Distress Tolerance as a Mediator and Moderator of a Brief Computer-Based Treatment Targeting Suicide Risk Factors

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Distress Tolerance as a Mediator and Moderator of a Brief Computer-Based Treatment Targeting Suicide Risk Factors

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Abstract

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Distress Tolerance as a Mediator and Moderator of a Brief Computer-Based Treatment Targeting Suicide Risk Factors

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Current rates of suicide are a growing global health concern. To best mitigate suicide risk, it is important that theoretically based interventions targeting empirically supported risk factors for suicide be developed and refined. Brief, accessible interventions could allow people to access these interventions when it is most necessary. A recent randomized control trial conducted by Schmidt et al. (2019) examined Building Stronger Alliances (BSA), a computer-based intervention based in the Interpersonal Theory of Suicide (IPTS), combined with cognitive bias modification targeting mood (CBM-I) along with two other suicide interventions. The current study is a secondary data analysis of the Schmidt et al. (2019) study focused on the BSA+CBM-I arm of the intervention in comparison to the control condition. Individuals in the BSA+CBM-I group were found to have reduced perceived burdensomeness, a key risk factor for suicide according to the IPTS, at the end of treatment compared to the control group. However, reduced perceived burdensomeness did not predict differences in suicidal ideation at 1-month follow-up. Distress tolerance at baseline predicted perceived burdensomeness at end of treatment but was not a significant moderator of the relationship between condition and perceived burdensomeness. No hypothesized mediation pathways from condition to suicidal ideation at 1-month follow-up, including

through perceived burdensomeness, thwarted belongingness, or distress tolerance were significant. BSA+CBM-I appears to be an effective treatment in reducing a key risk factor for suicide in an at-risk sample. Future research is needed to examine efficacy in reducing suicide risk. Additional research also needs to address construct validity and malleability of thwarted belongingness.

Dedication

This thesis is dedicated to my mother. For spending too many years letting me do whatever I wanted, being my biggest supporter, and my most reliable critic.

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Increasing rates of suicide have been recognized as a global health issue. Nearly 800,000 deaths per year are due to suicide, which equates to one death by suicide every 40 seconds (World Health Organization [WHO], 2019). Due to the high rates of suicide, the WHO has deemed suicide prevention, including the development of new, accessible methods of suicide prevention a "global imperative" (WHO, 2014, p. 30). To prevent deaths by suicide, the WHO recommends a public health model that includes identifying risk and protective factors, developing interventions and evaluating which interventions work for what people, and scaling up the interventions for implementation. The current study is a secondary data analysis of an RCT targeting theoretically relevant risk factors for suicide (thwarted belongingness [TB], perceived burdensomeness [PB]). Consistent with evaluating what works for whom, distress tolerance (DT) is considered as a moderator and mediator of treatment efficacy.

Identifying Risk and Protective Factors

A major limitation of suicide research has been the poor predictive power of even empirically supported risk factors of suicide (Franklin et al., 2017). This limitation interferes not only with identification of the most at-risk individuals, but also with determining relevant, effective targets for intervention. Without an empirically supported theory of suicide to guide research and intervention, it is more difficult to build an understanding of how these risk factors may work together to impact suicide risk and the most effective way to intervene. The Interpersonal Theory of Suicide (IPTS; Joiner,

2005; Van Orden et al., 2010) is a seminal contribution to the empirical understanding of suicidal behavior (Klonsky et al., 2018). The IPTS was proposed as a comprehensive theory of suicide that accounts for the large number of empirically supported risk factors and prior gaps in the literature. The theory includes three primary risk factors for suicide: TB, PB, and capability for suicide. TB is described as a state occurring when the fundamental need to belong is unmet. PB is defined as "the incorrect mental calculation that individuals make regarding their death being worth more than their life to others" (Chu et al., 2017, p. 1315). Finally, capability for suicide is an ability to defy our evolutionary instincts for survival (Joiner et al., 2016). Although it is clear that there are many additional risk factors for suicidal behavior, Van Orden and colleagues (2010) argue that more distal risk factors for suicide (such as mood disorders) influence suicide risk by increasing PB, TB, or capability for suicide.

According to the IPTS, people develop a desire for death (passive suicidal ideation) due to a sense of TB and/or PB. This desire is then increased by feelings of hopelessness about TB and PB, which leads to a desire for suicide. For a person who desires suicide, the theory predicts that lethal or near lethal suicidal behavior will occur if/when that person has acquired capability for suicide. In other words, "people die by suicide because they can and because they want to" (Van Orden et al., 2010, p. 8).

In a recent meta-analysis and review of 122 distinct samples, Chu and colleagues (2017) found that TB was significantly related to suicidal ideation (r = 0.37, N = 37,952) and suicide risk (r = 0.33, N = 9,108) as was PB (suicidal ideation: r = 0.48, N = 37,894; suicide risk: r = 0.42, N = 9,002). Chu et al. also found that PB had a significantly

stronger relationship with suicidal ideation and suicide risk compared to TB. Further, acquired capability was significantly, but weakly related to suicide attempts measured continuously (r = 0.09, N = 6,760). Given the large body of research on the IPTS and support of the relationships between IPTS constructs and suicide, it seems logical to utilize the IPTS as a framework in developing suicide interventions.

Develop and Evaluate Interventions

What Works

The IPTS provides a clear roadmap for how to target suicide intervention. According to the IPTS, capability for suicide is considered to be stable once it has been acquired. Based on this information, Van Orden and colleagues (2010) argue that interventions specifically targeting PB and TB will reduce suicide risk the most. Initial findings from two different studies have provided evidence that PB and TB can be modified through intervention. In a pilot RCT Hill & Pettit (2019) found that adolescents who were assigned to a brief internet-based intervention targeting PB had significantly lower PB at the end of treatment (partial η^2 =.10) as well as significantly lower PB (partial η^2 =.21), TB (partial η^2 =.16), and depression symptoms (partial η^2 =.12) at 6-week follow-up compared to the control group. However, no significant differences in suicidal ideation were found between groups. Van Orden et al. (2016) examined change in PB and TB during a companionship program for older adults. Preliminary data analyses indicated that individuals in the peer companion group had significantly more reductions in PB than those receiving care-as-usual. However, there was not a significant difference between groups regarding TB. Preliminary findings from these studies provide

evidence that PB is amenable to change through intervention. However, neither study presented analyses of PB and TB as mechanisms of change to reduce suicidality. Additionally, although both interventions examined changes in PB and TB neither intervention studied was specifically designed to target both PB and TB.

Building Stronger Allies (BSA; Schmidt et al., 2019) is a brief (50 min) computer-based intervention informed by the IPTS and designed to target PB and TB through psychoeducation and cognitive-behavioral techniques. Brief, computer-based cognitive-behavioral interventions have been found to be effective for a number of mental health concerns (Cavanagh & Shapiro, 2004; Rodriguez-Pulido et al., 2020) including reduction of suicide risk (Fleischmann et al., 2008; Raines et al., 2015). Computer-based interventions have also been shown to significantly reduce health-care costs for treatment-seeking individuals (Cavanagh & Shapiro, 2004). Thus, BSA was developed to provide an accessible, cost-effective intervention that improves suicide risk outcomes by specifically targeting PB and TB.

Schmidt et al. (2019) conducted a randomized control trial including a brief intervention that combined BSA with cognitive bias modification for interpretive biases (CBM-I) for individuals with elevated suicide risk. CBM interventions differ from many other psychological treatments in that the target of treatment is altering the subconscious cognitive processes that lead to maladaptive thoughts, rather than consciously coping with or challenging maladaptive thoughts when they arise. Thus, CBM-I may be beneficial in preventing thoughts that contribute to feelings of PB and TB. CBM-I has been found to be effective for reducing both anxiety and depression symptoms (Bowler et

al., 2012; Holmes et al., 2009; Lester et al., 2011) which are risk factors for suicide (Nock et al., 2006). Additionally, there is evidence that CBM-I is effective in reducing negative interpretation biases under cognitive load/emotional stress (Bowler et al., 2012; Lester et al., 2011). This may be meaningful in the context of suicide risk intervention as individuals who are having suicidal thoughts are likely at higher levels of distress and may feel overwhelmed.

Schmidt et al. (2019) compared BSA+CBM-I to a repeated contact control (RCC) as well as two additional active conditions: Cognitive Anxiety Sensitivity Treatment (CAST) + anxiety sensitivity focused CBM, and a combined condition in which participants received both other active interventions. In the BSA+CBM condition, there was an estimated 21% reduction in PB and 13.2% reduction in TB at 1-month follow-up. However, despite PB and TB being specifically targeted in the BSA + CBM-I condition, there were not significant differences between active conditions on PB and TB post-intervention scores. Therefore, the authors combined the active conditions in further analyses. The active conditions were found to be significantly more effective in reducing PB than the RCC (Cohen's d = .27). Additionally, the active conditions were found to reduce suicidal ideation, though only for those who had reductions in PB. TB was not significantly reduced in the active conditions and was not found to significantly mediate the relationship between intervention and suicidal ideation. Interpretation of these findings should take into account that the active conditions were collapsed into a single active condition for the majority of the analyses. Thus, it is unknown if the effects of

condition on PB and TB, and the indirect effects of PB and TB on suicidal ideation would be consistent when examining BSA+CBM on its own.

For Whom

In order to further evaluate BSA+CBM, it is important to consider influential moderators of treatment outcome. Understanding moderators of treatment approaches is key in identifying who specific treatments work for and under what conditions these treatments may work. Thus, we have information that can reduce the risk of providing an intervention that is less likely to be effective for a specific individual or a specific context. The negative impact of providing a suicide risk intervention that is unlikely to be effective can be dire. Evaluating potential moderators also provides an empirically-based starting place to personalize treatment for those whom treatment does not work for (Kraemer et al., 2002). One client characteristic that may have a large impact on the effectiveness of BSA+CBM-I is distress tolerance (DT).

DT is the ability to tolerate negative emotional states. Individuals with lower DT are more likely to use maladaptive coping mechanisms such as avoidance-oriented coping (Leyro et al., 2010). Low DT is also characterized by preoccupation with distressing emotion, which makes it difficult to attend to other thoughts or activities (Simons & Gaher, 2005). These features of low DT often impede functioning and may negatively impact activities that bring attention to negative thoughts or emotions, such as psychotherapy. This has been demonstrated by recent studies that have found clients with low DT have worse psychotherapy outcomes (e.g. Katz et al., 2017). In regard to BSA in particular, discussion of suicide and suicidal thoughts may be especially distressing for

those with low DT, who may have difficulty attending to or continuing treatment. Improving our understanding of the relationships between DT and treatment outcomes, particularly suicide risk, may help determine more efficient methods of reducing risk based on an individual's pre-treatment level of DT.

Evaluating Mechanism of Action

In addition to the potential role of DT as a moderator of BSA+CBM, DT may also serve as a mediator of intervention effect. Examining potential mediators is important for a number of reasons including determining whether the intervention works specifically through change in PB and TB or if the mechanism of change is more general. Determining if there are potentially unexpected mediators is beneficial to understanding suicide risk more broadly, developing ways to strengthen interventions, and provides important information to take into account while scaling up the intervention for wide-spread use (Kazdin, 2007). DT makes sense as a potential mediator from BSA+CBM to reductions in suicidal ideation due to the relations DT shares with psychotherapy outcomes and suicidal ideation. Banducci et al. (2017) explored the relationship between change in DT and change in PTSD pathology among 86 United States military veterans diagnosed with PTSD in two residential treatment programs. Within both programs, increases in DT across treatment predicted lower PTSD Checklist (PCL) scores at post-treatment, controlling for pre-treatment PCL scores. Low DT has also been found to predict increased suicidal ideation (Anestis et al., 2011, 2013). Therefore, it is possible that by increasing DT, suicidal ideation will decrease. Although BSA+CBM does not

specifically target DT, exposure to distressing topics, coupled with information to reduce distressing symptoms, may improve DT.

The Current Study

The current study aims to address limitations of the Schmidt et al. (2019) study by examining PB and TB as mediators of treatment outcomes of the BSA+CBM condition independent of the other active conditions. Given evidence that pre-treatment DT, as well as change in DT during therapy, may predict therapy outcome, this study also aims to examine DT as a moderator and mediator of suicide risk outcomes from the Schmidt et al. (2019) study. Hypotheses for the current study include:

Hypothesis 1a: Intervention condition (BSA+CBM-I vs. RCC) will be a significant predictor of Month 1 DSI-SS scores (controlling for baseline DSI-SS scores) such that those in the BSA+CBM-I condition will have significantly lower Month 1 DSI-SS scores than those in the RCC condition.

Hypothesis 1b: Intervention condition (BSA+CBM-I vs. RCC) will be a significant predictor of session 3 PB scores (controlling for baseline PB scores) such that those in the BSA+CBM-I condition will have significantly lower session 3 PB scores than those in the RCC condition.

Hypothesis 1c: Intervention condition (BSA+CBM-I vs. RCC) will be a significant predictor of session 3 TB scores (controlling for baseline TB scores) such that those in the BSA+CBM-I condition will have significantly lower session 3 TB scores than those in the RCC condition.

Hypothesis 1d: Intervention condition (BSA+CBM-I vs. RCC) will be a significant predictor of session 3 DT scores (controlling for baseline DT scores) such that those in the BSA+CBM-I condition will have significantly higher session 3 DT scores than those in the RCC condition.

Hypothesis 2a: It is expected that, similar to the findings in the main outcomes manuscript (Schmidt et al., 2019) comparing all active groups to RCC, session 3 PB scores (controlling for baseline PB scores) will significantly mediate the relationship between intervention condition (BSA+CBM-I vs. RCC) and month 1 suicidal ideation such that individuals in the active condition will have larger reduction in PB, which in turn will lead to lower month 1 suicidal thoughts.

Hypothesis 3: It is expected that, similar to the findings in the main outcomes manuscript (Schmidt et al., 2019) comparing all active groups to RCC, session 3 TB scores (controlling for baseline TB scores) will not significantly mediate the relationship between intervention condition (BSA+CBM-I vs. RCC) and month 1 suicidal ideation.

Exploratory Analyses: In order to evaluate a potential moderator as well as the mechanism of action for BSA+CBM I examined DT as both a moderator and mediator of the intervention. Thus, analyses were conducted to determine whether baseline DT may moderate the mediation effect that will be tested in hypothesis 2 (specifically the condition to PB path) as well as whether Session 3 DT scores (controlling for baseline DT scores) would mediate the relationship between intervention condition (BSA+CBM-I vs. RCC) and month 1 suicidal ideation.

Methods

Participants

The current study includes data from participants (*N*=153) selected from a larger randomized controlled trial (Schmidt et al., 2019;N=303) if they were randomized to either the BSA+CBM-I or RCC condition. Participants were recruited from the local community via flyers, newspaper advertisements, and local website listings. The study description was also sent to local health providers as well as local veteran organizations. Participants were eligible for the study if they were fluent in English, age 18 or older, were not diagnosed with bipolar or any other psychotic-spectrum disorder that was not being medically controlled, were not participating in psychotherapy, and were not at imminent risk for suicidal behavior. To ensure elevation on one of the suicide risk factors being targeted in either BSA or CAST, participants were also required to have elevated PB, TB, or anxiety sensitivity cognitive concerns. PB and TB were measured by the Interpersonal Needs Questionnaire-15 (INQ-15; Van Orden et al., 2012) and anxiety sensitivity was measured by the ASI-3 (Taylor et al., 2007). Thresholds for elevated PB (>9), TB (>20), and AS cognitive concerns (>8) were determined based on psychometric analyses of the respective measures (Mitchell et al., 2020; Schmidt & Joiner, 2002). Finally, individuals were not eligible for the study if they had any significant medical diagnoses (e.g. cardiovascular disease, respiratory disorders, renal disease, epilepsy, stroke, uncontrolled hypertension, or migraines) due to inclusion of interoceptive exposure exercises for research aims not included in the proposed study. However, no participants were excluded for these reasons.

Procedures

Prior to data collection, this trial was registered at clinicaltrials.gov (#NCT01941862). Participants who expressed interest in the study completed an initial screening over the phone with undergraduate and post-baccalaureate level research assistants. If deemed potentially eligible, individuals were then scheduled for a more in-depth in-person screening conducted by doctorate-level graduate students. During this in-person screening, individuals were administered a diagnostic interview, suicide risk screening, ASI-3, INQ-15, and additional self-report questionnaires used to aid in diagnostic decision making and assessment of risk.

Participants who were deemed eligible after the two-part screening process were then randomized via an online random number generator to one of four conditions. Once randomized, participants were scheduled for a baseline assessment. During baseline appointments, participants filled out a battery of self-report measures and scheduled their next appointment. The second baseline appointment included baseline physiological and neurological assessment, which is not discussed in the proposed study.

Following baseline appointments, participants received their assigned interventions within a university psychology clinic. During each of the three intervention appointments, participants completed intervention procedures followed by a series of self-report measures. After their third intervention appointment, participants were then scheduled for follow-up sessions one, three, and 6-months later. At each of these appointments, participants were brought into a private laboratory space to complete a battery of self-report measures after which they were provided monetary compensation.

Additionally, at the six-month follow-up appointment, participants were debriefed on the purposes of the study, and individuals within the RCC condition were offered active treatment if they wished to receive it. At each appointment (in-person screening through 6-month follow-up), suicide risk was assessed via structured interview (Joiner, Walker, Rudd, & Jobes, 1999) and additional steps taken as needed based on risk level.

Measures

Distress Tolerance Scale (DTS; Simons & Gaher, 2005)

The DTS is a 15-item self-report measure used to examine an individual's perceived ability to tolerate the distress of negative emotional states. Participants respond to each item using a 5-point Likert scale from 1 (Strongly Agree) to 5 (Strongly Disagree). Lower scores indicate worse perceived ability to tolerate distress. DTS data from baseline and session 3 were used in the current study. At both timepoints, the DTS demonstrated excellent internal consistency ($\alpha > .9$) in the current sample. Prior studies have found the DTS to have good test-retest reliability at 6 months (r=.61; Simons & Gaher,2005).

Depressive Symptom Inventory–Suicide Subscale (DSI-SS; Metalsky & Joiner, 1997)

The DSI-SS is a 4-item self-report questionnaire assessing frequency of suicidal thoughts, development of suicide plan, perceived ability to control suicidal thoughts, and severity of intent. Items are rated on a scale of 0-3 with 0 indicating low severity and 3 indicating high severity. The DSI-SS was collected at all timepoints; however only baseline and month 1 DSI-SS data were used in the current study. The DSI-SS demonstrated good internal consistency ($\alpha > .80$) at all timepoints in the current sample.

Interpersonal Needs Questionnaire-15 (INQ-15; Van Orden et al., 2012)

The INQ-15 is a 15-item measure of TB and PB. The TB subscale includes 9 items and the PB subscale includes 6 items. Items are rated on a 7-point Likert scale ranging from 1 (not at all true of me) to 7 (very true of me). The INQ-15 was collected at all timepoints; however only baseline and session 3 INQ-15 data were used. Internal consistency of the PB subscale ($\alpha > .90$) and TB subscale ($\alpha > .80$) was found to be good at each timepoint in the present sample.

Interventions

BSA+CBM Condition

The BSA+CBM condition included three sessions. During the first session, participants completed a 50-minute BSA intervention. BSA (Schmidt et al., 2019) is a 50-minute intervention aimed at reducing PB and TB. The intervention is presented via a webpage and contains a combination of videos, narration, written summaries, and interactive features such as brief comprehension quizzes. BSA contains two main sections, introductory psychoeducation, and PB and TB "myths".

During the introductory psychoeducation portion, individuals are presented with information about social connectedness as a human need, risk factors for social isolation, and the concepts of PB and TB. In the "myths" portion of the intervention, individuals are introduced to seven myths and associated facts related to PB and TB (e.g. "Myth: Isolation lasts forever; Fact: Feelings of isolation can change from day to day, and you can do things to reduce these feelings"). Cognitive-behavioral techniques are used to correct maladaptive thoughts or "myths" about PB and TB as well as introduce helpful

tools/skills to reduce the feelings associated with these thoughts (e.g. how to discuss feelings of burdensomeness with others, introduction of behavioral activation techniques). Finally, individuals are presented with resources to aid in behavioral activation (such as a list of local volunteer organizations to get involved with).

After completion of BSA, participants completed an auditory CBM-I procedure developed by Holmes et al. (2006). Participants were asked to listen to descriptions of scenarios that started ambiguously but were determined in their final words to have either a benign or positive outcome. For example, "You have started an evening class which is tough going. You are determined to succeed, and after a while, it becomes much easier and more enjoyable" (Holmes et al., 2006, p. 79). Within this procedure, 100 scenarios were presented across five blocks (20 scenarios per block) via E-prime software. Participants were asked to imagine themselves in each scenario as it was read to them. The CBM-I portion took approximately 30 minutes to complete. During the second and third sessions, participants only completed the CBM-I procedure.

RCC Condition

Individuals in the RCC condition were assigned to a study coordinator whom they met with once per week for three weeks. These study coordinators were trained undergraduate research assistants under the supervision of a licensed clinical psychologist. During each appointment, coordinators checked-in with the individuals and assessed for suicide risk via a structured suicide risk assessment (Joiner, Walker, Rudd, & Jobes, 1999). If risk was determined to be elevated, additional steps were taken such as creation of a safety plan, means restriction, and recommendation of additional resources.

Data Analytic Plan

Preliminary analyses were conducted in the Statistical Package for the Social Science (SPSS) version 26. All data were examined for outliers as well as skewness and kurtosis. Any variable with skewness beyond ±2 and excess kurtosis ±4 (±7 kurtosis proper) was considered non-normal (West et al., 1995) and appropriate adjustments were made based on variable distribution. All analyses were performed with and without adjustment with any substantial differences between results discussed further. Otherwise, models with adjusted variables were reported. Missing data was examined to ensure no differences between those who are missing and not missing data based on demographic and target variables.

Model analyses were conducted in Mplus version 8.3 (Muthén & Muthén, 2017). First, a series of path analyses using robust maximum likelihood were run to look at the effect of condition on all outcomes (hypotheses 1a-1d). Next, mediation models were constructed to examine indirect effects. All analyses included relevant baseline covariates (i.e. baseline DSI-SS predicting month 1 DSI-SS).

Significance of indirect effects was tested using percentile-based bootstrapped confidence intervals (CIs) and maximum likelihood estimation to account for the asymmetric indirect effect (Preacher & Hayes, 2008). For each indirect effect, a percentile-based confidence interval was constructed from a bootstrapped sample of 5,000 estimates of the indirect effect. The indirect effect was considered significant if the 95% CI did not include 0. However, due to non-normality concerns described below, Monte Carlo simulations (5,000 repetitions) were used to determine CIs of the indirect

effects. In order to obtain these CIs, values from Mplus were entered into R studio (RStudio Team, 2019) using code generated through the Selig and Preacher (2008) web utility. Only the CI derived from Monte-Carlo simulations is reported, except when there was a difference in significance level between the model run using percentile-based bootstrapping and Monte-Carlo simulation.

For hypothesis 2, structural equation modeling was used to examine the effect of condition on suicidal thoughts at month 1, through PB at session 3. To examine hypothesis 2, a mediation model was conducted including a path from condition (BSA = 0, RCC = 1) to session 3 INQ-PB, a path from session 3 INQ-PB to month-1 follow-up DSI-SS, and a direct path from condition to month-1 follow-up DSI-SS. To examine hypothesis 3, structural equation modeling was used to examine the effect of condition on suicidal thoughts at month 1, through TB at session 3. A mediation model was conducted including a path from condition (BSA = 0, RCC = 1) to session 3 TB, a path from session 3 TB to month-1 follow-up DSI-SS, and a direct path from condition to month-1 follow-up DSI-SS.

Exploratory analyses examined DT as a moderator and mediator of suicidal thoughts. First, whether the indirect effect of PB was moderated by baseline DT was examined by adding baseline DTS (mean centered) as a moderator on the path from condition to session 3 INQ-PB (DTS, as well as the interaction of Condition x DTS, was examined for effect on session 3 INQ-PB) in the model conducted for hypothesis 2 .To examine DT as a mediator, structural equation modeling was used to examine the effect of condition on suicidal thoughts at month 1, through DT at session 3. A mediation model

was conducted including a path from condition (BSA = 0, RCC = 1) to session 3 DTS, a path from session 3 DTS to month-1 follow-up DSI-SS, and a direct path from condition to month-1 follow-up DSI-SS.

To test overall model fit of over-identified models, χ_2 values were evaluated with a non-significant ($p > 0.05$) χ_2 value indicating good model fit. Additional indices of model fit were also evaluated including root mean square error of approximation (RMSEA), 90% CIs for RMSEA, comparative fit index (CFI), and Tucker-Lewis index (TLI). RMSEA values less than or equal to .05 indicate good fit (Hu & Bentler, 1999). 90% CI for RMSEA with the lower bound less than .05 suggests that good fit cannot be ruled out and upper bound greater than .10 suggests that poor fit cannot be ruled out (Kline, 2015). CFI and TLI values greater than .95 indicate good model fit (Hu & Bentler, 1999). Theory consistent modifications were made as needed if models were found to have poor fit.

Results

Preliminary Analyses

After randomization, 75 participants were assigned to the BSA+CBM condition and 78 participants were assigned to the RCC condition (*N*=153). Three individuals from the RCC condition did not attend any sessions, thus they were not included in the analyses. Nine participants completed the baseline session, but did not attend any intervention sessions (6 BSA+CBM, 3 RCC), 5 participants missed 2 intervention sessions (4 BSA+CBM, 1 RCC), and 6 participants (all from RCC condition) missed 1 intervention session. Demographics as well as means and standard deviations of study variables by treatment condition were examined (see Table 1). There were no significant differences between groups (*p*s>0.05). Additionally, baseline PB, TB, DT, and DSI-SS scores were compared between those who completed each individual timepoint (baseline through month-6 follow-up) and those who did not. There were no significant differences between those who discontinued at any timepoint and those who did not (*p*s>0.05).

Table 1

Descriptive Statistics for Baseline Measures by Treatment Condition

	BSA+CBM (N=75)		RCC (N=78)		
	Mean	*SD*	Mean	*SD*	*t**
INQ-15 PB	13.56	7.93	13.63	8.56	.05
INQ-15 TB	34.89	11.34	35.61	11.52	.39
DSI-SS	1.01	1.83	.73	1.49	-1.03
DTS	3.01	.85	2.87	.88	-1.17
Age	35.89	15.87	36.53	16.24	.249
	Percent		Percent		χ^2
Sex					.004
Male	46.7%		46.2%		
Female	53.3%		53.8%		

Note. BSA+CBM-I = Building Stronger Allies Plus Cognitive Bias Modification for Interpretive Biases; RCC = Randomized Contact Control; INQ-15 PB = Interpersonal Needs Questionnaire Perceived Burdensomeness; INQ-15 TB = Interpersonal Needs Questionnaire Thwarted Belongingness; DSI-SS = Depressive Symptom Inventory-Suicidal Subscale.
*all *t*'s ns

Skewness and kurtosis were examined for all variables of interest. Skewness of the INQ-15 PB and TB subscales, and the DTS at baseline and session 3 were all less extreme than ±2.0. However, skewness of the DSI-SS was 2.21 with excess kurtosis of 5.0 at baseline and 3.29 with excess kurtosis of 12.1 at month 1. Further examination of the distribution indicated large proportions of zeros and a positive skew at each timepoint. This was taken into consideration when making model adjustments as described below.

Correlations between PB, TB, DT, and DSI-SS at baseline, session 3, and Month 1 are provided in Table 2. PB, TB, and DSI-SS were significantly correlated within and across all timepoints. There were no significant correlations between DT and DSI-SS at any timepoint. Baseline PB was found to have a significant negative correlation with DT measured at session 3 and month 1, but not at baseline. Session 3 PB was only significantly correlated to DT at session 3. Month 1 PB was found to have significant, negative correlations with DT at all three timepoints. Baseline TB was not significantly correlated to DT at any timepoint, though session 3 TB was significantly, negatively correlated to DT at baseline and month 1. Month 1 TB was found to have significant, negative correlations with DT at all three timepoints.

Table 2

Correlations Between Study Variables

	BLTB	BL DSI-SS	BL DTS	S3 PB	S3 TB	S3 DSI-SS	S3 DTS	M1 PB	M1 TB	M1 DSI-SS	M1 DTS
BL PB	.60**	.42**	-.03	.61**	.37**	.34**	-.25**	.57**	.46**	.38**	-.18*
BLTB	-	.26**	-.11	.46**	.67**	.23**	-.12	.42**	.63**	.30**	-.11
BL DSI-SS		-	.06	.46**	.29**	.69**	-.08	.45**	.28**	.67**	-.05
BL DTS			-	-.14	-.24**	.08	.44**	-.19*	-.30**	.04	.41**
S3 PB				-	.52**	.43**	-.24**	.84**	.46**	.47**	-.15
S3 TB					-	.29**	-.13	.46**	.79**	.30**	-.23*
S3 DSI-SS						-	-.13	.45**	.25**	.81**	-.02
S3 DTS			-	-.26**	-.26**	-.09	.54**				
M1 PB				-	.45**	.51**	-.19*				
M1 TB					-	.29**	-.26**				
M1 DSI-SS						-	.03				

Note. BL = Baseline; S3 = Session 3; M1 = Month 1 follow-up; PB = Interpersonal Needs Questionnaire Perceived Burdensomeness; TB = Interpersonal Needs Questionnaire Thwarted Belongingness; DSI-SS = Depressive Symptom Inventory-Suicidal Subscale; DTS = Distress Tolerance Scale. *p<0.05, **p<0.01

Hypothesis 1a-1d

Direct effects of treatment on variables of interest were examined through a series of path analyses with condition (BSA+CBM-I=0, RCC=1) as the predictor. Due to the large skewness and kurtosis of DSI-SS, model fit for hypothesis 1a was examined after modeling DSI-SS following three separate distributions, Poisson, Negative Binomial (NB), and Zero-inflated Negative Binomial (ZNB), to determine best model fit. Akaike information criterion (AIC) and Bayesian information criterion (BIC) values indicated that a ZNB distribution provided the best fit (Table 3). All following analyses modeled DSI-SS following a ZNB distribution. Condition was found to significantly predict PB at session 3 (controlling for baseline PB) such that individuals in the BSA+CBM condition had lower INQ-15 PB scores at session 3 compared to those in the RCC group (B = 2.06, p = 0.04). When controlling for relevant baseline covariates (i.e. baseline DSI-SS predicting month 1 DSI-SS), there were no significant direct effects of condition on session 3 TB (B = 1.09, p = 0.50), session 3 DT(B = -0.18, p = 0.21), or Month 1 DSI-SS(B = 0.84, p = 0.14).

Table 3

Model Fit for Direct Effect of Condition on Month 1 Suicidal Ideation by Modeled Suicidal Ideation Distribution

	P	NB	ZNB
AIC	695.45	534.79	176.30
BIC	707.50	552.85	190.44

Note. AIC = Akaike information criterion, BIC= Bayesian information criterion, P= Poisson, NB= Negative Binomial, ZNB= Zero-inflated Negative Binomial.

Hypothesis 2

The model for hypothesis 2 (PB as mediator) was found to have poor model fit due to a significant χ_2 values ($p < 0.05$), a high RMSEA value, and a low TLI value (see Table 4). Modification indices were examined, and a path was suggested between baseline DSI-SS and session 3 PB. This is consistent with empirically supported relationships between suicidality and PB (Chu et al., 2017). This path was added and model fit was re-examined. Addition of this path improved fit indices with the χ_2 value no longer significant, CFI and TLI values above 0.95 and the RMSEA value below 0.05. However, the upper bound of the RMSEA 90% CI remained above 0.10, suggesting that poor fit could not be ruled out (Table 5). The addition of the path from baseline DSI-SS to session 3 PB did not change significance level of any existing model paths. Thus, this path was included in all further analyses. Due to the skewness and kurtosis of DSI-SS and based on findings from direct effect analyses that a ZNB distribution best fit the data, DSI-SS was modeled following a ZNB distribution.

Table 4

Model Fit for Unadjusted Mediation Models

	Mediator		
	PB	TB	DTS
Chi-Square Value	7.08	6.27	0.82
Chi-Square *p*	.03	0.04	0.37
RMSEA	0.14	0.13	0.05
90% RMSEA CI	0.04,0.26	0.02,0.25	0.00,0.19
CFI	0.95	.97	.99
TLI	0.88	.91	.97

Note. PB = Perceived Burdensomeness; TB = Thwarted Belongingness; DTS = Distress Tolerance Scale; RMSEA = Root Mean Square Error of Approximation; CFI= Comparative Fit Index; TLI = Tucker-Lewis Index.

Table 5

Model Fit for Mediation Models with Path from Baseline Ideation to Mediator

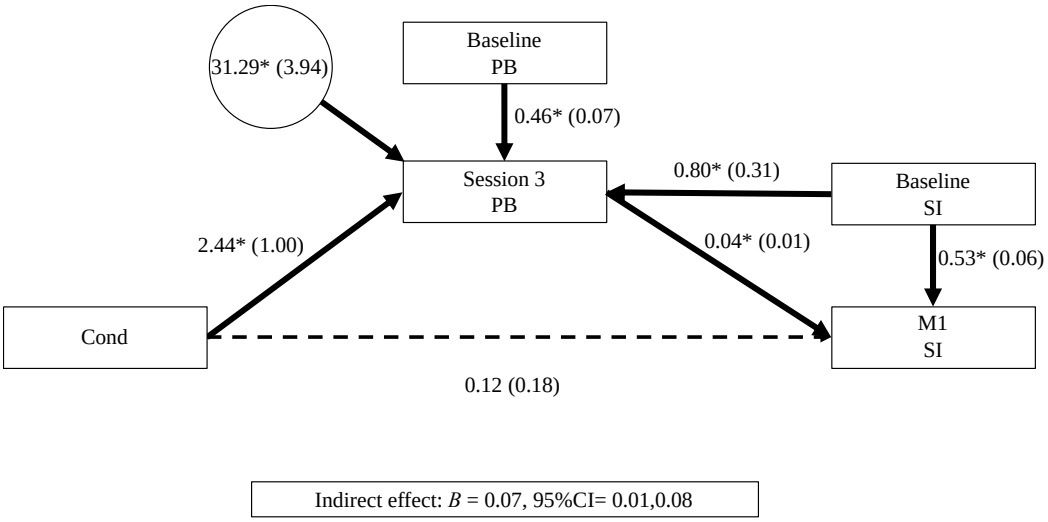
	Mediator		
	PB	TB	DTS
Chi-Square Value	0.75	2.60	0.82
Chi-Square *p*	0.39	0.11	0.37
RMSEA	0.00	0.11	0.00
90% RMSEA CI	0.00, 0.22	0.00, 0.29	0.00, 0.22
CFI	1	0.99	1
TLI	1.01	0.93	1.01

Note. PB = Perceived Burdensomeness; TB = Thwarted Belongingness; DTS = Distress Tolerance Scale; RMSEA = Root Mean Square Error of Approximation; CFI= Comparative Fit Index; TLI = Tucker-Lewis Index.

After adjustments were made, only the condition to session 3 (a) path was significant and the overall indirect effect was not found to be significant. However, of note, the significance level of the overall indirect effect as well as of the b path differed in the model with DSI-SS run as a continuous variable and DSI-SS run as a count variable using a ZNB distribution. The overall indirect effect was marginally significant (p = 0.085) when DSI-SS was run as a continuous variable and was not significant when run using a ZNB distribution (p = 0.15). Additionally, although both the a and b mediation paths were significant at the $p< 0.05$ level before utilizing a ZNB distribution for DSI-SS score (see Figure 1), only the a path remained significant after this change; the b was marginally significant (see Figure 2, p =0.073).

Figure 1

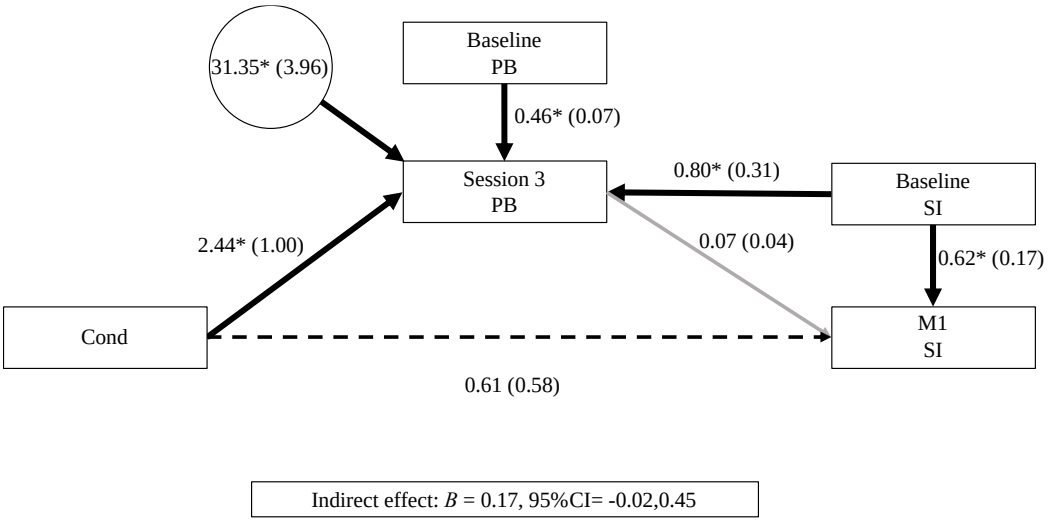
Mediation Model for the Effect of Treatment Condition on Suicidal Ideation Through Perceived Burdensomeness (Hypothesis 2a) with All Variables Modeled Continuously



Note. Cond = Treatment Condition (0= Building Stronger Allies Plus Cognitive Bias Modification for Interpretive Biases, 1= Control); PB = Perceived Burdensomeness; M1 SI = Suicidal Ideation at Month 1 Follow-up. *Black, solid lines indicate significance at $p<0.05$. Dotted lines indicate $p>0.10$.

Figure 2

Mediation Model for the Effect of Treatment Condition on Suicidal Ideation (SI) Through Perceived Burdensomeness (Hypothesis 2a) with SI Modeled as a Count Variable



Note. Cond = Treatment Condition (0= Building Stronger Allies Plus Cognitive Bias Modification for Interpretive Biases, 1= Control); PB = Perceived Burdensomeness; M1 SI = Suicidal Ideation at Month 1 Follow-up. *Black, solid lines indicate significance at $p<0.05$. Grey, solid lines indicate marginal significance at $p<0.10$. Dotted lines indicate $p>0.10$.

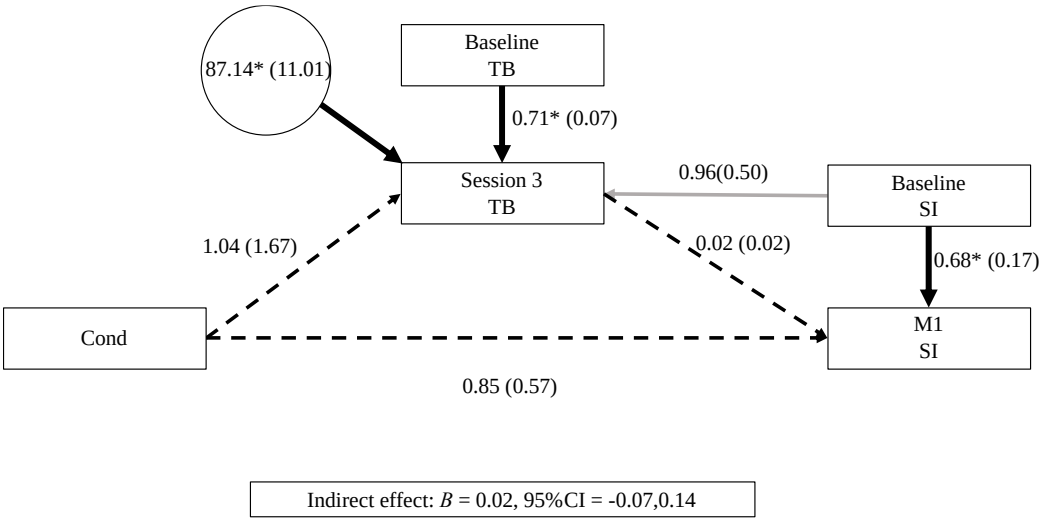
Hypothesis 3

Similar to the model for hypothesis 2, the model for hypothesis 3 (TB as mediator) was found to have poor model fit due to a significant χ_2 value ($p < 0.05$), a high RMSEA value, and a low TLI value (see Table 4). Modification indices did not suggest any new paths be added; however, due to the path added for hypothesis 1 being consistent with empirical evidence, model fit for hypothesis 2 was re-examined after adding a path between baseline DSI-SS and session 3 TB. Addition of this path improved fit indices with the χ_2 value no longer significant. However, TLI remained below 0.95, RMSEA

remained above 0.1, and the upper bound of the RMSEA 90% CI remained above 0.10, suggesting that poor fit could not be ruled out (see Table 5). The addition of the path from baseline DSI-SS to session 3 TB did not change significance level of any existing model paths. Thus, this path was included in all further analyses. Consistent with previous analyses, due to the skewness and kurtosis of DSI-SS, DSI-SS was modeled following a ZNB distribution. No differences in the significance of any paths or effects were found when comparing the model prior to and after model adjustments, thus the final model after adjustments is presented (Figure 3). No significant paths were found, and the overall indirect effect was not significant. A model was run including both PB and TB as mediators to examine unique effects of these constructs. Results did not differ substantively from models run with each mediator individually.

Figure 3

Mediation Model for the Effect of Treatment Condition on Suicidal Ideation Through Thwarted Belongingness (Hypothesis 3)



Note. Cond = Treatment Condition (0= Building Stronger Allies plus Cognitive Bias Modification for Interpretive Biases, 1= Control); TB = Thwarted Belongingness; M1 SI = Suicidal Ideation at Month 1 Follow-up. *Black, solid lines indicate significance at $p<0.05$. Grey, solid lines indicate marginal significance at $p<0.10$. Dotted lines indicate $p>0.10$.

Exploratory Analyses

DT as a Moderator

Although the overall indirect effect through PB tested in hypothesis 1 was not found to be significant, the path that was hypothesized to be moderated by DT (condition to session 3 [a] path) remained significant after model adjustment. Baseline DTS was mean centered and added as a moderator on the path from condition to session 3 PB. The path between condition and session 3 PB was significant ($p = 0.02$). Baseline DTS was found to be a marginally significant ($p = 0.07$) predictor of session 3 PB. However, the

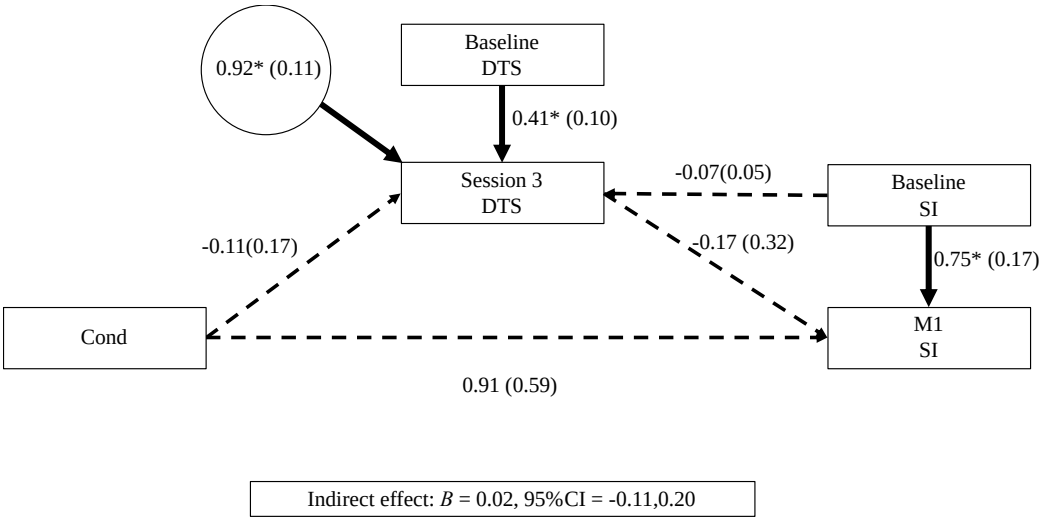
interaction effect of condition and baseline DTS on session 3 PB was not significant (p = 0.57).

DT as a Mediator

Similar to all prior models, the model examining DT as a mediator was found to have poor model fit due to the upper bound of the 90% CI for RMSEA being above 0.1(see Table 4). Modification indices did not suggest any new paths be added; however, due to empirical evidence of the relationship between suicidal ideation and DT (Anestis et al., 2011, 2013) and to increase consistency between models, model fit was re-examined after adding a path between baseline DSI-SS and session 3 DT. No changes were found in model fit and the upper bound of the RMSEA 90% CI remained above 0.10, suggesting that poor fit could not be ruled out (see Table 5). The addition of the path from baseline DSI-SS to session 3 DT did not change significance level of any existing model paths and the path was included in further analyses. Consistent with previous analyses, due to the skewness and kurtosis of DSI-SS, DSI-SS was modeled following a ZNB distribution. No differences in the significance of any paths or effects were found when comparing the model prior to and after model adjustments, thus the final model after adjustments is presented (Figure 4). No significant paths were found, and the overall indirect effect was not significant.

Figure 4

Mediation Model for the Effect of Treatment Condition on Suicidal Ideation Through Distress Tolerance



Note. Cond = Treatment Condition (0= Building Stronger Allies plus Cognitive Bias Modification for Interpretive Biases, 1= Control); DTS=Distress Tolerance Scale; M1 SI = Suicidal Ideation at Month 1 Follow-up. *Black, solid lines indicate significance at $p<0.05$. Dotted lines indicate $p>0.10$.

Discussion

The current study analyzed the BSA+CBM arm of an RCT reported in Schmidt et al. (2019), independent of other active conditions (CAST+CBM and combined interventions); DT was examined as a moderator and additional mediator of suicide risk outcomes. The current study found PB to be a marginally significant mediator of the relationship between treatment condition and suicidal ideation at month 1 follow-up when comparing BSA+CBM to RCC. People in the BSA+CBM-I condition were also found to have significantly lower session 3 PB scores than those in the RCC condition. TB was not found to mediate the relationship between treatment condition and suicidal ideation at month 1 follow-up. Inconsistent with hypotheses, DT was not found to significantly mediate the relationship between condition and suicidal ideation at month 1. It was also not found to moderate the mediation effect of PB on the relationship between condition and suicidal ideation at month 1. Nonetheless, DT at baseline was a marginally significant predictor of PB at session 3 when controlling for baseline PB.

Although Schmidt et al. (2019) found that PB significantly mediated the relationship between treatment condition and suicidal ideation at month 1 follow-up when comparing all three active conditions to RCC, the current study did not find this effect to be significant when comparing BSA+CBM to RCC. This difference likely reflects the difference in sample sizes between Schmidt et al. (2019) who collapsed across intervention conditions and this study, restricted to the BSA+CBM condition. The marginally significant indirect effect of PB suggests that BSA+CBM is performing as expected in regard to reducing PB and that similar relationships were found in the current

study as Schmidt et al. (2019). However, the inconsistencies in significant mediation were likely due to the differences in sample size as the current study was powered to find a medium effect size (0.39) on the PB to DSI-SS path (Fritz & MacKinnon, 2007). This is an ongoing difficulty in suicide research; Lack of reliable suicide-related outcomes because of the low base rates and small sample sizes was recently noted as the most common research challenge by a selection of experts in suicide research (O'Connor & Portzky, 2018). A larger sample size would likely include a larger number of individuals experiencing suicidal ideation which would allow for enhanced examination of mechanisms of change in DSI-SS scores, including PB.

In regard to TB, findings from the current study combined with prior research suggest a need for improved understanding of TB and its measurement. The IPTS posits that either PB or TB is sufficient for a desire for death (passive suicidal ideation) to develop. Alternatively, the IPTS assumes both PB and TB must be present for active suicidal ideation ("I want to kill myself") to develop (Van Orden et al., 2010). However, despite TB being theorized to be required in order to develop active suicidal ideation, TB is not always found to be related to suicidal ideation or suicide risk (Ma et al., 2016). This contrast in findings between PB and TB has also been found in other suicide risk intervention studies (Hill & Pettit, 2019; Van Orden et al., 2016). It is possible that the relationship between TB and suicide risk is more nuanced than the relationship between PB and suicide risk. Due to inconsistent findings, researchers have stressed the importance of investigating potential moderators of the relationship between TB (as well as PB) and suicide risk (Cero et al., 2015). For example, although PB has been found to

have a stronger relationship with suicidal ideation, one study found TB to have a stronger relationship with non-suicidal self-injury which is also a strong predictor of suicidal behavior (Assavedo & Anestis, 2016). TB has also been found to mediate the relationship between fears of negative evaluation and suicidal ideation (Chu et al., 2016). Another explanation for differences in findings between PB and TB is problems with the measurement of TB. In a study examining suicide risk and suicide risk factors measured by 6-day ecological momentary assessment (EMA) and retrospective report following the EMA period, TB was the only construct to have a stronger correlation with another construct (depression) than with itself between EMA and retrospective report (Forkmann et al., 2018). It is possible that current measurement of TB is not distinct enough from other related constructs or is more affected by recall bias than other constructs. It is imperative that research is consistently using accurate measurement of TB for that research to accurately inform further research and intervention development.

In addition to lack of nuance in understanding TB and measurement error, one reason for differences in outcome between TB and PB in intervention studies in particular may be that TB is simply harder to change or requires a different intervention approach. PB, as it is named, is theorized to be based purely on perception, regardless of whether someone is actually a burden on others (Joiner, 2005). However, TB is theorized to be based equally on perception (or feeling), and on the actual presence or absence of reciprocally caring relationships (Joiner, 2005; Van Orden et al., 2010). Joiner (2005) emphasized that without regular interaction, a person's need to belong is not satisfied, even if they feel they are cared for by others. He also noted that if interactions are not

pleasant, are inconsistent, or don't include stable, longer-lasting relationships, that need to belong may not be met. If these types of interactions or relationships are not already present in a person's life, it may be difficult to significantly alter TB in a brief intervention.

The inclusion of DT as a moderator and mediator of outcome in this study was based on prior literature on the relationship between DT and suicidal ideation as well as psychotherapy outcomes (Anestis et al., 2011, 2013; Banducci et al., 2017). Although DT was not found to significantly moderate the path between condition and PB, there was a marginally significant effect of baseline DT predicting session 3 PB. Given this finding, further exploration of the relationship between these two constructs would be valuable. Research examining DT interventions and how they may impact PB may also be constructive, especially considering there are already empirically supported treatments that specifically target DT (e.g. Linehan, 1993). This research would also be beneficial in understanding whether changes in DT can impact outcomes of suicide interventions, considering that BSA+CBM did not specifically target DT.

Refinement of BSA+CBM should maintain the treatment elements that remove barriers often encountered with other interventions such as lack of availability, stigma concerns, and high cost; at the same time, the potency of BSA+CBM needs to be increased. For example, although BSA targets PB and TB and encourages community involvement, it may be beneficial to model/reinforce lack of burden on others and feelings of belongingness through more meaningful follow-up contact as part of the intervention. Fleischmann et al., (2008) examined treatment as usual plus brief

intervention and contact (BIC) in a multi-site sample of individuals receiving medical care at a hospital due to a recent suicide attempt. Individuals received brief psychoeducation and were then contacted for follow-up with decreasing frequency over 18-months. Follow-up contact included check-in regarding mood, needs for support, and whether support had been sought. Fleischmann et al., (2008) found that there was significantly less death by suicide during follow-up in the BIC group. The WHO (2016) emphasizes the low cost and resources needed for this intervention, stating that follow-up can take place via phone, letter, contact cards, or in-person visits. Though not implemented in the Fleischmann et al., (2008) study, the WHO (2016) also recommends increasing and decreasing frequency of follow-up based on improvement of the individual's symptoms. Adding similar methods of follow-up to the BSA intervention may help to reinforce the initial intervention. Online peer support either as a group or through facilitated individual relationships may also be a beneficial addition to BSA+CBM. Online peer support has been found to be beneficial for various mental health problems, including depression (McColl et al., 2014). Online communities facilitated by trained individuals allow for continued mental health education and have also been found to lead to development of reciprocal care between members (Greidanus & Everall, 2010). This may be especially beneficial, given that absence of reciprocal care is one of the two dimensions (the other being loneliness) of TB (Van Orden et al., 2010).

There are several limitations of this study to be considered. The first is a relatively low sample size, which makes it difficult to capture suicidal ideation and suicidal behaviors that are low-base rate, even in a sample that was considered "high risk" based

on risk factors for suicide. A shorter follow-up period with relatively large spans of time between data collection also leads to difficulties in capturing the potential impact of the BSA+CBM intervention. Suicidal ideation has been found to vary significantly within a single day (Kleiman et al., 2017). Therefore, more granular collection of follow-up data spread across a longer span of time, such as a measurement burst design (Sliwinski, 2008) may provide more accurate information regarding trends in risk after intervention. Another limitation is that BSA and CBM-I were not able to be examined independently due to the nature of the intervention and data-collection methods used in the Schmidt et al. (2019) study. Finally, due to missing data, a multi-level modeling approach may have been more appropriate as multi-level approaches allow for modeling of cases with missing data points (Hox et al., 2010).

Overall, the current study indicates that BSA+CBM-I is an effective intervention for lowering PB. These findings are promising given empirical evidence of PB as a risk factor or suicide (Chu et al., 2017). The computer-based format of BSA+CBM-I also reduces barriers to treatment such as cost, time-commitment, availability of local services, and stigma concerns. However, further research with larger sample sizes and more granular assessment of suicide risk is needed to better understand the impact of BSA+CBM-I and reduction of PB on suicide risk. DT was not found to mediate the relationship between condition and treatment outcomes or moderate the relationship between condition and PB. However, the marginally significant effect of baseline DT predicting session 3 PB, controlling for PB at baseline, indicates that high DT may preclude reductions in PB. The current study did not find condition to significantly

predict TB. Further research is needed to improve understanding of the relationship between TB and suicide risk as well as how TB may be reduced through intervention. In spite of this, although the IPTS posits that PB and TB interact to lead to a desire to die, empirical evidence supports PB as an important unique risk for suicidal ideation. Thus, evidence that BSA+CBM-I reduces PB indicates that it is a promising intervention for individuals with elevated suicide risk factors.

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Appendix: Measures

Distress Tolerance Scale

Think of times that you feel distressed or upset. Circle the item that best describes your beliefs about feeling distressed or upset. Please answer regarding your feelings of distress 'in general', that is, on the average.

Strongly Disagree	Mildly Disagree	Agree and Disagree Equally	Mildly Agree	Strongly Agree	
1	2	3	4	5	1. Feeling distressed or upset is unbearable to me.
1	2	3	4	5	2. When I feel distressed or upset, all I can think about is how ba I feel.
1	2	3	4	5	3. I can't handle feeling distressed or upset.
1	2	3	4	5	4. My feelings of distress are so intense that they completely tak over.
1	2	3	4	5	5. There's nothing worse than feeling distressed or upset.
1	2	3	4	5	6. I can tolerate being distressed or upset as well as most peop
1	2	3	4	5	7. My feelings of distress or being upset are not acceptable
1	2	3	4	5	8. I'll do anything to avoid feeling distressed or upset.
1	2	3	4	5	9. Other people seem to be able to tolerate feeling distressed or upset better than I can.
1	2	3	4	5	10. Being distressed or upset is always a major ordeal for me.
1	2	3	4	5	11. I am ashamed of myself when I feel distressed or upset.
1	2	3	4	5	12. My feelings of distress or being upset scare me.
1	2	3	4	5	13. I'll do anything to stop feeling distressed or upset.
1	2	3	4	5	14. When I feel distressed or upset, I must do something about i immediately.
1	2	3	4	5	15. When I feel distressed or upset, I cannot help but concentra on how bad the distress actually feels.
Strongly Disagree	Mildly Disagree	Agree and Disagree Equally	Mildly Agree	Strongly Agree	

Interpersonal Need Questionnaire

The following questions ask you to think about yourself and other people. Please respond to each question by using your own current beliefs and experiences, NOT what you think is true in general, or what might be true for other people. Please base your responses on how you've been feeling recently. Use the rating scale to find the number that best matches how you feel and circle that number. There are no right or wrong answers: we are interested in what you think and feel.

	Not at all true for me			Some what true for me			Very True for me
1. These days, the people in my life would be better off if I were gone	1	2	3	4	5	6	7
2. These days, the people in my life would be happier without me.	1	2	3	4	5	6	7
3. These days, I think I am a burden on society	1	2	3	4	5	6	7
4. These days, I think my death would be a relief to the people in my life.	1	2	3	4	5	6	7
5. These days, I think the people in my life wish they could be rid of me	1	2	3	4	5	6	7
6. These days, I think I make things worse for the people in my life.	1	2	3	4	5	6	7
7. These days, other people care about me	1	2	3	4	5	6	7
8. These days, I feel like I belong	1	2	3	4	5	6	7
9. These days, I rarely interact with people who care about me	1	2	3	4	5	6	7
10. These days, I am fortunate to have many caring and supportive friends	1	2	3	4	5	6	7
11. These days, I feel disconnected from other people	1	2	3	4	5	6	7
12. These days, I often feel like an outsider in social gatherings	1	2	3	4	5	6	7
13. These days, I feel that there are people I can turn to in times of need	1	2	3	4	5	6	7
14. These days, I am close to other people	1	2	3	4	5	6	7
15. These days, I have at least one satisfying interaction every day	1	2	3	4	5	6	7

Depressive Symptom Index – Suicidality Subscale

Instructions: On this questionnaire are groups of statements. Please real all of the statements in a given group. Pick out and circle the one statement in each group that describes you best for the past TWO WEEKS. If several statements in a group seem to apply to you, pick the one with the higher number. BE SURE TO READ ALL OF THE STATEMENTS IN EACH GROUP BEFORE MAKING YOUR CHOICE.

A) 0 I do not have thoughts of killing myself
1 Sometimes I have thoughts of killing myself
2 Most of the time I have thoughts of killing myself
3 I always have thoughts of killing myself

B) 0 I am not having thoughts about suicide
1 I am having thoughts about suicide but have not formulated any plans
2 I am having thoughts about suicide and am considering possible ways of doing it
3 I am having thoughts about suicide and have formulated a definite plan

C) 0 I am not having thoughts about suicide
1 I am having thoughts about suicide but have these thoughts completely under my control
2 I am having thoughts about suicide but have these thoughts somewhat under my control
3 I am having thoughts about suicide but have little or no control over these thoughts

D) 0 I am not having impulses to kill myself
1 In some situations I have impulses to kill myself
2 In most situations I have impulses to kill myself
3 In all situations I have impulses to kill myself

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