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Comparing Brief Interventions for Suicidal Individuals Not Engaged in Treatment: A Randomized Clinical Trial

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Abstract

Background—Non-treatment-engaged individuals experiencing suicidal thoughts have been largely overlooked in the intervention literature, despite reviews suggesting most individuals who die by suicide were not in treatment immediately prior to their death. Most intervention studies recruit individuals from treatment providers, potentially neglecting those individuals who are not already engaged in services. These individuals clearly represent a group in need of additional empirical attention.

Methods—A randomized clinical trial was conducted to compare a single-session dialectical behavior therapy skills-based intervention to a relaxation training control condition. Ninety-three non-treatment-engaged subjects participated in a single in-person assessment, received one of the intervention protocols, and completed follow-up phone interviews for three months including measures of suicidal ideation, emotion dysregulation, and coping skills, as well as other relevant assessments.

Results—Both conditions reported significantly reduced levels of suicidal ideation, depression, and anxiety; however, analyses revealed no significant differences between conditions on the main outcome measures of suicidal ideation, emotion dysregulation, skills use, depression, or anxiety.

Limitations—The two interventions may have been too similar to permit detection of differential effects with this sample size. Specifically, the control condition may have been too active and there may have been stylistic overlap by providers who delivered both interventions.

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Conflict of Interest

Dr. Linehan receives royalties from Guilford Press for books she has written on Dialectical Behavior Therapy. Drs. Linehan and Ward-Ciesielski receive fees for Dialectical Behavior Therapy trainings. All other authors declare that they have no conflicts of interest.

Author Disclosure

Dr. Ward-Ciesielski is the principal investigator on the study and contributed to the design of the study, completion of the study, and preparation of this manuscript. Ms. Tidik is a research assistant on the study and contributed to data collection and preparation of this manuscript. Ms. Edwards is a research assistant on the study and contributed to data collection and preparation of this manuscript. Dr. Linehan is the faculty sponsor for the NIMH grant that provided funding for this study and contributed to the design of the study. All authors contributed to and have approved the final manuscript.

Conclusions—Encouragingly, half of subjects contacted other mental health services during the follow-up period. Although the two interventions under investigation did not yield differential results, the significant changes in important domains across interventions suggest that brief interventions may hold promise for this difficult-to-reach population.

Keywords

suicide; treatment engagement; brief interventions; suicidal ideation

Suicide is a pervasive problem throughout the world (World Health Organization [WHO], 2014), claiming tens of thousands of lives in the United States and hundreds of thousands worldwide (WHO, 2014). Given the total monetary costs associated with suicidal behaviors (Centers for Disease Control and Prevention [CDC], 2015) and the emotional and societal losses each year, the reduction of suicide events is a public health imperative. Despite the ubiquity of suicide, only approximately 40–60 randomized controlled trials (depending on the criteria used to select trials in each literature review) of interventions have been published to date which specifically target suicidal behaviors (e.g., Ward-Ciesielski & Linehan, 2014; Winter et al., 2013). Relative to the number of trials targeting depression, anxiety, substance use, and other important problems associated with a lower incidence of death, the paucity of research becomes even more pronounced.

Of these trials, approximately one-third have shown the experimental intervention to significantly outperform the control condition on suicidal outcomes (Ward-Ciesielski & Linehan, 2014); however, only two of these interventions have been replicated, Dialectical Behavior Therapy (DBT) and “caring letters” (Linehan et al., 1991; Motto, 1976). DBT has consistently been shown to be effective in decreasing suicidal behaviors up to 50% during treatment and follow-up phases (typically at least one year each), when compared to treatment as usual across seven randomized controlled trials (Koons et al., 2001; Linehan et al., 1991; Linehan et al., 2006; Linehan et al., 2015; McMain et al., 2009; Pistorello et al.; Verheul et al., 2003). The second replicated intervention involved sending caring letters at predetermined intervals to individuals who did not follow-up with treatment referrals. During each replication, the experimental group had lower rates of suicidal behaviors (attempts or completed suicides) than the control group (Carter et al., 2007; Hassanian-Moghaddam et al., 2011; Motto, 1976; Motto & Bostrom, 2001). Despite these significant effects, once the letters were no longer sent, the rates of suicidal behavior became equal across groups.

While there is a scarcity of research focused on treatments for suicidal individuals, the studies that have been conducted have neglected a significant proportion of the suicidal population: those individuals who do not seek treatment in times of suicidal crisis. With only minor exceptions (e.g., Litman & Wold, 1976; Oquendo et al., 2011; Weinberg et al., 2006), intervention studies targeting suicidal behaviors have required potential participants to receive referrals from their current mental health providers; however, recent research suggests that most suicidal individuals do not have contact with mental health services prior to their death (Luoma et al., 2002). Specifically, as many as 68% and 81% of individuals who die by suicide have not been in contact with mental health services in the one year and

one month prior to death, respectively (Luoma et al., 2002). Furthermore, Milner and De Leo (2010) found that individuals who utilized services following a suicide attempt were more likely to have attempted suicide via overdose; previously communicated suicidal thoughts; and had a history of psychological problems, suicide attempts, and help-seeking behavior. The individuals who did not seek services after a suicide attempt were more likely to be male and reported no history of communicating suicidal intent and no history of seeking help for their suicidal ideation. This suggests there may be important differences between suicidal individuals who engage in treatment during suicidal crises and those who do not.

A pilot study was conducted to develop and test an intervention for suicidal individuals who were not engaged in mental health treatment before conducting a randomized, controlled trial (Ward-Ciesielski, 2013). In this open pilot trial that did not include a control condition, five DBT skills were selected for the intervention and the promising results of the trial suggest that more evaluation of the DBT Brief Suicide Intervention (DBT-BSI) is warranted. Of note, outcomes and feedback from participants interested in treatment were compared to those uninterested in treatment and there were no significant differences, suggesting that individuals not engaged in treatment may benefit and find value in this brief intervention (Ward-Ciesielski, 2013).

In summary, there are limited efficacious interventions for suicidal individuals and those that do exist are limited in their applicability for a population uninterested or unengaged in mental health treatment. Hence, we conducted a randomized controlled trial to investigate the efficacy of the DBT-BSI (Ward-Ciesielski, 2013; Ward-Ciesielski et al., 2016) relative to a relaxation training (RT) control for suicidal adults who were non-treatment-engaged (i.e., had not met with a mental health provider in the past month). We hypothesized that participants who received the DBT-BSI would report lower levels of suicidal ideation, emotion dysregulation, depression, and anxiety than participants in the RT condition. Additionally, we predicted that DBT-BSI participants would report higher levels of skills use than RT participants over the three-month follow-up period.

Method

Study Design and Setting

This randomized, single-blind study was conducted in a university outpatient clinic in the Northwestern United States. The study protocol, which describes the study in more detail, has been previously published (Ward-Ciesielski et al., 2016). The sample size was determined using G-Power (Faul et al., 2007). Using Cohen's (1988) guidelines, the effect size of the decrease in suicidal ideation one month post-intervention from the pilot study (0.56; Ward-Ciesielski, 2013) is considered a medium effect. Based on power calculations for the full sample and the maximum expected decline and attrition rates, we had adequate power to detect medium ($d = 0.5$ – 0.6) differences.

Recruitment and data collection occurred between January 2012 and March 2014. Assessments were conducted by assessors trained extensively in the assessment and management of suicide risk (Linehan et al., 2012). Assessments were completed at five time

points: phone screening (T0), baseline (T1), one-week (T2), four-weeks (T3), and twelve-weeks post-intervention (T4). Except for the baseline assessment, all assessments were completed over the phone. Screening (T0) and follow-up (T2, T3, T4) interviews took approximately 30–45 minutes, while baseline (T1) assessment was completed in approximately 40–50 minutes. All follow-up interviews were conducted by assessors who were blind to intervention condition assignment. The one exception to the blind assessment was during the follow-up interviews when a non-blind assessor (typically the principal investigator) interviewed the participant regarding their use of specific strategies taught in their assigned intervention condition. The blind assessor was absent from the room during this part of the interview. Participants were eligible to receive up to \$45 in compensation for completing all the study assessments.

Participants and Eligibility Criteria

Eligible participants were 18 years or older, reported experiencing suicidal ideation in the last week (i.e., scoring ≥ 10 on the Scale for Suicidal Ideation; Beck et al., 1979), had not received mental health treatment in the month prior to screening, lived within commuting distance to the research office, and were willing to consent to study procedures. Of note, for the first seven months of active enrollment, eligibility requirements required participants to be without mental health treatment during the previous year. When recruitment progressed much more slowly than projected, inclusion criteria were revised to exclude only those individuals who had received treatment in the last month. Exclusion criteria were kept to a minimum; individuals were ineligible if they were non-English speaking or had significant cognitive impairment (i.e., scoring ≥ 8 on the 6-Item Cognitive Impairment Test; Katzman et al., 1983). Notably, current psychiatric medication was not an exclusionary criterion; however, if the individual had met with their prescribing provider in the past month, they were excluded. This was evaluated as a potential confounding factor in all presented analyses.

Potential participants were recruited from the community using a variety of strategies to reach individuals who were not already receiving mental health services. Recruitment strategies were largely a replication of a previous study (Ward-Ciesielski, 2013). All study methods were approved by the appropriate institutional review board.

Randomization

A minimization randomization algorithm was used to match participants on three variables that may have spuriously impacted analytic results: identified gender, history of suicide attempts, and whether the participant was interested in mental health treatment. Following completion of the in-person assessment battery, matching data for all participants were entered into a computerized system which utilized the minimization randomization algorithm to ensure equal numbers of participants at each level of the matching variable. Participants were randomized using a 1:1 ratio, such that equal numbers of participants were assigned to the experimental condition (DBT-BSI; $n = 46$) as to the control condition (RT; $n = 47$). The participant flowchart (CONSORT diagram) is presented in Figure 1.

Interventions—The interventions were provided by three masters’-level therapists. Every attempt was made to schedule the in-person intervention appointment within three days of the phone screening and the average time between the phone screening and the in-person appointment was 6–7 days (median = 5 days). The intervention was conducted on a one-on-one basis and was completed in the same appointment and by the same therapist as the in-person assessment. After the T1 assessment was completed, participants were randomized. At the start of each intervention session, participants were asked to briefly describe the factors they believed to be associated with their suicidal ideation and any patterns they had noticed in the occurrence of the ideation. At the end of each session, participants were provided an individualized list of mental health resources (e.g., community mental health centers, private practitioners), based primarily on financial and geographic considerations.

DBT Brief Suicide Intervention (DBT-BSI)—The DBT-BSI was designed to last 45–60 minutes. As in the open pilot trial (Ward-Ciesielski, 2013), the DBT-BSI involved presenting participants with five pre-selected DBT skills (Linehan, 1993, 2015): mindfulness, mindfulness of current emotions, opposite-to-emotion action, distraction, and changing your body chemistry (by applying ice water to the face, intensely exercising, pacing your breathing, and progressively relaxing muscles). Mindfulness skills provide concrete descriptions of how to be present to and participate in the present moment. These skills are divided into two components: 1) what to do with one’s attention or mind during a practice (i.e., observing, describing, and participating) and 2) how to engage in mindfulness practice (i.e., one-mindfully, non-judgmentally, and effectively). Mindfulness of current emotion is a specific type of mindfulness skill that involves observing and describing specific sensations (i.e., physical sensations) associated with emotions. Opposite-to-emotion action involves: 1) exposure to the stimuli or cues that are evoking an emotion, 2) blocking the behavior prompted by the emotion’s action urge, and 3) acting in a way that is opposite or inconsistent with the emotional response. Distraction was included in the curriculum to teach participants when and how to effectively use distraction for acute crises. “Changing your body chemistry” is a set of skills that are meant to rapidly reduce physiological arousal (Linehan, 2015). This includes dunking your face in ice water, intensely exercising, pacing your breathing, and progressively relaxing muscles. Each of these strategies was explained to the participant and, when appropriate, practiced during the appointment.

Relaxation Training Control (RT)—The RT control was designed to last 45–60 minutes and to control for non-specific factors left uncontrolled in the pilot trial, such as the amount of time spent with a caring assessor, providing a rationale for usefulness of the information presented, and participant expectancies. A relaxation control was selected owing to literature suggesting the immediate reduction in distress resulting from relaxation practices (e.g., Briggs et al., 2007; Rausch et al., 2006), thus providing a reasonably safe and acceptable control intervention. The RT condition has been described in more detail elsewhere (Ward-Ciesielski et al., 2016).

Screening Measures

Participants’ demographic characteristics were collected, including age, gender, and current and past mental health treatment. Cognitive impairment was assessed using the 6CIT

(Katzman et al., 1983) at T0. The 6CIT is a brief screening tool which assesses for present orientation, memory, and reasoning. It has been shown to strongly correlate with the Mini-Mental Status Exam ($r^2 = .91$) and to outperform the MMSE in milder forms of impairment (Brooke & Bullock, 1999). Suicidal ideation was assessed using the SSI (Beck et al., 1979).

Outcome Measures

The primary outcome domains were suicidal ideation, emotion dysregulation, skills use, depression, anxiety, and treatment utilization. Additionally, the occurrence of self-injurious behaviors during the follow-up phase was evaluated as an exploratory outcome. At T1, self-report questionnaires were completed via computerized forms; at all other assessment points, all measures were completed via interview.

Suicidal ideation—The SSI (Beck et al., 1979) was used to assess suicidal ideation at T0, T2, T3, and T4. The SSI is a 19-item self-report assessment that addresses domains including the intensity and frequency of suicidal thoughts, attitudes toward suicidal thoughts, planning and preparation for a suicide attempt, and discussing thoughts of suicide with others. The SSI has demonstrated moderate internal consistency ($\alpha = .84-.89$) and high interrater reliability ($r = .83-.98$) (Beck et al., 1979; Beck et al., 1997). In the present study, Cronbach's $\alpha = .80$ at T0.

Emotion dysregulation—The Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) was used to assess emotion dysregulation at T1, T3, and T4. The DERS is a 39-item self-report measure that assesses individuals' typical levels of emotion dysregulation across six domains: non-acceptance of negative emotions, inability to engage in goal-directed behaviors when experiencing negative emotions, difficulties controlling impulsive behaviors when experiencing negative emotions, lack of emotional awareness, and lack of emotional clarity. The DERS has been found to have high internal consistency ($\alpha = .93$), good test-retest reliability ($r = .88$), and adequate construct and predictive validity. In the present study, Cronbach's $\alpha = .92$ at T1.

Skills use—Skills use was assessed in three ways: 1) the 38-item skills use subscale of the DBT Ways of Coping Checklist (DBT-WCCL; Neacsiu et al., 2010), a self-report measure that assesses different methods of coping with stress (T1, T3, T4), 2) a subset of 12 DBT-WCCL items directly related to the skills taught as part of the DBT-BSI, and 3) a study-generated questionnaire which asked questions related to the skills taught in each of the intervention conditions (i.e., Skills Used Since the Intervention [SUSI]; T2, T3, T4). The DBT-WCCL has strong psychometric properties and does not include the names of the specific skills within the items. Therefore, it is a general measure of coping strategies used by participants. Participants rate the extent to which they have used the skill to cope with stressful events on a scale from 0 (never used) to 3 (regularly used). In the present study, Cronbach's $\alpha = .92$ for the skills-use subscale of the DBT-WCCL at T1 and Cronbach's $\alpha = .75$ for the 12 selected items.

Depression—The Patient Health Questionnaire Depression Module (PHQ; Spitzer et al., 1999) was used to assess depression at T1, T2, T3, and T4. The PHQ is a 9-item self-report

inventory that assesses the degree to which participants have experienced various symptoms of depression during the past two weeks. The PHQ is widely used, has high internal consistency ($\alpha = .92$), and is sensitive to symptom change (Spitzer et al., 1999). In the present study, Cronbach's $\alpha = .82$ at T1.

Anxiety—and the Beck Anxiety Inventory (BAI; Beck & Steer, 1990) was used to assess anxiety at T1, T2, T3, and T4. The BAI is a 21-item self-report inventory that lists various symptoms related to anxiety and asks participants to rate each symptom on a 0–3 scale based on its relevance during the last week. The BAI has high internal consistency ($\alpha = 0.92$) and high test-retest reliability ($r = 0.75$; Beck et al., 1988). In the present study, Cronbach's $\alpha = .92$ at T1.

Treatment utilization—At T1, recent mental health treatment history was assessed using a shortened version of the Treatment History Interview (THI; Linehan & Heard, 1987). The THI uses a timeline follow-back method of assessment to describe the participant's involvement with various psychological and pharmacological treatments. Reliabilities for the THI are high; for example, for clients who reported hospitalization in the past year, analyses have revealed 90% agreement between client report and hospital records for number of admissions per client ($r = .99$; Linehan & Heard, 1987). Then, a study-generated questionnaire assessing follow-up on mental health treatment referrals provided at T1 was administered at T2, T3, and T4.

Self-injurious behaviors—An exploratory measure (Lifetime Parasuicide Count; Comtois & Linehan, 1999) was used to assess the frequency of intentional self-injury and suicide attempts across the lifetime (at T1) and a count was obtained for a wide range of self-injurious behaviors, the number of times the behaviors occurred with true or ambivalent intent to die, and the times medical attention was obtained. This was reassessed at T2, T3, and T4.

Risk Assessment and Management

Monitoring current suicide risk of participants (i.e., the University of Washington Risk Assessment Protocol; Linehan et al., 2012) involved ratings of stress and suicidality both before and after participation in each assessment session of the study (in person or by phone). In the rare events when ratings indicated an increase in suicide risk, further assessment was conducted and a licensed psychologist (the last author) was consulted.

Statistical Analysis

All participants were included in the intent-to-treat (ITT) analyses. Potential confounding variables were both theoretically- and empirically-derived. Two *a priori* confounding variables were identified: psychiatric medications at baseline (yes/no) and date of phone screening (before/after inclusion criteria change). Additional potentially confounding variables were identified via chi-square and *t*-test comparisons of demographic and baseline clinical characteristics between the two conditions. Significant comparisons were treated as potential confounding variables and included in the longitudinal analyses as covariates to

determine whether they were significant predictors of the outcome variable. If the covariate main effect was significant ($p < .05$), it was kept in the outcome's model as a moderator.

Hierarchical Linear Modeling (HLM; Bryk & Raudenbush, 1992; Raudenbush & Bryk, 2002) was used to assess differences between conditions over time. Level-1, the within-subjects model, included the estimates of the individual changes in repeated measures of suicide ideation, emotion dysregulation, skills use, depression, and anxiety assessed over time. Level-2, the between-subjects model, incorporated condition assignment as a predictor of the Level-1 growth parameters. Appropriate covariance structures were analytically determined (Verbeke, 1997), and the analyses included a restricted estimated maximum likelihood model to account for missing data (Schafer & Graham, 2002). Effect sizes were computed using Feingold's (2009) formula and interpreted using Cohen's (1988) guidelines.

Intervention effects for binary outcomes (i.e., use of the skills taught during the intervention, mental health treatment contact, and suicidal behaviors) were evaluated in much the same way as continuous outcomes. Specifically, an extension of the generalized linear model, the generalized estimating equation approach (Liang & Zeger, 1986; Zeger & Liang, 1986) was used. Effect sizes were computed using relative risk ratios (McGough & Rarone, 2009).

Results

Participants

The 93 ITT participants were primarily male (59.1%; 35.9% female, 4.3% transgender) and White/Caucasian (89.1%), with a mean age of 40.22 ($SD = 15.15$). Participant demographics are provided in Table 1. Randomization successfully matched participants on gender, history of suicide attempt, and interest in mental health treatment. At T1, participants assigned to the DBT-BSI condition were significantly more likely to report a lifetime history of non-suicidal self-injury ($\chi^2(1, N = 61) = 6.46, p = .01$). Thus, this variable was evaluated as a potential confounding factor in the outcome analyses. There were no other baseline differences between conditions.

In total, 38 of 46 DBT-BSI participants (83%) and 32 of 47 RT participants (68%) completed T4. The 23 participants lost to attrition during follow-up, compared to the remaining 70 participants, reported significantly higher levels of depression ($t(88) = 2.72, p = .01$) and anxiety ($t(90) = 2.49, p = .02$) at T1. There were no other differences in the demographic or clinical characteristics of those who dropped out during follow-up and those who did not.

Preliminary Analyses

Means and standard deviations for all outcome variables are presented in Table 2. Fifteen participants (8 in the DBT-BSI condition and 7 in the RT condition) reported psychiatric medication use at T0. There was a trend for psychiatric medication to be a significant predictor for use of skills taught in the DBT-BSI condition ($p = .07$); however, this variable was not significant in any of the other analyses and was not included in the final models. Lifetime history of non-suicidal self-injury (at T1) was a significant predictor for suicidal

ideation, emotion dysregulation, and skills use. It was included in the final model for each of these outcomes.

Main Outcomes

ITT HLM analyses revealed a significant main effect of time for suicidal ideation, depression, and anxiety; however, there was no significant main effect of condition nor a time-by-condition interaction on any of these outcomes (see Table 3). This suggests participants in both conditions experienced a significant reduction in each outcome during follow-up. The effect size for the difference between T0 and T4 suicidal ideation was large ($d = 1.12$) and the effect sizes for the differences between T1 and T4 depression and anxiety scores were medium ($d = .61$ and $.59$, respectively).

ITT HLM analyses also revealed a significant main effect of condition for emotion dysregulation, skills use (both the DBT skill use subscale of the DBT-WCCL and the subset of 12 items related to skills taught as part of the DBT-BSI); however, there was no significant main effect of time nor a time-by-condition interaction on these outcomes. In general, RT participants reported higher levels of emotion dysregulation than DBT-BSI participants. The effect size for this difference when pooled across all three assessment points was small ($d = .24$). Additionally, at T1 and T3 (but not at T4), DBT-BSI participants reported higher levels of skills use than RT participants on both scales. The effect sizes for these differences between conditions, when pooled across all three assessment points, was small (skills use subscale, $d = .21$; 12-item subscale, $d = .19$).

ITT GEE analyses revealed a significant main effect of time in predicting participants' contact (phone or in-person) and appointments with mental health resources during follow-up. RT participants were more likely to report contact with services; however, there was no significant main effect of condition nor a significant time-by-condition interaction (see Table 4). Furthermore, there was a significant main effect of condition in predicting use of any strategies taught as part of the intervention condition. DBT-BSI participants were more likely to report using the skills they were taught. As with the other analyses of skills use, there was no significant main effect of time, nor a time-by-condition interaction.

Exploratory Outcomes

Three participants in each condition attempted suicide (one RT participant reported attempts at both T3 and T4). Nine participants (9.7% of ITT) engaged in non-suicidal self-injury during the follow-up period (5 DBT-BSI, 4 RT). A total of 14 participants (15.1% of ITT) reported self-injurious behavior (i.e., a suicide attempt and/or non-suicidal self-injury) during follow-up (7 DBT-BSI, 7 RT). There was no difference between conditions in the number of participants who reported a suicide attempt and/or non-suicidal self-injury. This is not surprising given the less than adequate power to detect differences in suicidal behavior. Although the difference was not significant, RT participants had a 2.4 times greater probability of engaging in self-injurious behavior between the T3 and T4 follow-up interviews relative to DBT-BSI participants.

Discussion

The present study compared two brief, one-time interventions for non-treatment-engaged suicidal individuals. We predicted the DBT-BSI would result in greater improvements than the RT; however, there was no evidence of differential rates of change between conditions. Suicidal ideation, depression, and anxiety significantly improved following the intervention. The stability of suicidal ideation over time has been implicitly assumed, yet rarely studied (Russ et al., 1999; Witte et al., 2005); however, the large effect size for the change in suicidal ideation over time and the simultaneous decreases in depression and anxiety suggests that the impact of brief interventions on these domains warrants further investigation.

In contrast to the pilot trial (Ward-Ciesielski, 2013), skills use did not appreciably change over time. While DBT-BSI participants were significantly more likely to report using the skills that they were taught during the intervention, this did not translate into an overall effect of skills use over time. Furthermore, emotion dysregulation did not change over time, contrary to what DBT's underlying theory—that emotion dysregulation results in maladaptive coping (Linehan, 1993)—would predict. One explanation for this lack of between-condition differences is the control condition itself. While the RT was meant to control for non-specific factors, it was also an active comparison condition that involved presentation of a potentially new skill (despite not being described to participants as such). A larger sample size may be necessary to detect differences between two active interventions, leaving the present study vulnerable to a type II error (Freedland et al., 2011; Mohr et al., 2009).

Alternatively, while the interventions were sufficient to produce short-term change on a limited number of domains, long-term change may require longer intervention. In fact, the largest changes in the three significant outcomes (i.e., suicidal ideation, depression, anxiety) were observed at the one-week follow-up assessment. These more immediate changes may indicate that the content of the interventions was less impactful than fast-acting non-specific factors (e.g., participation in a study, completing assessments, talking about suicidal thoughts and behaviors, readiness for change) and perhaps the skills-focused content would be expected to cause longer-term changes as participants implement the skills in relevant contexts. Alternatively, the mechanisms of change may not have been measured via the outcome domains described. Other potential mechanisms may include providing a validating and non-judgmental environment, teaching and encouraging behavioral skills use, and indirect targeting of problem-solving and cognitive flexibility via new coping strategies. These mechanisms represent important areas for further study.

Encouragingly, 50.7% of participants contacted mental health services and 22.5% began psychotherapy or pharmacotherapy during follow-up, suggesting an important benefit of the interventions with a non-treatment-engaged population. RT participants—who engaged in an open-ended discussion of their stressors—had higher rates of contact with mental health services. Perhaps the mechanism facilitating mental health contact is different than the one driving changes in other outcome domains. Alternatively, perhaps participants in the DBT-BSI felt their needs were adequately addressed via the skills presented while RT participants enjoyed the supportive discussion and were motivated to seek more of that experience.

Of note, nearly 40% of participants attempted suicide in the year prior to the in-person appointment and more than half of participants reported a lifetime history of NSSI. Although significant follow-up differences in self-injurious behaviors were not hypothesized given the sample size, their occurrence during a brief follow-up period suggests the generalizability of this sample to other RCTs. Furthermore, RT participants were over two times more likely to engage in self-injurious behavior than DBT-BSI participants between T3 and T4. This difference was not statistically significant, though it suggests that with a larger sample such a difference may have favored the DBT-BSI.

Several limitations warrant discussion. As mentioned, the intervention conditions may have been too similar to observe differences with this sample size. Of note, very few previous RCTs evaluating interventions for suicidal individuals have used non-active control conditions (e.g., Hawton et al., 1987; Linehan et al., 1991), researchers preferring instead to utilize treatment-as-usual controls (e.g., Weinberg et al., 2006), which are rarely described in detail. Thus, it is difficult to ascertain the extent to which a non-active control condition may have yielded different results than the active control used herein. In the present study, an active control condition was selected to more rigorously evaluate the effect of the DBT-BSI; however, the lack of a no-treatment or inactive control condition limits our ability to determine whether the results obtained are simply due to the passage of time rather than the interventions themselves. Relatedly, all study therapists were DBT-trained and conducted both types of interventions. While this was intended to consolidate resources and more accurately model non-research environments where the interventions may be implemented (e.g., primary care, emergency department, outpatient practice), there may have been a confounding stylistic overlap between the conditions. Research is yet lacking on the effect of stylistic strategies in DBT on patient outcomes; however, irreverent and reciprocal communication are considered critical elements of DBT meant to facilitate change and communicate acceptance (Linehan, 1993). Given that intervention fidelity was not evaluated, the possibility of stylistic overlap between conditions cannot be ruled out. The extent to which style impacts outcome, especially in brief interventions, warrants further investigation.

Importantly, the final sample size was smaller than expected. To correct slower-than-anticipated enrollment, inclusion criteria were changed and recruitment efforts were expanded. These efforts improved enrollment; however, the target sample size and associated power were not obtained. Finally, the rate of attrition bears consideration. Of the 23 study drop-outs, six participants were entirely unreachable. Every effort was made to establish contact; however, these participants may have died by suicide, been incarcerated, or were lost for other reasons relevant to study outcomes. This is an important factor in interpreting this study's results.

Despite these weaknesses, the present study also has several important strengths. To our knowledge, this is the only treatment study to date geared toward those who are suicidal and non-treatment-engaged. Most participants (89%) had a history of previous mental health treatment and several (16%) were currently taking prescribed medication (although they hadn't met with their provider in at least one month prior to enrolling in the study); however, on average, participants had not been engaged in mental health treatment for a considerable

length of time (3.7 years). The decreases in suicidal ideation, depression, and anxiety following the one-session intervention present an important step toward reaching this population, understanding their barriers to engagement, and learning what interventions are helpful and valuable for them. Furthermore, the successful enrollment of a sizeable number of males and individuals 55 and older suggest that the recruitment strategies employed (most notably, not requiring a clinical referral) have begun to create a path toward these high-risk, underserved individuals. Finally, the 75% retention rate suggests that this sample was willing to follow up on low-cost advertisements and complete follow-up interviews via phone after a single in-person contact. Thus, a significant strength of the present study and its methodology is the acceptability to a historically difficult to reach and retain population.

This study is only the beginning of a line of research targeting a more complete understanding of the factors that contribute to low rates of treatment engagement among suicidal individuals and the ways to overcome them. Future studies would benefit from assessing factors that impact suicidal individuals' decisions to seek or avoid mental health treatment. This would allow investigation of whether those who seek treatment are the same as those who volunteer for research studies and those who neither seek treatment nor volunteer for research. It would also allow for assessment of the ways that brief interventions impact these factors and how these interventions can be enhanced. This study has laid the groundwork upon which future researchers can continue to expand our ability to engage and help these previously underserved individuals.

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Highlights

- Non-treatment engaged suicidal individuals require empirical attention.
- Single-session coping skills and relaxation training interventions are compared.
- Both interventions yield reductions in suicidal ideation, depression, and anxiety.

Figure 1.
CONSORT flow diagram

Table 1

Baseline Characteristics for Intent-to-Treat Participants (n = 93)

	Baseline, No. (%)				χ^2	<i>t</i>	<i>p</i>
	DBT-BSI (n = 46)	RT (n=47)	Total (n=93)				
Age, mean (SD), yrs ^a	38.6 (15.0)	41.8 (15.3)	40.2 (15.2)		1.00		.32
Gender ^{b, c}							
Male	26 (57)	29 (62)	56 (59)	.41			.87
Female	18 (39)	16 (34)	34 (37)				
Transgender	2 (4)	2 (4)	4 (4)	3.86			.41
Ethnicity ^b							
Caucasian	38 (88)	37 (80)	75 (84)				
American Indian	1 (2)	1 (2)	2 (2)				
African American	4 (9)	4 (9)	8 (9)				
Asian	0 (0)	1 (2)	1 (1)				
Other	0 (0)	3 (7)	3 (3)	9.54			.28
Highest education ^b							
Less than high school	1 (2)	4 (9)	5 (6)				
High school or equivalent	7 (16)	6 (13)	13 (14)				
Some college	22 (50)	22 (47)	44 (48)				
Bachelors' degree	12 (27)	6 (13)	18 (20)				
Beyond bachelors' degree	2 (5)	9 (19)	11 (12)				
Annual income ^b				4.31			.79
< \$10,000	19 (44)	19 (41)	38 (43)				
\$10,000–24,999	19 (44)	15 (33)	34 (38)				
\$25,000–50,000	4 (9)	10 (22)	14 (16)				
> \$50,000	1 (2)	2 (4)	3 (3)				
Homeless (yes, lifetime)	24 (52)	26 (57)	50 (54)	.11			.75
Marital status ^b				4.69			.30
Married	3 (7)	6 (13)	9 (10)				
Separated	2 (4)	2 (4)	4 (4)				

	Baseline, No. (%)			
	DBT-BSI (n = 46)	RT (n=47)	Total (n=93)	
Divorced, single	12 (26)	6 (13)	18 (19)	
Widowed	0 (0)	2 (4)	2 (2)	
Single, never married	29 (63)	31 (66)	60 (65)	
Children (yes)	14 (30)	16 (36)	30 (33)	.61
Suicide attempt (yes) ^d				
Lifetime	28 (61)	31 (66)	59 (64)	.43
Past year	7 (15)	12 (26)	19 (21)	1.53
Past month	3 (7)	2 (4)	5 (6)	.24
NSSI (yes)				
Lifetime	33 (72)	21 (45)	54 (58)	6.46
Mental health treatment				.01 ^e
Past year	14 (34)	16 (30)	30 (32)	.55
Never	5 (11)	5 (11)	10 (11)	.00
Time since most recent, mean (SD), yrs ^{a, f}	3.30 (4.5)	4.12 (6.7)	3.71 (5.7)	.65
Medications at T0	7 (15)	8 (17)	15 (16)	.81

Abbreviations: DBT-BSI, Dialectical Behavior Therapy Brief Suicide Intervention; RT, Relaxation Training; NSSI, non-suicidal self-injury; T0, phone screening assessment

^aValues are expressed as mean (SD).

^bValues are expressed as percentages of the total group unless otherwise indicated.

^cFor chi-square comparisons in which there are fewer than five cases in a cell, the Fisher's exact test is reported.

^dCategories are overlapping (i.e., participants with past year and past month suicide attempts are also counted in the total of participants who reported lifetime suicide attempts).

^eAs a result of the significant difference in the proportions of participants in each condition who reported a lifetime history of engaging in non-suicidal self-injury, this variable was evaluated as a potential confounding factor in all analyses.

^fIncludes all participants with lifetime mental health treatment.

Table 2

Means and Standard Deviations for Outcomes by Condition

Scale	n	DBT-BSI M (SD)	n	RT M (SD)	Range
Suicidal ideation (SSI)					
T0	46	19.80 (5.20)	47	18.64 (5.41)	0 to 38
T2	34	12.79 (7.27)	37	12.08 (8.71)	
T3	35	11.37 (7.82)	35	10.89 (8.65)	
T4	39	10.62 (8.89)	30	8.47 (8.82)	
Skills use subscale (DBT-WCCL)					
T1	46	1.83 (0.42)	47	1.69 (0.49)	0 to 3
T3	35	1.76 (0.48)	36	1.59 (0.49)	
T4	38	1.71 (0.62)	30	1.72 (0.50)	
12-item skills subscale (DBT-WCCL)					
T1	38	1.91 (0.40)	40	1.79 (0.55)	0 to 3
T3	35	1.90 (0.46)	35	1.68 (0.57)	
T4	37	1.84 (0.56)	29	1.90 (0.47)	
Skills taught in intervention (SUSI)					
T2	41	0.98 (0.16)	38	0.63 (0.49)	0 to 1
T3	35	0.91 (0.28)	36	0.78 (0.42)	
T4	38	0.92 (0.27)	30	0.60 (0.50)	
Emotion dysregulation (DERS total)					
T1	46	102.74 (21.91)	47	108.76 (23.29)	39 to 195
T3	36	95.00 (24.17)	39	100.54 (25.60)	
T4	39	91.21 (18.84)	32	96.13 (27.67)	
Depression (PHQ)					
T1	45	16.38 (6.19)	46	17.33 (5.66)	0 to 27
T2	41	13.39 (7.30)	39	14.46 (6.49)	
T3	36	13.17 (6.22)	38	13.53 (6.79)	
T4	39	12.64 (6.69)	31	13.10 (7.09)	
Anxiety (BAD)					
T1	46	12.83 (10.14)	47	14.26 (9.54)	0 to 63

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Scale	DBT-BSI M (SD) n	RT M (SD) n	Range
T2	41 7.37 (7.90)	39 8.15 (8.92)	
T3	36 8.22 (8.74)	38 8.47 (8.97)	
T4	39 7.23 (7.82)	31 8.45 (9.43)	

Abbreviations: DBT-BSI, Dialectical Behavior Therapy Brief Suicide Intervention; RT, Relaxation Training; SSI, Scale for Suicidal Ideation; DBT-WCCL, DBT Ways of Coping Checklist; SUSI, Skills Used Since Intervention; DERS, Difficulties in Emotion Regulation Scale; PHQ, Patient Health Questionnaire – Depression Module; BAI, Beck Anxiety Inventory

Table 3

Tests of Fixed Effects and Estimated Slopes during Follow-up for Intent-to-Treat Participants (n = 93)^a

Scale	Fixed Effects Estimates			Estimated Slopes for Each Condition		
		<i>F</i> (<i>df</i>)		DBT-BSI (n = 46) ^a	<i>p</i> ^b	RT (n = 47) ^a
Suicidal ideation (SSI) ^c						
Condition	.34 (1.10)	.10 (279.4)				
Time	-2.16 (.60)	15.48 (126.2)*				
Condition * Time	.53 (.91)	.34 (96.3)		-2.08 (.38)	-5.44*	-2.25 (.40)
Skills use subscale (DBT-WCCL) ^c						
Condition	.25 (.08)	10.79 (200.4)*				
Time	-.05 (.05)	1.05 (127.1)				
Condition * Time	.02 (.07)	.07 (95.6)		-.04 (.04)	-1.07	-.00 (.04)
12-item skills subscale (DBT-WCCL) ^c						
Condition	.25 (.09)	7.21 (163.5)*				
Time	-.03 (.05)	.14 (158.4)				
Condition * Time	.02 (.07)	.10 (105.8)		-.02 (.04)	-.64	.02 (.04)
Emotion dysregulation (DERS) ^c						
Condition	-8.90 (3.68)	5.85 (191.4)*				
Time	-4.86 (2.23)	1.89 (130.1)				
Condition * Time	4.72 (3.43)	1.90 (90.4)		-1.11 (2.45)	-.45	-5.77 (2.05)
Depression (PHQ)						
Condition	-.99 (.97)	1.05 (307.2)				
						-2.81*

Scale	Fixed Effects Estimates		Estimated Slopes for Each Condition			
	<i>F</i> (<i>df</i>)		DBT-BSI (n = 46) ^a	<i>p</i> ^b	RT (n = 47) ^a	<i>p</i> ^b
Time		-1.18 (.54)				
	7.68 (120.9)*					
Condition * Time		.29 (.74)				
Anxiety (BAI)			.16 (120.9)	-1.17 (.45)	-2.58*	-1.43 (.48)
Condition		-1.39 (1.38)	1.05 (312.9)			-3.01*
Time		-1.96 (.74)	10.41 (116.9)*			
Condition * Time		.60 (1.03)	.34 (116.9)	-1.66 (.63)	-2.64*	-1.89 (.66)
						-2.88*

Abbreviations: DBT-BSI, Dialectical Behavior Therapy Brief Suicide Intervention; RT, Relaxation Training; SSI, Scale for Suicidal Ideation; DBT-WCCL, DBT Ways of Coping Checklist; DERS, Difficulties in Emotion Regulation Scale; PHQ, Patient Health Questionnaire – Depression Module; BAI, Beck Anxiety Inventory.

^aReported as coefficients (SE).

^bA t-test assessed whether each slope estimate was significantly different from 0.

^cThe covariate of lifetime NSSI reported at the in-person assessment is included in the model.

Table 4

Parameter Estimates for Binary Outcomes for Intent-to-Treat Participants (n = 93).

Scale	Estimate (SE) ^a	Wald χ^2	p	RR ^b
Skills taught in intervention (SUSI)				
Condition	−3.21 (1.17)	7.59	.01*	
Time	−.02 (.22)	.87	.35	
Condition * Time	.52 (.50)	1.05	.31	
RR (DBT-BSI > RT)				
T2				1.5
T3				1.2
T4				1.5
Any mental health contact (RFQ)				
Condition	.52 (.69)	.57	.45	
Time	−.49 (.24)	14.30	<.001*	
Condition * Time	−.11 (.29)	.15	.70	
RR (RT > DBT-BSI)				
T2				1.3
T3				1.2
T4				1.1
Attended appointment (RFQ)				
Condition	1.35 (1.82)	.55	.46	
Time	−1.00 (.26)	12.82	<.001*	
Condition * Time	−.24 (.61)	.15	.70	
RR (RT > DBT-BSI)				
T2				2.2
T3				2.9
T4				1.6
Any SA and/or NSSI (LPC)				
Condition	−4.74 (3.80)	1.56	.21	
Time	.08 (.50)	2.24	.13	
Condition * Time	1.56 (1.15)	1.83	.18	
RR (RT > DBT-BSI)				
T3				1.1
T4				2.4

Abbreviations: RR, relative risk; SUSI, Skills Used Since Intervention; DBT-BSI, Dialectical Behavior Therapy Brief Suicide Intervention; RT, Relaxation Training; RFQ, Referral Follow-up Questionnaire; LPC, Lifetime Parasuicide Count; SA, suicide attempt; NSSI, non-suicidal self-injury

^aDBT-BSI is coded as 0, RT is coded as 1.

^bRelative risk of the outcome at each follow-up for the condition with the greater prevalence (e.g., for SUSI, DBT-BSI participants had a 1.5 times greater likelihood than RT participants of reporting use of the skills they were taught in the intervention at T2).