	Yes

Author	Year	Country	IPTS constructs	Outcome	Study design	N	Sub-pop	Age	% F	IPTS supported?
Davidson, C. L.	2009	U.S.A	TB, PB, AC	SI	CS	129	No sub-pop	20.1 (NR)	65.1%	Yes
Davidson, C. L.	2010	U.S.A	TB, PB, TB×PB, TB×AC, PB×AC,	SI	CS	115	Specific ethnic group	20.3 (NR)	67.8	Yes
Davidson, C. L.	2011	U.S.A	TB×PB×AC TB, PB	SI	CS	269	No sub-pop	19.5 (NR)	71.3%	Partially
Rasmussen, K. A.	2011	U.S.A	TB, PB, AC	SI	CS	452	No sub-pop	19.8 (3.1)	65.6%	Yes
Timmmons, K. A.	2011 (2)	U.S.A	TB	SA	CS	1482	Adolescents	16.6 (1.2)	59%	Yes
Hill, R. M.	2012	U.S.A	TB, PB	SI	CS	198	No sub-pop	21.2 (4.4)	59.6%	Partially
Lamnis, D. A.	2012	U.S.A	TB, PB	SI	CS	628	Specific	19.2 (1.2)	100%	Partially
Cole, A. B.	2013	U.S.A	TB, PB	SI	CS	156	ethnic group Indigenous	22.8 (NR)	75.6%	Partially
Hill, R. M.	2013	U.S.A	TB, PB	SI	CS	499	No sub-pop	20.4 (4.3)	73.1%	Partially
Kleiman, E. M.	2013	U.S.A	TB, PB	SI, SA	CS	585	No sub-pop	21.2 (5.1)	82%	Partially
Lamnis, D. A.	2013	U.S.A	TB, PB	SI	CS	994	No sub-pop	19.3 (1.3)	69.5%	Partially
Wang, K. T.	2013	U.S.A	TB, PB	SI	CS	466	Specific	26.3 (4.9)	49.5%	Yes
Zhang, J.	2013	China	TB, PB, AC	SI	CS	439	ethnic group No sub-pop	20.6 (1.3)	58.3%	Partially

Author	Year	Country	IPTS constructs	Outcome	Study	N	Sub-pop	Age	% F	IPTS supported?
Davis, M. T.	2014 (a)	U.S.A	TB	SI	CS design	434	No sub-pop	19.9 (1.9)	100%	Yes
Davis, M. T.	2014 (b)	U.S.A	TB, PB	SI	CS	334	Other	19.6 (3.3)	72.2%	Partially
Kleiman, E. M.	2014 (a)	U.S.A	TB, PB	SI	L	245	Other	20.0 (3.0)	79.2%	Partially
Kleiman, E. M.	2014 (b)	U.S.A	TB, PB, TB×PB	SI	L	171	No sub-pop	20.6 (3.8)	70%	Partially
O'Keefe, V. M.	2014	U.S.A	TB, PB, TB×PB	SI	CS	171	Indigenous	23.0 (NR)	77%	Partially
Zaroff, C. M.	2014	China	PB	SI	CS	273	No sub-pop	18.8 (1.0)	62%	Yes
Baams, L.	2015	U.S.A	TB, PB	SI	CS	876	Other	18.3 (1.8)	53.7%	Partially
Ploskonka, R. A.	2015	U.S.A	TB	SI	CS	249	No sub-pop	20.1 (1.4)	60.2%	Partially
Poindexter, E. K.	2015	U.S.A	TB, PB	SI	CS	254	Other	19.5 (3.2)	55.3%	Partially
Ribeiro, J. D.	2015	U.S.A	AC	Suicidality	CS	1208	Military	30 (4.9)	8.3%	Yes
Silva, C.	2015	U.S.A	PB	SI	CS	140	Other	19.5 (1.8)	71.4%	Yes
Community, n = 8										
Joiner, T. E.	2009 (1)	U.S.A	TB, PB, TB×PB	SI	CS	815	Other	19-26	54%	Partially
Bryan, C. J.	2010	U.S.A	TB, PB, AC, TB×PB, PB×AC, TB×AC, TB×PB×AC	Suicide behaviours	CS	88	Military	18-24	37.5%	Partially

Author	Year	Country	IPTS constructs	Outcome	Study	N	Sub-pop	Age	% F	IPTS supported?
Smith, P. N.	2010	U.S.A	AC	SA	CS design	44	Clinical	SI = 33.07	SI =	Yes
								(14.03)SA =	66.7%.	
								28.60	SA =	
								(11.98)C =	53.3%. C	
								20.36 (2.17)	= 42.9%	
								74.1 (7.5)	56.1%	Yes
Cukrowicz, K. C.	2011 (1)	U.S.A	PB	SI	CS	57	Older adults			Yes
Cramer, R. J.	2012	AUS	TB, PB, AC	SI, suicide	CS	307	Other	31.8 (11.0)	11.7%	Yes
Bryan, C. J.	2013 (b)	U.S.A	TB	SI potential	CS	273	Military	25.9 (5.9)	18.3%	Partially
Christensen, H.	2013	AUS	TB, PB, TB×PB, AC×SI	SI, SA	CS	6133	No sub-pop	28-72	51.5%	Partially
Christensen, H.	2014	AUS	TB, PB, AC, TB×PB	SI, SA	CS	1167	No sub-pop	34.7 (NR)	58%	Yes
Online, n = 2										
Woodward, E. N.	2014	U.S.A	PB	SI	CS	210	LGBT	36.1 (13.9)	52.9%	Partially
Kim, S.	2015	South Korea	TB, PB	SI	CS	201	LGBT	25.8 (5.9)	41.2%	Partially
Other, n = 5										
Ireland, J. L.	2012	UK	AC	SI, SA	CS	191	Detainee	31 (10.01)	100%	Partially
Bryan, C. J.	2013 (a1)	U.S.A	TB, PB, AC	Suicide risk	CS	348	Military	24.5 (4.8)	10.3%	No



Author	Year	Country	IPTS constructs	Outcome	Study design	N	Sub-pop	Age	% F	IPTS supported?
Smith, P. N.	2013	U.S.A	AC	SI	CS	399	Detainee	35.2 (11.0)	0%	No
Simlot, R.	2013	U.S.A	TB, PB, AC	Suicidality	CS	38	Detainee	31.8 (10.2)	0%	Partially
Shelef, L.	2014	Israel	AC	SI	CS	168	Military	19.7 (1)	40.4%	Yes

*Note.* TB = Thwarted belonging, PB = Perceived burdensomeness, AC = Acquired capability, SI = Suicidal ideation, SA = Suicidal attempt, CS = Cross-sectional, L = Longitudinal, C = Control group, × = interaction, (a) and (b) after year differentiate studies from the same first author with the same year, (1) - (3) differentiate studies within the same paper (i.e., study 1).

## Appendix B

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## Highlights

- No previous systematic review has comprehensively examined evidence for the IPTS
- The effect of perceived burdensomeness on suicide ideation was the most robust
- Other IPTS effects were tested less frequently with less consistent findings
- Many studies were limited by cross-sectional design and reliance on student samples
- Additional research should test the full predictions of the IPTS in diverse samples