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Evidence-Based Treatments for Self-Injurious Behaviors in Youth

Evidence-Based Psychosocial Treatments for Self-Injurious Thoughts and Behaviors in Youth

Abstract

Objective—To review the current evidence base of psychosocial treatments for suicidal and nonsuicidal self-injurious thoughts and behaviors (SITBs) in youth.

Method—We reviewed major scientific databases (HealthSTAR, MEDLine, PsycInfo, PubMed) for relevant studies published prior to June 2013.

Results—The search identified 29 studies examining interventions for suicidal or nonsuicidal SITBs in children or adolescents. No interventions currently meet the *JCCAP* standards for Level 1: *well-established* treatments. Six treatment categories were classified as Level 2: *probably efficacious* or Level 3: *possibly efficacious* for reducing SITBs in youth. These treatments came from a variety of theoretical orientations, including cognitive-behavioral, family, interpersonal, and psychodynamic theories. Common elements across efficacious treatments included family skills training (e.g., family communication and problem-solving), parent education and training (e.g., monitoring and contingency management), and individual skills training (e.g., emotion regulation and problem-solving).

Conclusions—Several treatments have shown potential promise for reducing SITBs in children and adolescents. However, the probably/possibly efficacious treatments identified each have evidence from only a single randomized controlled trial. Future research should focus on: replicating studies of promising treatments; identifying active treatment ingredients; examining mediators and moderators of treatment effects; and developing brief interventions for high-risk periods (e.g., following hospital discharge).

Keywords

suicide; suicide attempt; nonsuicidal self-injury; deliberate self-harm; evidence-based; intervention; treatment

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Introduction

Self-injurious thoughts and behaviors (SITBs) are a broad class of cognitions and actions aimed at intentional and direct injury to one's own body. Although the range of terms

employed to describe SITBs (e.g., suicidality, parasuicide, deliberate self-harm, self-mutilation) traditionally has created confusion, the field has recently begun to focus on the distinction between *suicidal* and *nonsuicidal* self-injurious thoughts and behaviors based on key differences in the prevalence, frequency, function, and severity of these behaviors (Nock, 2009; 2010). Most notably, suicidal phenomena (e.g., suicide ideation, plans, attempts) are associated with any intent to die whereas nonsuicidal phenomena (e.g., nonsuicidal self-injury [NSSI], suicide threats and gestures) are not (Nock, 2010). Though suicidal and nonsuicidal SITBs are distinct, growing research indicates that NSSI is a significant risk factor for suicidal behavior (Asarnow et al., 2011b; Wilkinson et al., 2011), suggesting a complex association between these two types of behaviors.

Rates of SITBs are relatively rare in childhood, but increase drastically during the transition to adolescence (Nock et al., 2008; 2013). In the United States, suicide is the third leading cause of death in youth, with approximately 4,600 suicide deaths among adolescents each year (Centers for Disease Control and Prevention [CDC], 2010). Moreover, current estimates indicate that each year approximately 16% of adolescents will seriously consider killing themselves, 13% will make a suicide plan, and 8% will attempt suicide (CDC, 2012). NSSI is even more common among adolescents with studies reporting an average lifetime prevalence of 18% in this population (Muehlenkamp et al., 2012).[1]

Given that suicidal and nonsuicidal self-injurious thoughts and behaviors (which will be referred to collectively as *SITBs* for the remainder of the manuscript) usually begin between the ages of 12 and 14 (Nock, 2009) and millions of adolescents engage in SITBs each year, treatments designed specifically for youth are especially important. Unfortunately, although most suicidal adolescents have received some form of mental health treatment (Nock et al., 2013), and the rate of treatment for suicidal behavior in the U.S. has increased (Kessler, Berglund, Borges, Nock, & Wang, 2005), the rate of suicidal behavior has not shown a similar decrease (Kessler et al., 2005). Taken together, this research indicates that the field is in urgent need of more efficacious treatments for SITBs.

Importantly, over the past 10 years, there has been a sharp increase in research examining interventions specifically designed for SITBs in youth. The purpose of the current manuscript is to review and evaluate the evidence-base of psychosocial treatments for SITBs in children and adolescents. This is the first review of evidence-based treatments for SITBs in youth that has been included in the *Journal of Clinical Child and Adolescent Psychology (JCCAP)*, which reflects the growing research in this area, as well as the need for a critical examination of existing treatments' efficacy to inform both future treatment research and clinical care.

Review Parameters

To identify all relevant studies that examined a psychosocial intervention aimed at reducing SITBs in children or adolescents, we performed a comprehensive search of four major scientific databases (HealthSTAR, MEDLine, PsycInfo, PubMed) for articles published

prior to September 2013. Searches used a number of different terms for SITBs (e.g., self-injury, nonsuicidal self-injury, deliberate self-harm, self-harm, suicide ideation, suicide attempt, suicidal behavior) and interventions (e.g., intervention, therapy, treatment). In addition, to ensure that we included the most current treatment research, we also searched ProQuest.com for dissertation abstracts relevant to our review (although this search did not generate any relevant unpublished dissertations), as well as ClinicalTrials.gov for any clinical trials currently in progress or recently completed that examined relevant treatments for SITBs in youth. Our initial aim was to include only randomized controlled trials (RCTs) of interventions for SITBs (see review: Brent et al., 2013). However, due to the paucity of research in this area, and in line with our goal to review *all* evidence-based interventions in this area, we broadened our review to also include non-randomized controlled studies (i.e., studies including a comparison group but without randomization) and pilot studies describing promising new interventions for reducing SITBs in youth.

Inclusion and exclusion criteria

Studies were included if they examined an intervention: (1) for children and/or adolescents under the age of 19, (2) specifically designed to treat SITBs, and (3) measured a specific SITB outcome. First, we restricted our review to studies that examined interventions exclusively in youth. A number of studies were excluded because they examined interventions across adolescence and adulthood, but did not examine treatment effects separately in adolescent participants (e.g., Bateman & Fonagy, 1999; Hawton et al., 1981; 1987). We included two studies that examined adolescents and young adults, ages 15-24 (Robinson et al., 2012; Rudd et al., 1996), because young adults are relatively close in age to older adolescents. All other studies reviewed here included participants 19 years of age or younger. Of note, given that SITBs are relatively rare in childhood, most studies focused on treating SITBs in adolescents. A few studies included children as young as age 10 (e.g., Asarnow et al., 2011a; Harrington et al., 1998; Huey et al., 2004) and one study focused on children ages 8 to 11 (Perepletchikova et al., 2011). Due to the limited research on treatments for SITBs in children, we did not devote a separate section to these studies but, instead, highlighted in the text those interventions that have been examined in pre-adolescent youth.

Second, given that a major goal of this review is to inform clinical care that targets SITBs, we only included studies that examined treatments specifically designed for SITBs. A comprehensive review of all treatments for all disorders that might include a SITB outcome was outside the scope of this review, and we did not want to give interventions for specific disorders (e.g., borderline personality disorder and major depression) preferential coverage. We considered including school-based prevention programs that focused on SITBs, but ultimately decided to exclude these studies from our review: prevention programs generally aim to screen and identify high-risk youth, whereas our review was focused on interventions for youth that are already determined to be at high-risk (for reviews of prevention programs: see Katz et al., 2013; Robinson et al., 2013).

Third, we only included studies that reported one of the following specific SITB outcomes: (a) nonsuicidal self-injury (NSSI: self-injurious behavior performed without intent to die),

(b) suicide ideation (SI: thoughts of ending one's life), (c) suicide planning or preparations (SP: actions taken to plan or prepare to attempt suicide), (d) suicide attempts (SAs: self-injurious behavior performed with at least some intent to die), (e) suicide threats or gestures (ST: threatening to harm oneself without intent to die) (f) deliberate self-harm, self-harm, or parasuicide (DSH: terms used to refer collectively to self-injurious behaviors performed with OR without intent to die), and (g) suicide events or suicide-related behavior (SE or SRB: terms used to refer collectively to suicidal thoughts, plans or preparatory acts, and attempts). We excluded the following types of studies if they did not include a specific SITB outcome: treatment adherence studies (e.g., Spirito et al., 2002a) and studies including measures of broad suicide risk factors, such as psychiatric symptoms (e.g., Orbach & Bar-Joseph, 1993). It is important to note that most studies included in our review were designed to test interventions for youth with a past history of SITBs who were at risk for future SITBs. Therefore, treatment efficacy was determined by assessing the recurrence of SITBs over the treatment period (e.g., suicide *reattempts*).

Evaluation criteria

Psychosocial interventions for SITBs in youth were assessed using the *JCCAP* evidence-based treatment evaluation criteria (see Table 1). The *JCCAP* five-level system (Southam-Gerow & Prinstein, in press) is adapted from the evaluation criteria initially proposed by Chambless et al. (1993) and the APA Division 12 Task Force on the Promotion and Dissemination of Psychological Procedures to determine intervention potency, which were later revised and expanded to cover a wider range of treatment studies (e.g., pilot studies) (see Chambless et al., 1998; Chambless & Hollon, 1998; Silverman & Hinshaw, 2008). Using the *JCCAP* criteria, treatment efficacy is determined by evaluating the number and quality of studies comparing the experimental intervention to another active treatment/ psychological placebo/medication or to a wait list/no treatment control. Randomized controlled trials (RCTs) are the highest-quality study used to evaluate a treatment's efficacy. Based on the level of evidence, interventions are placed into one of five categories (see Table 1): *well-established* (Level 1), *probably efficacious* (Level 2), *possibly efficacious* (Level 3), *experimental* (Level 4), and *treatments of questionable efficacy* (Level 5). For interventions with mixed findings, we used the guidelines provided by Chambless and Hollon (1998) to evaluate "whether the preponderance of studies argue for the treatment's efficacy" (p.13). First, we examined the quality of the disparate studies and weighted rigorous studies, such as RCTs, more than other types of study designs. Second, if conflicting results were found using comparable treatment designs, we evaluated interventions conservatively and did not classify them as *well-established* or *probably efficacious* treatments.

It is important to note that, for *JCCAP* Evidence-Base Updates, interventions are classified into broad families of treatments based on the target and mode of treatment (e.g., Family-based therapy: Ecological) rather than by "brand names" of treatments (e.g., Multisystemic Therapy; Huey et al., 2004) (for a rationale for this change: see Southam-Gerow & Prinstein, in press). In the sections below, we review the existing interventions for SITBs in youth using the "brand names" and then, to be consistent with the other *JCCAP* Evidence-Base Updates, we evaluate the overall families of treatments (rather than each "brand name"

treatment individually) using the *JCCAP* evaluation criteria displayed in Table 1. However, we recognize that these broad intervention categories may not be mutually exclusive and that collapsing across interventions in this manner does not allow for consideration of differences between treatments that may be important.

Review of Interventions for Self-Injurious Thoughts and Behaviors

Based on the review parameters described above, our search yielded 29 relevant intervention studies: 18 RCTs; five non-randomized controlled trials; and six pilot studies. Table 2 displays the descriptive information and main findings for each study, and Table 3 summarizes the level of evidence for each broad treatment family. Three things are important to note about the information presented in these tables. First, many interventions designed for children and adolescents included a family component, even those that were primarily designed as individual treatments. Based on the primary modality and target of treatment, we categorized interventions as follows: (1) Treatments where the family was the primary focus of the intervention (e.g., Attachment-Based Family Therapy: Diamond et al., 2010) were classified as family-based therapy; (2) Interventions that focused on individual skills training and augmented treatment with family therapy sessions (e.g., Integrated Cognitive-Behavioral Therapy; Esposito-Smythers, Spirito, Kahler, Hunt, & Monti, 2011) were classified as individual therapy + family therapy; and (3) Treatments where the adolescent was the main focus of the intervention and family sessions were optional or not presented as integral to the treatment plan (e.g., Skills-Based Treatment; Donaldson, Spirito, & Esposito-Smythers, 2005) were classified as individual therapy. This classification is consistent with other EBT Updates in this series (e.g., Freeman et al., 2014).

Second, when comparing interventions, it is important to consider the type of SITBs examined. For instance, some interventions examined treatment effects on suicidal thoughts only, whereas others examined the impact on specific suicidal behaviors, such as suicide attempts. Table 2 displays the specific SITB outcomes and measures included in each study (if specified), and Table 3 indicates which SITB outcomes were examined in studies of each treatment family.

Third, the majority of treatment conditions, even control or comparison conditions, showed a marked reduction in SITBs over time (an issue we will return to at the conclusion of our review). For trials that included a comparison condition, we focused our discussion on between-group differences (i.e., those attributable to the experimental treatment examined). Significant treatment mediators or moderators (when reported) are displayed in the last column of Table 2.

And finally, attrition is a major problem in treatment research with youth (Kazdin, 1996), and the studies in our review were no exception. This issue is further complicated by the different evaluation methods of treatment attrition and compliance used across studies; for instance, some studies report detailed information about the number of sessions completed by each treatment group, other studies report the number of individuals assessed at follow-up only, and still others report little to no information about dropout rates. Chambless and Hollon (1998) note that dropout becomes a serious concern when rates of attrition differ

between the experimental treatment and comparison treatment groups. They suggest that, especially in these cases, intent-to-treat (ITT) analyses are crucial to examine treatment outcomes for all individuals randomized to a specific intervention. However, this does not address the issue that, with high dropout rates, a small percentage of individuals are actually receiving a particular intervention. For the current review, we did not want to penalize studies that *did* provide adequate information about treatment dropout or more intensive treatments that may have had greater dropout than briefer interventions. Therefore, we included a column in Table 2 detailing information about treatment attrition and compliance in each study (when available) and we discuss treatment dropout and use of ITT analyses in the text – particularly when evaluating the more promising interventions.

Cognitive-behavioral therapy (CBT)

Six studies in our review examined a form of CBT for reducing SITBs in youth. From a CBT perspective, maladaptive behaviors, such as SITBs, result from distorted thinking patterns and deficits in specific skills (e.g., emotion regulation and problem-solving). CBT aims to reduce SITBs by challenging and modifying cognitive distortions, and by strengthening skills to adaptively cope, communicate, and solve problems.

CBT-Individual— Two studies were classified as individual CBT because they examined interventions primarily focused on addressing the adolescent's skills deficits. Of note, both interventions included some form of optional family training or therapy, but these components were viewed as adjuncts to the adolescent's individual therapy; moreover, the studies reported that these optional family trainings were infrequently used.

In a small RCT with adolescent suicide attempters (n = 39), Donaldson, Spirito, and Esposito-Smythers (2005) compared a six-month individual skills-based treatment (SBT) (e.g., emotion regulation and problem-solving skills) to supportive relationship therapy (SRT). Although both were primarily individual interventions, parents attended the initial treatment session and were offered one optional family problem-solving session if needed. Adolescents in both conditions reported reductions in SI over the treatment period and follow-up, but there were no differences between conditions. In addition, there were no between-group differences in SAs over the treatment follow-up. Results from this trial indicate that individual CBT is not superior to supportive therapy for reducing SAs and SI in youth with a history of suicide attempts.

Taylor and colleagues (2011) also examined a time-limited (8-12 sessions over 6 months) individual CBT package – Manualized Cognitive-Behavioral Therapy (MCBT) – for adolescent DSH, which incorporated common CBT treatment components, such as problem-solving and coping skills training, as well as recognizing connections between thoughts, feelings, and behaviors. In addition, an optional brief (3-session) psychoeducation group was offered for parents but only two parents participated. Results from the initial pilot study in 25 adolescent outpatients indicated reductions in DSH from pre- to post-treatment that were maintained at 3-month follow-up. However, it is important to note that attrition over the treatment period was high (36% of adolescents dropped out) and DSH reductions were within-participants (because there was no control condition). RCTs in larger samples are

needed before any firm conclusions can be drawn about the efficacy of MCBT for DSH in youth.

Individual CBT has not been shown to be more efficacious than another treatment for reducing SITBs in adolescents. Using the *JCCAP* evaluation criteria, individual CBT was classified as *Level 4: experimental* for DSH and SI in youth.

CBT-Individual + CBT-Family—Two studies were classified as combined individual CBT and family CBT because the interventions included both individual and family sessions as integral components of the treatment packages. Moreover, reductions in risk factors at both the individual and family level were identified as treatment targets. In an initial pilot study, Esposito-Smythers and colleagues (2006) modified their individual CBT treatment package (examined by Donaldson et al., 2005) to include family therapy and motivational enhancement. The combined individual and family CBT intervention was examined in a small sample of adolescents (n = 6) with recent SI or SAs and comorbid substance use disorders. Adolescents reported reductions in SI from pre- to post-treatment but the intervention had little impact on SAs (33% of the sample attempted suicide during the treatment period). Because this trial lacked a comparison group, conclusions about the efficacy of individual CBT + family CBT for reducing SI in youth are tentative.

A CBT-individual and family intervention was also examined in the large (n = 124) Treatment of Adolescent Suicide Attempters (TASA) study – an open trial designed to examine intensive and tailored treatments for adolescent suicide attempters with major depression (Brent et al., 2009). The TASA trial compared Cognitive Behavior Therapy for Suicide Prevention (CBT-SP: see Stanley et al., 2009), a medication algorithm, and the combination of CBT-SP and medication. CBT-SP consists of both individual CBT (e.g., behavioral activation, problem-solving) and family skills training (e.g., family problem-solving, family communication) over 6 months. Treatments were evaluated based on reductions in suicide events (SEs) – a category that included completed suicide, attempted suicide, preparatory acts towards imminent suicidal behavior, and suicidal ideation. There were no differences between the treatment groups in SEs at six-month follow-up, but the authors noted that SE rates generally, and SA rates specifically, were lower in the TASA trial compared to those reported in naturalistic studies of high-risk adolescent samples following hospital discharge (e.g., Goldston et al., 1999). Comparing outcomes across treatment conditions is complicated for a few key reasons. First, more high-risk adolescents received the combined intervention than medication or therapy alone. RCTs demonstrating superiority of CBT-SP compared to another active treatment are needed. Second, individual and family treatment strategies were tailored to each adolescent and therefore active treatment components varied across participants. Finally, and most importantly, the TASA trial was not intended to compare any single intervention to treatment-as-usual (TAU); the lack of group differences between the three treatment arms may be due in part to significant treatment effects for all conditions.

It is difficult to evaluate the efficacy of combined individual and family CBT interventions based on these two trials. However, given the existing evidence, combined CBT-Individual + CBT-Family was classified as *Level 4*: *experimental* for reducing SE and SI in youth.

CBT-Individual + CBT-Family + Parent Training—Building on earlier versions of their CBT packages (Donaldson et al., 2005; Esposito-Smythers et al., 2006), Esposito-Smythers et al. (2011) added a parent training component to create integrated CBT (I-CBT), which includes a variety of individual CBT (e.g., problem-solving), family CBT (e.g., behavioral contracting), and parent training (e.g., monitoring) sessions delivered over 12 months (six months active-weekly sessions, 3 months continuation-biweekly sessions, and 3 months maintenance-monthly sessions). In a small RCT of adolescents with SAs or significant SI and comorbid substance use disorders (n = 40), the authors compared I-CBT to enhanced treatment as usual (E-TAU: community-based TAU enhanced with a diagnostic evaluation report and case monitoring). Although both groups' SI decreased over the course of treatment, adolescents receiving I-CBT had significantly fewer SAs over the 18-month study period compared to E-TAU (ITT analyses).

I-CBT is one of the few interventions to report reductions in suicidal *behavior* compared to TAU and there are some notable conclusions from this trial. First, in addition to fewer SAs, the I-CBT group also reported less heaving drinking and marijuana use over the course of treatment. Given that substance use increases risk for suicidal behavior among adolescents (Esposito-Smythers & Spirito, 2004), reductions in alcohol and drug use in the I-CBT group may have been important for treatment efficacy. Second, this version of the treatment package, which included parent training, led to significant reductions in suicidal behavior, whereas previous versions of the intervention (Donaldson et al., 2005; Esposito-Smythers et al., 2006) did not. We will return to these points later when we discuss common elements of efficacious interventions. Finally, it is important to note that, despite low attrition (10% for I-CBT and 15% for E-TAU), there were differences in the treatment dose received: in the I-CBT group, 74% of adolescents, 74% of families, and 90% of parents received 24 adolescent and 12 parent sessions, whereas only 44% of adolescents, 19% of families, and 25% of parents in the comparison condition received this dose. Differences in treatment compliance could be due to the nature of the intervention; that is, perhaps the protocol used in I-CBT is superior for retaining families in treatment compared to E-TAU. Given that so few families received an adequate dose of E-TAU, it is somewhat unclear what I-CBT was compared to in this trial. Despite this limitation, I-CBT was found to be superior to an active control using ITT analyses in an RCT. Therefore, combined individual CBT + family CBT + parent training appears to be a promising intervention and was classified as *Level 2*: *probably efficacious* for reducing SAs in youth. Of note, I-CBT has only been examined in a sample of suicidal adolescents with comorbid substance use disorders. Replications in more clinically diverse samples are needed.

CBT skills-Group—Rudd and colleagues (1996) examined a time-limited CBT skills group treatment delivered to 264 adolescents and young adults (ages 15-24) in a partial hospitalization setting. The experimental group treatment, consisting of intensive daily (9 hours per day) psychoeducation and skills training groups (e.g., communication, emotion regulation, problem-solving) for two weeks, was compared to TAU (which included both inpatient and outpatient treatment). Youth in both conditions reported significant reductions in SI over the treatment period, but there were no differences between treatment conditions.

Because the group intervention did not demonstrate relative efficacy over TAU, the CBT skills group intervention was evaluated as Level 4: *experimental* for reducing SI in youth.

Dialectical behavior therapy (DBT)

Six studies examined a form of DBT for reducing SITBs in youth. DBT (Linehan, 1993), one of the first treatments to specifically target SITBs, was originally designed to treat adult female patients with borderline personality disorder (BPD), but has since been adapted for adolescents regardless of BPD diagnosis (DBT-A: Miller, Rathus, & Linehan, 1997; Rathus & Miller, 2014). DBT includes an intensive combination of weekly individual therapy, weekly group skills training (i.e., distress tolerance, emotion regulation, interpersonal effectiveness, and mindfulness skills modules), and phone skills coaching with the therapist as needed. The goal of DBT is to help individuals regulate their emotional and interpersonal difficulties in adaptive ways instead of using harmful strategies such as SITBs.

DBT—Five studies (non-randomized controlled trials or pilot studies) have examined some variation of the standard DBT package in youth, including individual sessions, skills groups, and telephone consultation (see Table 2 for details about the dose and length of treatment examined in each trial). Three studies included a standard adolescent-only skills group (James, Taylor, Winmill, & Alfoadari, 2008; James, Winmill, Anderson, & Alfoadari, 2011; Katz, Cox, Gunasekara, & Miller, 2004), whereas two trials delivered skills in a multifamily group format (Fleischhaker et al., 2011; Rathus & Miller, 2002). The three small pilot studies (sample sizes ranged from 12 to 25 adolescents) examining DBT reported significant reductions in DSH (James et al., 2008; 2011) and NSSI (Fleischhaker et al., 2011) over the course of treatment. However, because these studies did not include a control or comparison group, it is unclear whether reductions in SITBs were attributable to DBT. Moreover, these studies included primarily female patients with BPD; further research in more diverse clinical samples is needed to examine whether these treatment effects will generalize to non-BPD adolescents.

Two studies used a non-randomized controlled design to compare DBT-A to psychodynamic or supportive interventions (Katz et al., 2004; Rathus & Miller, 2002). Rathus and Miller (2002) compared 12 weeks of outpatient DBT (individual sessions and multifamily skills groups) to 12 weeks of outpatient TAU (either psychodynamic or supportive therapy) in a large sample of predominantly Hispanic youth (n = 111). Fewer adolescents in the DBT group made a SA during treatment than the TAU group, but these group differences were not statistically significant. Adolescents receiving DBT also reported significant reductions in SI from pre- to post-treatment; however, SI was not measured in the TAU usual group post-treatment preventing any between-group analysis. It is important to note that this study reported a relatively high attrition rate – 38% of the DBT group and 60% of the TAU group did not complete the 12-week intervention. In addition, patients were assigned to treatment based on clinical severity with more severe patients referred to DBT.

In a more acute setting, Katz et al. (2004) compared a brief (2-week) DBT package (individual sessions, skills group, and DBT milieu) to psychodynamic psychotherapy (TAU) for 62 adolescents receiving inpatient treatment. DBT and TAU were administered to

patients on two different units. Adolescents in the DBT group had fewer "behavioral incidents" (e.g., self- or other-directed violent episodes) during treatment than those receiving TAU. However, it is unclear how many of these incidents were DSH. Over the 1-year follow-up, both groups reported reduced DSH and SI compared to pre-treatment, but there were no between-group differences.

In summary, no published RCTs have examined the efficacy of DBT in youth (however, see *Clinical Trials in Progress*) and no published studies to date have found that DBT is superior to an active treatment control. Of note, the two controlled trials of DBT examined brief intervention formats (2 and 12 weeks) that are much shorter than the standard one-year DBT package, which may have decreased the potency of the intervention and ability to detect significant treatment effects. Pilot studies using longer DBT interventions (6-12 months) are promising but RCTs are needed before conclusions can be made about DBT's relative efficacy. Based on the existing evidence, DBT was classified as *Level 4: experimental* for SITBs (specifically DSH, NSSI, and SI) in youth.

DBT-Group only—Perepletchikova and colleagues (2011) adapted a DBT skills group only intervention for children ages 8-11. In this initial pilot study, 11 children attended twice weekly skills groups for six weeks and reported significant reductions in SI from pre- to post-treatment. Because there was no control group, it is unclear whether SI reductions were attributable to DBT. Due to limited research on DBT-Group only, this intervention was evaluated as *Level 4: experimental* for SI in youth.

Family-Based Therapy (FBT)

Seven studies were classified as family-based therapy (FBT). These interventions all focused on the family and targeted improvements in family functioning as a means to decrease SITBs. FBTs employed a variety of traditional family therapy components, such as psychoeducation, communication training, and problem-solving. Although all interventions in this category focused on the family, the techniques included in the treatment packages varied. Therefore, FBTs were further categorized based on the primary intervention targets – attachment, parent training only, ecological, problem-focused, or emergency.

FBT-Attachment—Diamond et al. (2010) examined Attachment-Based Family Therapy (ABFT: Diamond et al., 2002), which aims to reduce SITBs by improving family relationships, and especially the parent-adolescent relationship. ABFT uses a variety of process-oriented, emotion-focused, and cognitive-behavioral techniques to enhance the quality of attachment bonds in weekly sessions over a three-month period. In an RCT with 66 adolescents (74% African American) referred from the ED or primary care, patients receiving ABFT reported significantly larger and more rapid reductions in SI over the course of treatment, compared to enhanced TAU (i.e., TAU with referrals and clinical monitoring), and these differences were maintained 12 weeks post-treatment (ITT analyses). Depressive symptoms also declined over the course of treatment but were not specifically examined as a treatment mediator. This study is notable as one of the few to examine, and to find positive effects for, a SITB intervention in a predominantly minority sample of adolescents.

However, several limitations of this study should be noted. First, there were low rates of treatment completion, especially in the TAU group. Though the majority of adolescents attended at least one therapy session, only 69% of the ABFT group and 19% of the control attended six or more therapy sessions, and even fewer attended 10 or more therapy sessions (ABFT: 63%, TAU: 6%). Second, because no behavioral outcomes were compared in this trial, it is unclear whether ABFT is effective for reducing suicidal *behavior* (e.g., SAs). Despite these limitations, ABFT has shown promising effects compared to an active treatment control (RCT using ITT analyses) and therefore FBT-Attachment was classified as Level 2: *probably efficacious* for SI in youth.

FBT-Parent training only—Pineda and Dadds (2013) reported promising findings for a brief (4-session) parent education program for reducing adolescent suicide risk – Resourceful Adolescent Parent Program (RAP-P). RAP-P aims to reduce SITBs by increasing family education about SITBs, enhancing effective parenting, and decreasing family conflict and stress. Because this intervention targeted parents only in treatment (rather than the adolescent and family), RAP-P was categorized on its own as FBT-Parent training only. In a small RCT, 48 adolescents in families receiving RAP-P plus routine care reported less SITBs (i.e., combined measure of DSH and SRB), than adolescents in families receiving routine care only; reductions in SITBs were maintained at six-month follow-up (ITT analyses). Notably, improvements in family functioning fully mediated the treatment effects on SITBs. In addition, treatment compliance for the RAP-P trial was extremely high: 100% of parents in both groups completed the brief (four-session) intervention. Future research would benefit from examining whether RAP-P is efficacious for treating *suicidal* forms of self-injury (e.g., SA), nonsuicidal forms of self-injury (e.g., NSSI), or both. Based on the positive results from the initial RCT examining RAP-P, FBT-Parent training only was classified as Level 2: *probably efficacious* for SITBs in youth.

FBT-Ecological—In contrast to brief interventions that focus only on the parent, more intensive and long-term FBT has also been examined for reducing SITBs in youth: Multisystemic Therapy (MST: Henggeler, Schoenwald, Borduin, Rowland, & Cunningham, 2009) is a home-based family intervention that targets adolescents' problematic behaviors within the multiple systems thought to cause and/or maintain these behaviors. MST was classified as FBT-Ecological because it focuses on systems outside of the family (e.g., peers, school, community) in order to change behavior. In MST, families receive daily contact (if needed) for 3-6 months that focuses on safety planning and risk management, parent skills training, and disengagement from problematic social systems (e.g., peer groups). In a large RCT (n = 156), Huey et al. (2004) compared MST to inpatient treatment in a sample of predominantly African American children and adolescents referred for emergency psychiatric hospitalization. Both groups reported reduced rates of SAs from pre-treatment to one-year treatment follow-up, but the MST group reported significantly fewer SAs than the hospitalization comparison group (of note, this difference was only observed via adolescent, but not parent, report).

This study is notable because it is one of the few to examine a SITB intervention in minority youth, who are underrepresented in the treatment literature, and one of two interventions

found to significantly reduce SAs among adolescents (the other being I-CBT: Esposito-Smythers et al., 2011). Although these results appear promising, there are some important limitations of this study. First, adolescents were included if they were at risk of harming themselves *or* others, and only half the sample was identified as at-risk for *self*-harm (due to past SAs or SI). Therefore, this study may not accurately estimate the efficacy of MST for reducing *self*-injurious thoughts and behaviors specifically. Second, although participants were assigned to either MST or hospitalization, and treatment completion rates were high in both groups, 44% of adolescents in the MST treatment group had to be hospitalized during the study due to psychiatric emergencies (but were kept separate from the control group). The high rate of hospitalization suggests that MST was not particularly effective in preventing acute crises. And finally, the suicide reattempt rate was the same in both groups at the follow-up assessment. Reductions over the course of the study could have been greater in the MST group because these adolescents reported more SAs at baseline. Further studies are needed to rule out regression to the mean as a potential explanation for the positive MST findings.

In sum, results from the initial MST trial for SITBs are promising. However, given the limitations of this particular study, FBT-Ecological was classified as Level 3: *possibly efficacious* for reducing SAs in youth.

FBT-Problem-focused—Harrington et al. (1998) examined a family-based intervention that used behavioral (e.g., modeling, behavioral rehearsal) and family therapy techniques (e.g., psychoeducation, communication training) to target family problems hypothesized to contribute to adolescents' DSH (Kerfoot, Harrington, & Dyer, 1995). The brief (five-session) home-based family problem-solving intervention plus routine outpatient care was compared to routine care alone in a large RCT of children and adolescents with recent deliberate self-poisoning (n = 162). The FBT was not more effective than the comparison treatment for reducing SI in the total sample, but was somewhat effective for the subset of adolescents without major depressive disorder (33% of the sample). However, given that the depressed adolescents reported more SI at baseline, findings suggest that this brief home-based intervention was not effective for more severely suicidal youth. Based on the overall between-group comparison of treatment efficacy, FBT-Problem-focused was evaluated as Level 4: *experimental* for reducing SI in youth. Of note, this intervention was much briefer than other FBTs that were efficacious for reducing SITBs (e.g., Diamond et al., 2010; Esposito-Smythers et al., 2011). Given the limited research in this area, it is currently unclear whether this treatment was ineffective due to the target of treatment, the dose of the intervention, or both.

FBT-Emergency—The remaining three FBT studies employed even briefer (one-session) interventions in the ED to enhance motivation for change and increase treatment compliance.

First, in a non-randomized controlled trial, Rotheram-Borus and colleagues (1996; 2000) examined a brief (one-session) specialized ED intervention, consisting of psychoeducation, a family-based therapy session (including safety planning and contracting for follow-up treatment), and staff training, to increase outpatient treatment adherence in female suicide

attempters (n = 140). Although the initial study reported reduced SI following the specialized ED intervention (Rotheram-Borus et al., 1996), these differences did not hold at any of the follow-up assessments over the subsequent 3-18 months (Rotheram-Borus et al., 2000). There were fewer SAs in the specialized ED group over the 18-month follow-up; however, the low base rate of SAs in the total sample limited power to statistically detect the small between-group differences.

Asarnow et al. (2011a) also examined a brief ED intervention in 181 children and adolescents presenting to the ED with SAs or SI. In an RCT, ED TAU plus staff training was compared to a brief Family Intervention for Suicide Prevention (FISP), which included one family-based CBT session in the ED (including safety planning and contracting for follow-up treatment) plus follow-up telephone contact 48 hours post-discharge and several times over the next month to improve rates of follow-up treatment. Although the intervention increased treatment compliance (for both psychotherapy and medication), there was not a significant reduction in SAs or SI over the subsequent two months compared to ED TAU.

And finally, Ougrin and colleagues (2011; 2013) examined the utility of a one-session family-based ED intervention (i.e., therapeutic assessment), which included motivational enhancement and a cognitive analytic therapy assessment of the adolescent's DSH. The therapeutic assessment was compared to assessment as usual (i.e., psychosocial history and risk assessment) in a sample of 70 adolescents presenting with recent DSH. Similar to the other ED interventions, the therapeutic assessment increased treatment compliance but did not significantly reduce DSH over the two-year follow-up.

Taken together, although these brief ED interventions seem to effectively increase compliance with follow-up care, none of the treatments were more efficacious than TAU for reducing SITBs in youth. Based on these trials, FBT-Emergency interventions were classified as Level 4: *experimental* for reducing DSH, SA, and SI in youth.

Interpersonal psychotherapy (IPT)

IPT-Individual—One study to date has examined individual IPT for adolescents (IPT-A) at risk for SITBs. IPT-A focuses on resolving developmentally appropriate interpersonal problems (e.g., peer pressure, relationships with authority figures) and improving interpersonal functioning to reduce clinical symptoms (Mufson, Moreau, Weissman, & Klerman, 1993). Tang and colleagues (2009) randomized 73 at-risk students with depression to attend intensive IPT-A (IPT-A-IN) in school (two sessions weekly for six weeks) or TAU in school (psychoeducation and supportive counseling for six weeks). Adolescents receiving IPT-A-IN reported greater reductions in SI from pre- to post-treatment compared to those receiving TAU. The treatment group also reported significant reductions in depression, anxiety, and hopelessness over the course of treatment, but it is unclear whether these changes mediated reductions in SI.

Based on positive results from this initial RCT, individual IPT was classified as Level 2: *probably efficacious* for reducing SI in youth. Although promising, it is unclear from this study whether IPT will lead to reductions in suicidal *behaviors* as well as reductions in

suicidal thoughts. In addition, this trial was conducted in a sample of adolescent students with depression; replications in more diverse clinical samples are needed.

Psychodynamic therapy

Psychodynamic therapy-Individual + family—One study in our review examined a psychodynamic intervention for reducing DSH in adolescents – Mentalization-Based Treatment for Adolescents (MBT-A: Rossouw & Fonagy, 2012). MBT-A proposes that DSH is a reaction to interpersonal stress when individuals are unable to mentalize, or understand how their own and others behaviors are related to internal thought and feeling states. Originally developed as a treatment for BPD, the year-long manualized intervention includes weekly individual and monthly family therapy sessions aimed at improving mentalizing skills and self-control to ultimately reduce DSH. In an RCT, Rossouw and Fonagy (2012) compared one year of MBT-A to one year of community-based TAU in a sample of primarily female patients with BPD (n = 80). Adolescents in both conditions reported significant declines in DSH over the course of treatment; however, adolescents assigned to MBT-A reported significantly less DSH at the end of treatment compared to TAU (ITT analyses). Improvements in mentalization and reduced attachment avoidance mediated the observed treatment effects.

Although the results of this trial appear promising, the findings should be interpreted in the context of a few limitations. First, attrition rates in both groups were relatively high –50% of the MBT-A group and 58% of the TAU dropped out of treatment during the trial. Second, treatment effects did not emerge until 12 months after treatment initiation (i.e., not during the 3, 6, or 9-month assessments) and a significant percentage of adolescents (56% of the MBT-A group and 83% of the TAU group) still reported engaging in DSH at the end of treatment. Finally, although the modality and duration of treatment were relatively similar across groups, more adolescents in the MBT-A group received family sessions than the TAU group. Despite some notable limitations, Psychodynamic therapy-Individual + Family was found to be superior to an active treatment control in an RCT and was classified as Level 2: *probably efficacious* for reducing DSH in adolescents. Replications in more clinically and demographically diverse samples are needed.

Combined skills group intervention

CBT skills + DBT skills + Psychodynamic therapy skills-Group—Three studies in our review examined a group intervention – Developmental Group Therapy (DGT; Wood, Trainor, Rothwell, Moore, & Harrington, 2001) – that combines skills components from a wide range of theoretical orientations, including CBT, DBT, and psychodynamic group therapy. DGT includes six acute weekly sessions that focus on a range of themes from depression, hopelessness, and self-harm to family and peer relationships. After the acute phase of treatment, long-term booster sessions are provided for as long as needed. The initial RCT, conducted by the developers of the treatment package, reported promising results in a sample of 63 adolescents with a history of DSH (Wood et al., 2001): compared to routine care, adolescents receiving DGT engaged in fewer DSH episodes over the course of treatment (although between-group differences were not significant), were less likely to be DSH "repeaters" (i.e., engage in multiple DSH episodes), and reported that more time

elapsed before the next DSH episode. In terms of dose response, more sessions of DGT were related to less DSH, whereas more sessions of routine care were related to *more* DSH (Wood et al., 2001).

However, these initially promising treatment findings have failed to replicate in other samples of adolescents (Green et al., 2011; Hazell et al., 2009). Both studies compared DGT to routine care in moderate to large samples of adolescents with a history of DSH (n = 366: Green et al., 2011; n = 72: Hazell et al., 2009). Notably, Hazell et al. (2009) found that adolescents receiving DGT engaged in *more* DSH than those receiving routine care; however, adolescents in the DGT group reported more medication overdoses prior to study initiation, which may have accounted for the higher rates of DSH reported among this group during treatment. Given the mixed results of this group therapy and the potential for contagion of SITBs among groups of adolescents (Prinstein et al., 2010; Walsh & Rosen, 1985), group therapy alone may be contraindicated for this population. Therefore, the combined CBT, DBT, and Psychodynamic skills group intervention was evaluated as Level 5: *questionable efficacy* for reducing DSH in youth.

Other intervention techniques

Five studies in our review examined interventions that focused on increasing adolescents' access to resources and supports. These intervention packages did not fit well into any of the treatment families described above and therefore were classified as "other intervention techniques," divided into Resource interventions-Individual and Support-based interventions.

Resource interventions-Individual—Three studies examined different intervention strategies to increase adolescents' access to resources and improve treatment compliance. None of these interventions were significantly more efficacious than TAU for reducing SITBs in youth. Deykin et al. (1986) examined an intervention package aimed at increasing treatment compliance among disadvantaged (e.g., Medicaid-eligible) youth. The intervention (employed at one site) included direct service (e.g., patient advocacy to increase access to psychiatric, financial, and social resources) plus service provider educational training was compared to TAU (used at another site). Over two years, incidence of ED visits for DSH, SA, and SI were examined at the two sites in 319 adolescents; the direct service intervention was not superior to TAU for reducing SITBs.

Cotgrove et al. (1995) examined a relatively simple intervention that provided adolescents with immediate access to hospital care (via a green card). In an RCT, 105 adolescents with a history of DSH or SAs were assigned to receive the green card intervention or clinic TAU. Although adolescents in the intervention group reported few suicide attempts over the treatment period, these rates were not significantly lower than adolescents receiving standard care. Notably, only 11% of adolescents (n = 5) used the green card service during the one-year follow-up; the infrequent use of the intervention limits the conclusions that can be drawn about its relative efficacy.

Finally, Robinson and colleagues (2012) modified a postcard intervention that has previously been effective for reducing SITBs in adults (see Motto, 1976). Adolescents (n =

164) were randomly assigned to receive 12 monthly postcards that promoted well-being and use of evidence-based coping skills (additions to the original Motto [1976] postcard intervention) plus community-based TAU, or TAU alone. SITBs decreased for all participants over the 18-month follow-up period, but there were no between-group differences. It is important to note that the original Motto (1976) study examined the postcard intervention in a sample of over 3,000 adults. Robinson et al.'s sample of 164 adolescents may have been underpowered to statistically detect any small effects of this intervention.

Taken together, results from these resource intervention studies suggest that individual-based interventions aimed at increasing access to clinical resources and enhancing treatment compliance are not more effective than TAU for reducing SITBs in adolescents. Based on existing evidence, individual-based resource interventions were classified as Level 4: *experimental* for reducing DSH, SA, and SI in youth.

Support-based interventions—King and colleagues (2006; 2009) examined a support-based intervention for adolescents following hospitalization – Youth-nominated Support Team (YST). YST aims to decrease SITBs by increasing adolescents connections with supportive others who can buffer against stressors in their environment. Adolescents nominate up to four individuals (within or outside their family) who complete psychoeducation sessions about suicide risk and safety planning and are encouraged to maintain weekly supportive contact with the adolescent. The original YST program (YST-I) lasted for 6 months and, in the total sample, was not more efficacious than TAU in reducing SA or SI. Although there was not a main effect of treatment, the YST-I was more efficacious than TAU for reducing SI in girls (King et al., 2006).

In the second iteration of the intervention – YST-II – adolescents were asked to nominate adult supports only (as opposed to peers) who provided support over 3 (rather than 6) months (King et al., 2009). Again there was no main effect of treatment, but YST-II was more efficacious than TAU for reducing SI among adolescents with a history of multiple SAs (King et al., 2009); however, this moderated effect was only significant six weeks into treatment and did not maintain for the rest of treatment or the follow-up period. YST did not significantly reduce the risk of SAs in either study. In addition, it is important to note that, although these RCTs were some of the largest conducted in adolescents with SITBs, the participation rate in the trials was very low (i.e., 35-43% of targeted adolescents were enrolled in the trials) which could limit the effectiveness of these interventions outside of a controlled trial.

Taken together, these studies suggest that support-based interventions are not generally more efficacious than TAU for adolescents with SITBs. These interventions may be useful for specific subgroups of adolescents (e.g., females or multiple attempters); however, further research is needed replicating these moderation effects before firm conclusions can be drawn about the efficacy of YST in these groups. Because there was not a main effect of the experimental treatment, and the moderation results did not replicate across the two studies, the support-based intervention was classified as Level 4: *experimental* for reducing SI in youth.

Clinical trials in progress

Our search of ClinicalTrials.gov generated the following six relevant clinical trials currently in progress or recently completed. Four are RCTs replicating treatments that have demonstrated promising results in previous research. The first RCT (NCT01732601: Intensive Outpatient Services for High-Risk Suicidal Teens, PI: Spirito) will extend the initial promising results for intensive CBT (Esposito-Smythers et al., 2011) by examining the intervention in a larger sample of adolescents (n = 150) at high-risk for suicidal thoughts and behaviors (i.e., those with a comorbid mood disorder, and either substance use or self-harm). The second ongoing RCT is comparing Attachment-Based Family Therapy (ABFT) to an active family supportive psychological control (NCT01537419: Attachment Based Family Therapy for Suicidal Adolescents, PI: Diamond & Kobak); this will be the second large-scale RCT to examine this family-based therapy in suicidal adolescents. Two RCTs are evaluating the efficacy of DBT in suicidal adolescents (NCT01528020: Collaborative Adolescent Research on Emotions and Suicide [CARES], PI: Linehan, McCauley, Asarnow, & Berk) or adolescents engaging in DSH (NCT00675129: Treatment for Adolescents With Deliberate Self Harm, PI: Mehlum); these will be the first RCTs of DBT in youth. Positive treatment effects from these RCTs would greatly increase the level of evidence for these interventions.

The fifth trial identified is a multi-center RCT, currently in progress, that is comparing Mindfulness-Based Cognitive Therapy (MBCT), CBT, and TAU (NCT00694668: The [Cost-] Effectiveness of Mindfulness-training and Cognitive Behavioural Therapy in Adolescents and Young Adults with Deliberate Self Harm [DSH], PI: de Klerk & van Giezen); this will be the first study to examine mindfulness-based CBT in suicidal adolescents. Finally, a small, non-randomized pilot study recently examined the efficacy of IPT for adolescents with comorbid depression and NSSI (NCT00401102: Interpersonal Psychotherapy for Depressed Adolescents Engaging in Non-suicidal Self-injury [IPT-ASI], PI: Jacobson). This is the first study to examine IPT for NSSI (Jacobson & Mufson, 2012); however, it appears that only five adolescents completed the treatment and results of the trial have not yet been published.

Summary of Evidence-Based Treatments

Our review of the evidence-based treatment literature for SITBs in youth indicates that there are currently no Level 1: *well-established* treatments for any form of SITB (nonsuicidal or suicidal) among children and adolescents. Level 1 classification requires evidence from at least two independent RCTs indicating that an intervention is superior to an active treatment, psychological placebo, or medication. Most treatments in our review were only examined in a single RCT.

Probably and possibly efficacious interventions

Six treatments were evaluated as Level 2: *probably efficacious* or Level 3*: possibly efficacious* interventions for SITBs in youth. Level 2: *probably efficacious* treatments require evidence from at least one sound RCT indicating superiority to an active treatment, psychological placebo, or medication (rather than waitlist or no treatment controls).

Probably efficacious treatments included: (1) CBT-Individual + CBT-Family + Parent Training for SAs, (2) FBT-Parent training only for SITB (outcome measure combined suicidal and nonsuicidal self-injurious thoughts and behaviors), (3) FBT-Attachment for SI, (4) IPT-Individual for SI, and (5) Psychodynamic therapy-Individual + Family for DSH. It is important to note that the interventions in our review meeting Level 2 criteria were each evaluated in a single RCT: although the initial findings are promising, future studies replicating positive treatment effects are needed to increase confidence in these effects and for the intervention to progress to a *well-established* treatment for SITBs in youth.

In addition to the *probably efficacious* interventions, FBT-Ecological was evaluated as Level 3: *possibly efficacious* for reducing SAs in youth. Promising results from this trial are notable because it is one of two interventions found to significantly reduce suicidal *behavior* specifically in youth. Future research in purely *self*-injurious samples is needed to increase the evidence for this intervention in SITB populations.

It may be surprising that DBT was not classified as an efficacious treatment, given its utility for reducing SITBs in adults (e.g., Linehan, Heard, & Armstrong, 1993; Linehan et al., 2006). However, there are currently no published RCTs examining the efficacy of DBT in youth. As indicated above, favorable results from the RCTs currently in progress would increase the evaluation of DBT from *experimental* (Level 4) to *probably efficacious* (Level 2), or potentially *well-established* (Level 1) if both trials demonstrate that DBT is superior to another active psychological treatment, for adolescent SITBs.

Efficacious treatment components

Our review indicates that efficacious treatments for SITBs in youth are rooted in a wide variety of theoretical orientations, including CBT, FBT, IPT, and psychodynamic therapy. Because no single theoretical orientation is superior, treatment efficacy is likely due to common elements across these interventions (also see review: Brent et al., 2013). In general, efficacious treatments: (1) target relationship or interpersonal functioning, particularly within the family (and almost all include the family or parents in treatment), (2) involve skills training, (3) are intensive (specifically interventions that reduced self-injurious *behavioral* outcomes), and (4) address other maladaptive behaviors, or risk factors for, SITBs (specifically interventions found to reduce SAs). These components are addressed in turn below.

First, efficacious interventions all focused on improving some aspect of relationship or interpersonal functioning. Given that family problems and interpersonal difficulties are commonly reported reasons for suicidal behavior among adolescents (Cotgrove et al., 1995; Wagner, Silverman, & Martin, 2003), improving familial and interpersonal functioning may be particularly important for reducing further SITBs in this population. Most efficacious interventions targeted familial relationships specifically. Family sessions in CBT, FBT, and psychodynamic therapy focused on improving the parent-adolescent relationship or family functioning using psychoeducation, communication training, and/or problem-solving skills training. Moreover, two of the efficacious interventions found that improvements in family functioning (Pineda & Dadds, 2013) and attachment (Rossouw & Fonagy, 2012) mediated positive treatment effects. The individual IPT intervention, delivered to students in a school

setting, was the only treatment that did not include a formal family component. However, IPT does highlight the importance of interpersonal effectiveness and ameliorating interpersonal problems to improve psychological functioning (Mufson et al., 1993). Taken together, this research indicates that improving family functioning specifically, or interpersonal functioning more broadly, is an important component of efficacious treatments.

Second, all efficacious treatments included at least one skills training component, such as emotion regulation, problem-solving, or interpersonal effectiveness skills. The necessity of skills training for treatment success may explain why resource interventions, which increase access to mental health resources and social support but do not include any formal skills training, have not been effective for reducing SITBs in youth. However, it is unclear from this review *which* skills are the most important for effective treatment. Family-based and CBT interventions included a range of emotion regulation, problem-solving, and conflict management skills, whereas psychodynamic and interpersonal interventions focused primarily on skills training in one area (affect regulation and interpersonal problem-solving, respectively). Despite differences in skills training, a number of these interventions demonstrated some promise for reducing SITBs. The field would benefit from future research identifying the individual, parent, and family skills necessary for treatment efficacy.

Notably, our review suggests that parent skills training may be a particularly important component of efficacious treatments for SITBs in youth. The series of studies by Esposito-Smythers and colleagues provide the strongest evidence for the role of parenting skills. The initial individual CBT intervention developed by this group (Donaldson et al., 2005) was not more effective than supportive therapy for reducing SITBs. When family sessions were added to the intervention, significant reductions in SI, but not SAs, were found (although this could be due to the small sample size in this pilot study: Esposito-Smythers et al., 2006). It was not until parent training was added to the treatment package in I-CBT that significant reductions in SAs were observed (Esposito-Smythers et al., 2011). Other efficacious interventions also included parenting components, such as a parent education and training in RAP-P and MST. The importance of parent training may help explain why some brief family-based interventions were effective, whereas others were not: short-term (4-5 session) parent training in the RAP-P trial reduced SITBs, but very brief (one-session) family interventions that focused primarily on family problem-solving did not. Further support for parent training as a mechanism of change comes from a classroom-based prevention trial indicating that behavior management strategies in childhood may reduce SI over adolescence and young adulthood (Wilcox et al., 2008).

Third, the most effective interventions for reducing self-injurious *behaviors* (i.e., DSH or SAs) are intensive (i.e., greater number of weekly contacts and longer length of treatment), especially in the beginning of treatment. Notably, none of the brief family-based or resource interventions were effective for reducing SITBs. Given that adolescents are most at risk shortly after hospital discharge (e.g., Goldston et al., 1999), early intensive intervention may be necessary to provide a sufficient treatment dose during this high-risk period.

Finally, it may also be important to target other maladaptive behaviors, or risk factors for SITBs, in treatment. For instance, in the most promising intervention study for SITBs in youth, Esposito-Smythers et al. (2011) found that, in addition to reductions in SAs, the treatment group also reported less substance use over the course of treatment. (Of note, this particular trial recruited participants for comorbid suicide risk and substance use disorders, and provided treatment for both symptoms.) Findings from this study suggest that targeting risk factors for SITBs, such as substance use, may enhance interventions. However, it is important to note that this is not true for all risk factors: interventions that reduce depression do not decrease SITBs in youth (Asarnow et al., 2011b; Gibbons, Brown, Hur, Davis, & Mann, 2012; Wilkinson et al., 2011). In addition to general risk factors, future research is needed to elucidate the specific mechanisms that cause and maintain SITBs over time, so these factors can be targeted in treatment (see *Future Research Directions*).

Considerations when evaluating treatment efficacy

There are a number of important issues to consider when evaluating the treatments reviewed here, including the: (1) SITB outcome(s), (2) comparison or control condition, (3) general decline in SITBs over time, (4) single trials used to evaluate most treatment families, and (5) high attrition rates as well as low, and differential, rates of treatment dose. Each of these issues is considered in more detail below.

When comparing the efficacy of interventions, it is important to note the variety of SITB outcomes examined. In this review, we identified 10 different SITB outcomes that ranged from specific behavioral outcomes, such as NSSI (rarely examined) and SAs, to broader outcomes, such as DSH (which includes both nonsuicidal and suicidal behaviors) and terms that collapsed suicidal thoughts, plans, threats, and attempts into a single category (e.g., suicide events). Moreover, the SITB outcomes for the *probably efficacious and possibly efficacious* treatments varied across studies. Some interventions were effective for reducing SI only (FBT-Attachment, IPT-Individual), DSH (Psychodynamic therapy-Individual + Family), SAs (CBT-Individual + CBT-Family + Parent Training, FBT-Ecological), or SITBs more broadly (FBT-Parent training only). The difference in SITB outcomes assessed is important for a few key reasons. First, it is difficult to compare treatment outcomes across studies because different SITBs were examined using a variety of measures. Second, for studies that included more vague outcomes, such as DSH or SITBs (which includes both suicidal and nonsuicidal thoughts and behaviors), it is unclear whether these interventions are efficacious for reducing nonsuicidal forms of self-injury, suicidal forms of self-injury, or both. Researchers often collapse multiple SITB outcomes into a single category because these behaviors are relatively infrequent in the population and therefore large sample sizes are necessary to examine a single form of SITB. Although combining different forms of SITB makes sense for practical reasons, these broad categories limit our understanding of treatment effects. Finally, many studies examined, and found positive treatment effects for, suicidal thoughts. Although SI is concerning, not all adolescents with suicidal thoughts will engage in suicidal behaviors (Nock et al., 2008; Nock et al., 2013). Moreover, given that a history of SAs (rather than other SITBs) is currently the most robust risk factor for *completed* suicide (Goldsmith, Pellmar, Kleinman, & Bunney, 2002), it will be important for future research to examine interventions that specifically target suicidal *behavior*.

Second, a range of control or comparison conditions were also used across trials, making it difficult to interpret the consistency of treatment effects across studies. Although treatment as usual (TAU) is the most frequently employed comparison condition, the nature of the usual care provided ranges and is often not described in great detail. In a sample of 63 adolescents receiving TAU, Spirito, Stanton, Donaldson, and Boergers (2002b) found that treatments varied widely in theoretical orientation (cognitive, behavioral, psychodynamic) and frequency of sessions (Range: 0-22). Consistent with Spirito et al. (2002b), TAU in the current review varied from supportive counseling (Tang et al., 2009) to inpatient hospitalization (Huey et al., 2004). Of course, the appropriate comparison treatment will depend on the severity of the sample, with more severe patient samples requiring more intensive control treatments than less severe groups. However, as Spirito et al. (2002b) noted, the increased monitoring and resources available in RCTs may make less intensive interventions clinically appropriate for even severe samples of adolescents. We will return to this issue in our discussion of future research.

Third, in most studies reviewed, SITBs tended to decrease markedly over time, even without intervention. Given this natural decline, or regression to the mean, pilot studies, which lack a control or comparison group, are of limited utility for evaluating an intervention's efficacy. In the current review, RCTs were weighted more heavily than pilot studies, which resulted in a less favorable evaluation of interventions that have primarily been examined in non-controlled studies.

Fourth, most treatments, and particularly the more efficacious treatments, were only examined in a single trial and, therefore, evaluations are based on the efficacy of an intervention in one specific sample. For instance, both IPT-Individual and FBT-Parent training only interventions were examined in adolescents with depression, and I-CBT (CBT-Individual + CBT-Family + Parent Training) was examined in adolescents with substance use disorders. Replications of promising treatments in more diverse samples are needed before conclusions can be made about the generalizability of treatment findings.

Finally, high attrition rates and poor treatment attendance were major problems in many of the trials reviewed. These issues made it difficult to evaluate the efficacy of some experimental interventions: if a large percentage of the treatment and/or control group dropped out of the trial, or there were differences in the dose of treatment between conditions, this limited the inferences that could be drawn about a specific treatment approach. Moreover, low rates of treatment completion are important when considering how these interventions will work in naturalistic settings (i.e., moving from efficacy to effectiveness studies).

Future Research Directions

Improvement in study design and measurement

A major shortcoming of the treatment literature in this area is the lack of experiments or RCTs. As discussed above, RCTs are essential for establishing the efficacy of an intervention, and multiple independent RCTs are necessary for a treatment to be considered *well-established*. Moreover, our review indicates that pilot studies are of limited utility given

the episodic nature of SITBs. Future research also would benefit from studies that include: specific SITB outcomes, more detail about the intervention components included in both the experimental and comparison treatment packages, and greater standardization of usual care conditions across trials.

Replication and dismantling studies of promising treatments

Replication is vital to confirm the efficacy of an intervention. For instance, although Wood et al. (2001) initially reported promising results of DGT, attempts to replicate these findings by other research groups were unsuccessful (Green et al., 2011; Hazell et al., 2009). Given that *well-established* treatments require at least two independent RCTs, one straightforward, but vitally important, future direction is for independent research teams to examine the efficacy of the *probably efficacious* treatments identified in this review. In addition, it will be important for future studies to examine the efficacy of these treatments in various sociodemographic and clinical groups (since most have only been examined in one specific sample of adolescents). Although obtaining grant funding for replication studies can be difficult, researchers can enhance the incremental utility of replications by building in tests of additional factors, such as testing mediators or moderators of change.

In addition, the field would benefit from future research examining whether some or all intervention components included in potentially efficacious treatments are necessary to produce significant treatment effects. The current interventions demonstrating the most promise for reducing SAs in youth are intensive and include a variety of treatment elements. Dismantling studies could be helpful for identifying the components essential for treatment efficacy. For instance, Esposito-Smythers et al. (2011) found that parent training enhanced their CBT package. Relatedly, Pineda and Dadds (2013) reported positive effects for a parent education intervention that did not include the adolescent in treatment. Future research is needed to examine the treatment efficacy of parent training and education alone for reducing suicidal *behavior* in youth.

Examination of treatment mediators and moderators

It will also be important for future studies to examine *how* (mediation) these interventions work and for *whom* (moderation). A few family-based treatment studies have identified significant mediators of treatment outcome. For instance, increased family functioning mediated positive treatment effects in the RAP-P trial (Pineda & Dadds, 2013), and improvements in mentalization and attachment mediated positive outcomes for MBT-A (Rossouw & Fonagy, 2012). These findings provide support for the proposed mechanisms of change in these trials.

In addition, it will be important for future research to highlight potential moderators of treatment effects, as not all interventions will work for all individuals (Kraemer, Wilson, Fairburn, & Agras, 2002). Some studies in our review reported that their intervention only worked for some participants (e.g., Harrington et al. 1998). However, because there was no main effect of treatment, it is unclear whether these findings reflect true moderation.

Development of effective brief interventions

Treatments demonstrating the most promising results for reducing self-injurious *behaviors* (e.g., SAs) in adolescents are intensive and long-term. However, given that adolescents (and adults) are at greatest risk for attempting suicide in the six months following hospital discharge (Brent et al., 1993; Goldston et al., 1999; Prinstein et al., 2008), long-term interventions may be inadequate for helping adolescents during these high-risk periods. For instance, in the TASA trial, 40% of SE occurred within the first month of the study before a sufficient dose of treatment could be delivered (Brent et al., 2009). Unfortunately, the brief (resource) interventions examined to date, including crisis management and increasing hospital access, have not proven effective for reducing SITBs in adolescents.

Safety planning is one potential brief treatment that is being used increasingly in a variety of clinical settings, and specifically within the United States Department of Veterans Affairs Healthcare System (Stanley & Brown, 2012). Through a series of six steps, safety planning helps patients identify: warning signs for distress, coping skills, social supports, clinical resources, and ways to restrict access to lethal means. The safety planning intervention (SPI) is designed to be unique as a single-session, stand-alone treatment for individuals at risk for suicide (Stanley & Brown, 2012). Although potentially promising as a brief intervention, there is currently no empirical evidence documenting safety planning's efficacy for reducing SITBs in adults or adolescents. However, there is data indicating that restricting access to lethal means, such as firearms, can decrease SAs using that particular method (Brent & Bridge, 2003). Future research should focus on examining other brief interventions that may be useful for reducing risk for SITBs during early high-risk periods.

Utilization of single-case experimental designs

Although large-scale RCTs are necessary to ultimately evaluate an intervention as *well-established*, they are not the only designs useful for treatment research. In fact, large trials that require hundreds of participants (to have enough power to detect effects) may actually be inappropriate for testing novel treatments with unknown efficacy. Single-case experimental designs (SCEDs: Barlow, Nock, & Hersen, 2009) are one alternative to RCTs that may be particularly ideal for developing new treatments for SITBs. In contrast to RCTs that examine treatment effects on target outcomes *between* individuals, SCEDs examine the impact of treatment on targets *within* individuals (e.g., Wallenstein & Nock, 2007). SCEDs may be particularly useful for developing new interventions that can later be examined in standard RCTs.

Concluding Comments

Although research on interventions for SITBs has increased over the past 10 years, there are currently no *well-established* treatments for suicidal or nonsuicidal SITBs in youth. Several treatments have shown potential promise: interventions identified as efficacious include treatment components that foster familial and other interpersonal relationships, improve parenting skills, and strengthen individual coping skills. Most of these interventions are intensive and focus on treating both the family as well as the adolescent. However, these conclusions are based on a single RCT per treatment and it is unclear which intervention

components are necessary and sufficient for reducing SITBs. Future research is needed: to replicate promising treatments, to isolate essential treatment components, to determine how these treatments work (i.e., mediators), as well to identify which adolescents will benefit most from these interventions (i.e., moderators). In addition, given that adolescents are at heightened suicide risk shortly after discharge from the hospital, the field needs brief interventions that can be administered within the month post-discharge.

Due to the paucity of established treatments for SITBs, treatment providers may find it useful to refer to evidence-based clinical guidelines for working with suicidal youth, such as those provided by the Council of the American Academy of Child and Adolescent Psychiatry (AACAP Official Action, 2001). These guidelines provide information regarding clinical assessment, crisis management, and hospitalization for suicidal youth. Given the increasing treatment research in this area, it is our hope that the next edition of this review will be able to discuss *well-established* treatments for effectively reducing SITBs in children and adolescents.

Does Insurance Matter? Implementing Dialectical Behavior Therapy with Two Groups of Youth Engaged in Deliberate Self-Harm

Abstract

This paper presents the outcomes of a Dialectical Behavior Treatment (DBT) program, implemented in intensive outpatient care with two groups of adolescents (n=55 and n=45), ages 12–18, who engaged in deliberate self-harm (DSH) but had different insurance/funding sources and risk backgrounds. This pre-post study examined variability in clinical functioning and treatment utilization between the two groups and investigated moderating risk factors. Findings support DBT's effectiveness in improving clinical functioning for youth with DSH regardless of insurance type. However, lower rates of treatment completion among youth without private insurance call for extra engagement efforts to retain high-risk youth in DBT.

Keywords

deliberate self-harm; adolescents; DBT; insurance type; implementation

The significant numbers of adolescents who engage in deliberate self-harm (DSH) during their lifetime have been cause for concern in community and clinical settings. A history of self-injurious behaviors is one of the primary indicators for suicide (Hawton & Harriss, 2007), which in turn remains one of the leading causes of death among 15- to 24-year olds (CDC, n.d.). Since engagement in self-harming behaviors can lead to serious injury and even death, it is a common trigger for admission to inpatient psychiatric care (e.g., Zalsman, Levy & Shoval, 2008), an expensive and restrictive treatment option with a weak evidence base (Burns, Hoagwood & Mrazek, 1999). Finding effective treatments for adolescents engaged in deliberate self-harm has been identified as an important area of study (Ougrin, Tranah, Leigh, Taylor & Asarnow, 2012).

In this paper, we present the outcomes of a DBT program that was implemented in an intensive outpatient setting with two groups of youth who engaged in DSH but had different insurance/funding sources and related risk backgrounds.

An Overview of DSH among Adolescents

In the research literature, multiple terms are used to describe self-harm, which is defined as engagement in intentionally self-injurious behaviors such as cutting, scratching, punching, biting, ripping, carving and burning (Klonsky, 2007; Whitlock 2010). In the United States, a distinction is often made between self-harm with or without suicidal intent (e.g., non-suicidal self-injury [NSSI]). In this paper we will use the term deliberate self-harm (DSH), which is more commonly used in the UK and Europe and is more encompassing, describing "self-harm with suicidal intent, nonsuicidal self-harm and self-harm episodes with unclear intent" (Ougrin et al., 2012, p.337). Studies have only recently begun to empirically investigate different types of self-harm (e.g., Jacobson et al., 2008), and disparate conceptualizations and operationalizations render cross-study comparisons about the prevalence and correlates of self-harm difficult.

Not surprisingly, prevalence estimates of DSH in adolescent community samples are highly variable (Muehlenkamp, Claes, Havertape & Plener, 2012), ranging from 4% (Patton et al., 2007) to 42% (Cerutti, Manca, Presaghi & Gratz, 2011), depending on sampling method and assessment and classification systems for self-injury. For instance, single-item assessments of DSH have been found to yield significantly ($p<.03$) lower prevalence estimates (12.2%) than behavioral check-list surveys (31.4%), suggesting measurement bias (Muehlenkamp et al., 2012). Estimates also vary depending on the timeframe during which DSH is assessed, i.e. lifetime prevalence versus 6- or 12-month prevalence (Muehlenkamp et al., 2012). Youth in clinical settings have significantly higher rates of DSH than youth in community samples. Among those in inpatient psychiatric care, DSH rates as high as 60–80% have been reported (Nock & Prinstein, 2004).

Multiple studies have investigated risk factors or correlates of DSH and have implicated a range of sociodemographic and psychosocial factors (Boxer, 2010; Challis, Nielssen, Harris & Large, 2013; Evans, Hawton & Rodham, 2004; Gratz et al., 2012; Madge et al., 2011; Scoliers et al., 2009). For instance, being female (e.g., Gratz et al., 2012; Hawton & Harriss, 2008) and between the ages of 15–18 years old (Sourander et al., 2006) have been found to

increase the risk of DSH. Some studies have also documented racial/ethnic variation in self-harm (Cooper et al., 2010; Gratz et al., 2012) as well as higher prevalence rates of self-harm and suicidality in youth from more socio-economically deprived backgrounds (Gratz et al., 2012; King & Merchant, 2008). Mental health problems, in particular depression, borderline personality traits, impulsivity, problems with self-esteem and sexual identity issues, child abuse histories and poor familial and interpersonal relationships have all been found to be associated with adolescent DSH. Explanatory models for self-harm vary depending on the presence of suicidality or not (Jacobson, Muehlenkamp, Miller & Turner, 2008). Commonly cited functions of self-harm without suicidal intent include emotion regulation, expression and alleviation of psychological distress, and refocusing away from negative stimuli (Klonsky, 2007; Laye-Gindhu & Schonert-Reichl, 2005).

Treating youth engaged in DSH is challenging (Zila & Kiselica, 2001). First of all, much remains unknown about the different presentations of self-harm (with or without suicidality, suicidality without deliberate self-harm) and the implications for treatment (Jacobsen et al., 2008). Secondly, self-harm in all of its forms has been linked to higher rates of psychiatric disorders and engagement in other health-risking behaviors (Gould, Greenberg, Velting & Shaffer, 2003; Ogle & Clements, 2008), contributing to a complex clinical picture. Thirdly, only a fraction of youth engaged in DSH seek or receive help (Hawton, Rodham, Evans & Weatherall, 2002; Pages, Arvers, Hassler & Choquet, 2004). Findings from population-based studies indicate that 10–20% of youth engaged in DSH are hospitalized following an incident of self-harm, and less than one-fifth receives other types of health services (Hawton et al., 2002; Pages et al., 2004; Ystgaard et al., 2009). For those youth in treatment, the empirical evidence-base of available treatments remains limited (Ougrin et al., 2012). Studies have been conducted testing a range of treatment approaches, including pharmacotherapy, group therapy, systemic treatments, psychodynamic interventions and cognitive-behavioral approaches (Muehlenkamp, 2006; Ougrin et al., 2012). Independent replications of rigorously conducted trials with adolescents are urgently needed. There is evidence from the adult literature on suicidality and non-suicidal self-harm that behaviorally-based interventions that teach problem-solving and coping skills constitute an effective approach to reducing self-harm (Panos, Jackson, Hasan & Panos, 2014; Tarrier, Taylor & Gooding, 2008). Dialectical Behavior Therapy (DBT) is on the short list of treatments most promising in reducing self-harming behavior among adolescents (Muehlenkamp, 2006; Ougrin et al., 2012).

Dialectical Behavior Therapy (DBT)

DBT is a structured multi-component treatment involving psychotherapy, group skills training, phone consultation, and team-based therapist consultation (Linehan, 1993a). Steeped in cognitive-behavioral principles, dialectics, and mindfulness, DBT targets affective and behavioral dysregulation, and is considered effective in the treatment of borderline personality disorder and suicidality among adults, many with histories of self-harm (Linehan, Comtois, Brown, Heard, & Wagner, 2006). The intervention incorporates four modules: mindfulness, distress tolerance, emotion regulation, and interpersonal effectiveness (Linehan, 1993a). These modules are implemented through a series of skills,

which foster cognitive-behavioral change over the course of a one year long treatment (see Linehan, 1993b for a full review).

In addition to skills training, which is supported through weekly group and individual therapy, DBT effectiveness is rooted in creating a consistent system that supports behavioral change (Linehan, 1993a). While in treatment patients explore the presentation and function of their harmful behaviors, enabling them to identify, evaluate and modify their behavior over the course of treatment. Through this process patients complete diary cards, or weekly reports of their emotions, behaviors, and use of DBT skills to quantify their experiences and expose behaviors that interfere with treatment progress. DBT therapists are available to their clients outside of therapy sessions to provide support for using the skills during time of distress.

DBT has been adapted for adolescents (Miller, Rathus, & Linehan, 2006; Rathus & Miller, 2002). Treatment modifications in Adolescent DBT range from including family members in multifamily skills training groups, to adding specific adolescent skills such as "Walking the Middle Path," and reducing treatment time from 1 year (standard DBT) to 16 weeks (Macpherson, Cheavens & Fristad, 2013). Evidence in the treatment of adolescents with a range of severe emotional problems is growing although findings to date, with rare exceptions, (Rathus & Miller, 2002) are mostly based on pre-post design studies (Fleischhaker et al., 2011; James, Taylor, Winmill, & Alfoadari, 2008; Woodberry & Popenoe, 2008). An NIMH-funded randomized clinical trial of DBT with multi-problem youth is currently underway (NIH Research Portfolio Online Reporting Tools [RePORT], n.d.). Overall findings of available outcome studies suggest decreased psychiatric hospitalization during treatment, reduction of suicidal ideation and general psychiatric symptoms, decreased episodes of deliberate self-harm and improved overall functioning following DBT (Macpherson et al., 2013).

Purpose of Study

While DBT is a promising treatment for self-harm, much remains to be learned about the types of youth for whom DBT may be effective. In this study, we compare the outcomes of a DBT program for two naturalistically occurring groups. The first group was privately insured and therefore had the requisite funding to receive intensive outpatient treatment. Foundation funding was acquired to extend treatment to youth with public insurance or those who based on family income level would have been eligible to receive public insurance. As stated above, some studies have reported variation in self-harming behaviors depending on socio-economic status (Gratz et al., 2012; King & Merchant, 2008), and there is evidence from multiple studies in the mental health disparities literature that youth with public or no insurance fare worse in terms of mental health services access (Burnett-Zeigler & Lyons, 2010; Valet, Kutny, Hickson & Cooper, 2004), retention (González, 2005; McKay, Stoewe, McCadam, & Gonzales, 1998), and outcomes (Lichtenstein, Sharma, & Wheat, 2005).

By facilitating equal access to DBT, thereby controlling for the potential effects of insurance or funding type, we are able to examine variability in clinical functioning and treatment

utilization between the two groups of youth while in the program and investigate other risk factors that moderate outcomes.

Methods

In 2008, a large psychiatric facility in the Southwest of the United States began implementing DBT as part of its intensive outpatient program. This effort was initiated for two reasons: (1) Schools and community providers referred growing numbers of self-harming youth to the facility; and (2) the facility increasingly focused on implementing interventions with an empirical evidence base. While the evidence-base for DBT with adolescents is still being developed, DBT had a comparably stronger evidence base in the treatment of self-harm than other treatments used at the facility. After requisite training was obtained (see below – DBT Training and Procedures – for more detail on training), the intervention began to be implemented. Foundation funding was acquired to support access to the program for public insurance or public insurance-eligible children who otherwise would not have been able to receive intensive outpatient treatment.

Enrollment of Treatment Participants

Patients were referred to the program through behavioral health departments, private therapists, and self-referral. To be eligible for participation, youth had to be between 12–18 years old, have a current or recent (within the last 12-month) history of self-injurious behaviors with or without suicidality as indicated by clinical assessment, and be willing to participate in all program components along with their parents/guardians. As the initial focus of this project was the implementation of DBT with self-harming youth, no standardized measure of the severity, frequency or methods of self-harm was introduced at this stage. However, clinical assessment indicated that self-harm varied considerably in frequency, severity and methods. Severity ranged from non-lethal (e.g., fingernail scratching of skin tissue) to potentially lethal (e.g., knife injuries on limbs which required a visit to the ER and subsequent stapling of the injuries). Frequency was at minimum once per week to a few times per day, and duration of engagement in self-harm varied as well. Methods of self-harm included virtually every form of self-injury recorded in the literature. Most common was some form of cutting with razors, although other forms included fingernail scratching, burning with salt and ice, eraser burns, scalding self with hot water, shocking oneself, intentionally walking through thorn bushes, punching walls, hitting oneself, triggering a cat to bite or scratch limbs, etc.

Within three years, 154 youth had enrolled in the program. The current study reports on 99 youth with complete pretest-posttest Youth Outcome Questionnaire data, the main outcome measure. Partial data (either pre- or post) were available for 36 youth (23.3%); 12.3% had all data missing. Analysis of missing data indicated that the analytic sample of 99 did not differ from the eligible sample of 154 on any key characteristics, including funding type (our main variable of interest), except with regard to reason for discharge. Cases with no or missing clinical data were more likely to have withdrawn prematurely from the program (54.1% versus 45.9%; χ^2=14.87, df=1, p<.05).

Analyses presented here are based on the intent-to-treat sample. The institution's Institutional Review Board approved analysis of de-identified data that had been collected and maintained as part of quality assurance.

DBT Training and Procedures

The program is based on Miller's DBT for adolescents (Miller et al., 2006). Patients attended treatment twice a week for 16 weeks or until medical necessity for intensive outpatient care had ceased. Medical necessity connotes a regulatory concept specifying that payment for medical treatment will not occur unless it is considered to be reasonable and necessary for a given diagnosis (Jensen, 2006). Within the context of intensive outpatient care, patients generally cannot be an imminent danger to self or others (which would justify hospitalization) but need to have sufficiently severe symptoms to require an intensity of treatment that goes beyond regular once-a-week outpatient care. This determination is made through clinical assessment. Generally speaking, goals of the program include stabilization and behavioral control, decreasing life-threatening suicidal behaviors, therapy- and quality of life-interfering behaviors and increasing behavioral skills, which are the aims of Stage 1 of traditional DBT and have generally been described as the goals of Adolescent DBT (Blennerhasset & O'Raghallaigh, 2005; Linehan, 1993b). Treatment consisted of two 3-hour group therapy sessions and weekly individual and/or family therapy lasting 30–60 minutes. Group therapy included 90 minutes of peer group followed by 90 minutes of a multi-family skills training group. Parents attended a weekly hour-long parent education group.

Treatment was provided by a team of DBT-trained clinicians. Most staff received the gold standard two-week intensive training through Behavioral Tech (www.behavioraltech.org), Marsha Linehan's DBT training institute. In addition to the intensive training, the lead therapist received an additional week of training from a Behavioral Tech approved training series. The team of clinicians included a board certified psychiatrist, a licensed psychologist, licensed marriage and family therapists, licensed clinical social workers, and pre-licensed staff and students in the disciplines of psychology, social work, marriage and family therapy, and professional counseling. Pre-licensed staff received training and supervision from the intensively trained licensed staff during formal weekly sessions and as needed throughout the week. Therapists received DBT training once they became part of the program, so selection of therapists for the DBT program was guided by demonstrated interest in self-injury and a willingness to learn and implement DBT.

To increase fit with the service setting several modifications had to be made during implementation. The program was delivered as part of the intensive outpatient program, which falls under a number of regulatory requirements, including services being provided primarily in a group setting for a minimum of three hours at a time, two to three days per week. Regulatory requirements about medical necessity further governed the length of stay, limiting the ability to implement a long-term program, as in traditional, comprehensive DBT. Negotiations with managed care companies allowed for a program that lasted two rather than three days a week for altogether 16 weeks to be more similar to traditional DBT. This translated to 32 treatment sessions, which was roughly equivalent to the skills modules in Miller's model.

As three hours of group time are very intensive, especially for emotionally dysregulated adolescents, the time was broken up into peer group and multifamily time during every session. Peer groups focused on reinforcing and generalizing skill use for the adolescents. During multifamily groups youth and their caregivers were taught the skills together. In traditional DBT, one to two weeks of mindfulness training are provided followed by several weeks of a particular module (e.g., interpersonal effectiveness), after which mindfulness would be reviewed and the next module addressed. Additionally, in traditional DBT, groups are either closed to new members, or new members are admitted during the mindfulness time. Due to the nature of the setting, new patients had to be admitted continuously, which meant that the sequencing of modules varied depending on when a family entered the program. Modules were rotated on a weekly basis so that a family would receive some skills from each module on a monthly basis. The parent education groups are standard in the site's other intensive outpatient programs and are the source of particular approval from managed care companies, making them a practical necessity. Parent education groups were focused on teaching, reinforcing and generalizing DBT skills in a parental context. We were unable to implement telephone coaching due to institutional policies around employees being on call. However, in Year 5 of the program telephone coaching has begun to be piloted.

Variables and Measures

Outcome variables—Outcomes are reported for clinical functioning and treatment utilization.

Clinical functioning: The Youth Outcome Questionnaire-Self-Report 2.0 (Y-OQ-SR), (Wells, Burlingame, & Rose, 2003) a 64-item measure for adolescents ages 12–18 receiving mental health treatment, was used to measure clinical functioning. The Y-OQ-SR is not a diagnostic tool, but measures improvement in functioning over the course of treatment. Youth self-report on beliefs, attitudes, feelings, moods, and behaviors during the previous 7-day period using a 5-point Likert scale (0–4). The measure consists of six subscale scores (Intrapersonal Distress, Somatic, Interpersonal Relations, Critical Items, Social Problems, and Behavioral Dysfunction) and a summative (Total) score. The Total Score reflects a patient's overall level of psychological distress. The clinical cutoff is 46, which distinguishes between individuals in the clinical and non-clinical range. A Reliable Change Index (RCI) of 18 connotes clinically significant change.

The Y-OQ-SR includes one item that addresses both suicidal and non-suicidal self-harm (Item 21. "I have hurt myself on purpose, e.g., cutting or scratching self, attempting suicide). This item was examined separately as an indicator of self-harm.

The Y-OQ-SR takes 8 to 10 minutes to administer, is sensitive to change over short periods of time, and has sound psychometric properties with internal consistency for both clinical and community samples reported at α=.96, and test-retest reliability at r=.89 for the total score and r= .73 to .91 for the subscales (Ridge, Warren, Burlingame, Wells, & Tumblin, 2009). While collected on a weekly basis, this analysis only reports on changes between pretest (collected in either week 1 or 2 of treatment) and posttest (last available score prior to discharge; had to be obtained at minimum during the last four sessions of treatment).

The parent version of the Youth Outcome Questionnaire (Y-OQ 2.01; Burlingame, Wells, Lambert, & Cox, 2004) was also administered. The Y-OQ 2.01 is a 64-item parent or guardian report for youth ages 4–17, and it is similar to the Y-OQ 2.0 SR in the type of subscales available, its ability to measure change metrics, and its normative score range (community = −16 to 46; clinical = 47 to 240). However, the Y-OQ 2.01 has an RCI of 13, which is five points lower than the RCI on the Y-OQ 2.0 SR. The Y-OQ 2.01 has been used more extensively in outpatient care settings for a greater period of time than the adolescent self-report version (McClendon et al., 2011).

Treatment utilization: Two variables captured this outcome: (1) Psychiatric hospitalization while in DBT (yes/no); (2) Discharge reason from DBT (1=graduated; 2=withdrew). Graduation was defined as youth who successfully completed the program. This generally meant completing the 16-week/32-session program. However, therapists had discretion in consideration of medical necessity requirements to slightly extend or shorten treatment to support individual treatment goals. For patient graduates in our sample, a total of 5 (7%) had less than the standard 32 sessions recommended while 10 (14%) had more.

Between-group factor—Funding type was the between-group factor (1=private insurance; 2=grant-funded).

Other variables/covariates—For purposes of describing the sample and to adjust for possible baseline differences between the two groups of interests, the following variables were used.

Demographic information: Information was available on gender (1=male, 2=female), age (continuous), ethnicity (1=Caucasian, 2=African American, 3=Hispanic, 4=other) and sexual orientation (1=heterosexual, 2=LGBT).

Clinical data: Information on current substance use, which was obtained as part of the initial clinical assessment, was operationalized as a dichotomous variable (1=yes; 2=no). It should be noted that 92% of youth had a primary diagnosis of major depression, therefore, diagnosis was not used in the analysis. We also did not use GAF scores as in real-world service settings these scores are highly vulnerable to thresholds set by insurance companies to ensure continued services.

Risk factors: To capture risk factors in the youths' background, we relied on indicators that had been recorded as part of youth's initial clinical assessment and have been reported in the literature as psychosocial risk factors or correlates of adolescent depression, self-harm, and/or suicidality. Data, dichotomously reported (yes/no), were available on (1) abuse violence history (Gratz, 2006); (2) history of abandonment (Timmons, Selby, Lewinsohn & Joiner, 2011); (3) adoption (Slap, Goodman & Huang, 2001); (4) academic functioning below average/failing (Verboom, Slijtsema, Verhulst, Penninx & Ormel, 2014); (5) family history of mental illness and/or drug abuse (Ping, Agerbo & Mortensen, 2002); (6) head trauma/seizures (Jackson & Turkington, 2005). A summative score (0–6) was calculated as a gross indicator of psychosocial risk (James et al., 2010).

Service history: Youth service history included (1) prior psychiatric hospitalizations (1=yes; 2=no), (2) number of episodes in psychiatric hospitals, and (3) number of days in psychiatric hospitals.

A more comprehensive standardized pre-post assessment battery, measuring outcomes in multiple biopsychosocial domains (e.g., parenting relationship, executive functioning, behavior problems), was added in Year 3. However, given the small sample size for these measures to date analyses presented here will focus only on clinical functioning.

Data Analysis

Descriptive statistics were generated for the intent-to-treat sample of 99. *t*-tests and *chi*-square tests were applied to detect differences on key characteristics between privately-insured and grant-funded youth. Parametric assumptions were assessed and determined to be acceptable with regard to outliers, normality and homogeneity of variance. A mixed between-within factorial ANOVA was carried out to examine main and interaction effects of funding type on changes between pre- and posttest clinical functioning scores. Variables that significantly distinguished between the two funding types in bivariate analyses or were otherwise conceptually compelling were subsequently included as covariates in the model. Main and interaction effects as well as effect sizes are reported. Eta squared (η^2) is the most commonly used index for factorial ANOVA designs where 0.04 constitutes the recommended minimum effect size, 0.25 a moderate effect and 0.64 a large effect (Ferguson, 2009). Tests were run separately for all subscales due to sample size considerations. All analyses were performed with IBM SPSS 20.0.[1]

Results

Sample Characteristics

Table 1 shows the characteristics of the 99 youth in the analytic sample – 54 in the private insurance group and 45 in the grant-funded group. The vast majority of youth were female. The average age was 14.9 (SD=1.3). Almost 59% of the youth were white, 14.1% African American, 21.2% Hispanic and 6.1% Asian or other. Due to cell size concerns the race/ethnicity variable was subsequently collapsed into two categories – white and other. The two groups showed statistically significant differences with regard to race/ethnicity, with the grant-funded youth having a significantly higher percentage of minority youth (53.3% versus 31.5%; $p<.05$), and risk factor score where grant-funded youth had a risk factor score of 2.7 versus 2.2 for the private insurance youth (range 0–6; $p<.05$).

Baseline Clinical Functioning

While clinical functioning data were collected from youth and parent, data inspection indicated much missing parent data, with complete data for only 68 of the 99 youth in the analytic sample. The parent-report sample also had a higher rate of white parents (66.2% vs. 58.6%) and a higher rate of youth who completed the treatment successfully (79.4% vs

71.7%). While analyses were subsequently conducted separately on both parent and youth samples differences in sample characteristics prevent a straight comparison of youth- and parent-report findings. Findings generally converged, but results presented here will reflect youth-report scores for the sample of 99 unless otherwise indicated.

The mean pretest Y-OQ-SR Total Score was 82.55 (SD=36.49), well above the clinical cutoff. Differences in pretest mean scores across all scales were not statistically significant except in the area of Interpersonal Relations where grant-funded youth had slightly elevated scores compared to private insurance youth ($t(97)=2.13$; $p<.05$). With regard to self-reported DSH at baseline, 22.2% of youth reported self-injuring "almost always or always," 16.2% "frequently," 29.3% "sometimes," 10.1% "rarely," and 22.2% "never or almost never." These rates converged with parent-reported DSH except that fewer parents (10.4%) reported self-injury "almost always or always." Instead they were more likely (26.5%) to indicate that youth self-injured "frequently." No differences were found by funding type.

Pretest-Posttest Changes in Clinical Functioning by Funding Type

A mixed between-within factorial ANOVA examined changes in clinical functioning between pretest and posttest (within-subjects factor) by funding type (between-subjects factor). Table 2 shows descriptive results for pretest and posttest scores for the two funding types, and includes *F*-tests, eta squared (η), and *p* values for the main effects of Time and Funding Type as well as interaction effects for Time x Funding Type. Findings indicate statistically significant main effects for Time on all subscales. For Total Score, the mean change score was 27.65 (SD=1.08), exceeding the Reliable Change Index of 18, which would indicate clinically significant change. However, on average posttests were still above the clinical cutoff of 46. Effect sizes were moderate for Total Score (η=.31), Intrapersonal Distress (η=.27), Critical Items (η=.29), and Item 21 (η=.42). For all other subscales, effect sizes were small. Funding type did not moderate changes in clinical functioning. In contrast to youth self-report scores, there was a statistically significant Time x Funding Type interaction with regard to the parent report behavior problems subscale with private insurance parents reporting significantly greater improvement in this area compared to grant-funded parents; $F(2,66)=5.30$, $p<.05$. No notable main effects for funding type were found in any analyses.[2]

Treatment Utilization

There were no differences between funding types with regard to psychiatric hospitalization while in DBT treatment. Twenty-six percent were psychiatrically hospitalized. Of these youth, all but six had one episode; the remaining experienced two stays. Differences in the percentage of treatment completers (Discharge Reason) approached statistical difference, $x^2(1)=3.67$, $p=.056$. Close to 80% of youth with private insurance graduated from the program whereas 62.2% did in the grant-funded group. Since a greater percentage of youth who had withdrawn from the program prematurely also had missing clinical data (see earlier discussion under Enrollment of Treatment Participants), we further examined the

relationship between Discharge Reason and Funding Type for the larger sample of 154 youth, and found the relationship to be even stronger and statistically significant ($x^2(1)=11.98$, $p<.001$), justifying inclusion of this variable as a covariate in subsequent analyses.

Covariate Effects

We tested the moderating effect of the two covariates, for which significant differences by funding type had been found: Race/ethnicity ($x^2(1)=4.83$; $p=.028$), and Risk Factor Score ($t(1)=2.17$; $p=.032$). We also included Discharge Reason for reasons described in the prior paragraph. Neither Race/ethnicity, Risk Factor Index nor Funding Type had significant main or interaction effects in this model. Main effects for Time could now only be found for Total Score, $F(5,94)=6.12$, $p<.05$; Interpersonal Relations, $F(5,94)=3.93$, $p<.05$, and Intrapersonal Distress, $F(5,94)=5.72$, $p<.05$. There were also main effects for Discharge Reason with regard to Total Score, $F(5,94)=6.85$, $p<.01$; Interpersonal Relations, $F(5,94)=11.78$, $p<.01$; Social Problems, $F(5,94)=6.48$, $p<.05$; and Behavioral Dysfunction, $F(5,94)=4.87$, $p<.05$. In these areas, graduated youth had significantly lower pretest and posttest scores than youth who withdrew prematurely from the program. However, overall effect sizes were small. There were also significant interaction effects for Discharge Reason x Time with regard to Total Score, $F(5,94)=4.82$, $p<.05$; and Intrapersonal Distress, $F(5,94)=4.73$, $p<.05$. Youth who graduated experienced an average change score of 33.48 (SD=41.56) whereas youth who withdrew prematurely from the program had a mean change score of 12.86 (SD=38.04). The trend was the same for the Intrapersonal Distress subscale, and approached statistical significance in the area of Interpersonal Relations.

Additional Analyses

Given differences in graduation rates by funding type, we conducted additional analyses on treatment completers (n=71) (not shown). Trends described above and shown in Table 2 were confirmed and amplified. Effect sizes for main effects of Time increased, and as before, no main effects of Funding Type or interaction effects of Time x Funding Type were found.

Discussion

Adolescent self-harm has been described as difficult to treat (Muehlenkamp, 2006) and even as a set of behaviors resistant to treatment (Zila & Kiselica, 2001). The potential for serious and perhaps fatal self-injurious behaviors, whether intended or not, prompts many therapists and families to hospitalize youth - an expensive option that is not reliably effective in the treatment of self-harm or suicidal acts (Linehan, 2000). Since self-harm is used by many youth as a form of emotional self-regulation, it is a behavior that can be inadvertently maintained through positive and negative reinforcers. For the same reason, carefully implemented cognitive-behavioral strategies seem to be effective in reducing engagement in DSH. DBT is considered one of the promising treatments for youth engaged in self-harming behaviors (Miller, Rathus, Linehan, Wetzler, & Leigh, 1997; Muehlenkamp, 2006).

As such, this study, which has a comparably large sample size, contributes in part to the limited body of pretest-posttest studies supporting DBT's promise in improving overall clinical functioning in adolescents with DSH within the context of intensive outpatient care. Within an average treatment period of a little more than three months, youth showed statistically significant improvement across all domains of functioning captured by the Youth Outcome Questionnaire. Treatment completers who stayed in the program for the full four months displayed an even greater reduction in problematic behaviors. DBT was further effective in reducing the rate of self-reported self-injury, thus converging with findings from the limited number of studies previously conducted in this area (Miller, Wyman, Huppert, Glassman, & Rathus, 2000; Rathus & Miller, 2002). Overall, improvement was deemed clinically significant. However, posttest scores remained above the clinical cutoff, suggesting that a longer treatment period or less intensive post-treatment DBT may be indicated. Miller and colleagues (2007) have previously outlined the use of peer-led graduate groups following DBT to aid in the consolidation of skills.

The primary focus of this paper was, however, on investigating differences in outcome by funding type. Relatively little is known to date about factors that may moderate DBT treatment success for DSH youth (Perseius, Öjehagen, Ekdahl, Åsberg, & Samuelsson, 2003; Shearin & Linehan, 1992). The effect of funding type was examined due to documented variation in DSH among different socio-economic groups (e.g., Gratz et al., 2012) and findings from some studies in the mental health care disparities literature, suggesting that insurance type influences treatment access, utilization, and outcomes (Fry-Johnson et al., 2005; Lichtenstein et al., 2005). This naturalistic study offered the opportunity to examine outcomes for two groups of youth participating in the same program but under different funding types. About half of the youth in our sample would not have had access to DBT at the index facility unless their participation in the program had been paid through a specially acquired private foundation grant, which aimed to make best practices available to needy youth who were without the requisite insurance. Grant-funded youth were on Medicaid or were eligible for Medicaid based on their families' income level. Not surprisingly, treatment utilization is often affected by insurance type since having certain types of insurances determines in part access to particular types of treatments. This program controlled for funding type by providing equal access to all youth meeting clinical eligibility criteria. Therefore, unless other moderating factors are at play, one would expect equal outcomes for both groups. This was indeed confirmed. Regardless of funding type, youth reported significant improvement in clinical functioning between pretest and posttest across all measured domains, including self-reported self-injury. We also did not find differences with regard to admission to inpatient psychiatric care while in the DBT program. Findings thus suggest that youth from higher risk backgrounds can similarly benefit from DBT if given equal access to the treatment.

However, study findings also suggest that youth who were in the grant-funded group were at higher risk for not completing treatment. When testing the moderating effect of Discharge Reason (i.e., graduation versus withdrawal), main effects for time (capturing changes between pretest and posttest) disappeared in four subscales (Somatic Subscale, Social Problems, Behavioral Dysfunction and Critical Items), and were visibly reduced in the remaining areas (Total Score, Interpersonal Relations, Intrapersonal Distress, and Item 21/

Self-injury). Discharge Reason also had main effects in several areas. Follow-up analyses on treatment completers showed amplification of results previously obtained for the intent-to-treat sample. Main effects for time were stronger, and covariates had a lessened impact. While these findings have to be treated with caution given bias related to the exclusion of missing data which included a higher percentage of non-completers, it is likely that effects in the determined direction would be even stronger had we had clinical data for all 154 youth who enrolled during the three years. In future analyses, multilevel modeling will be useful in not only examining trajectories of clinical during the course of treatment but to also address missing data. These preliminary findings related to treatment completion are not surprising, yet they underscore the importance and promise of success when completing treatment. They also demonstrate the vulnerability of the grant-funded group for withdrawing prematurely from DBT.

Reasons for premature withdrawal from this treatment program are unknown at this point. The literature demonstrates a high degree of non-responsiveness to CBT-based treatments among adolescents (Weisz, McCarty, & Valeri, 2006). There is also a sizable body of literature chronicling problems in engaging low-income youth and families referred for mental health treatment (McKay & Bannon, 2004). Low response and high attrition rates have prompted calls to examine mediators and moderators of effective mental health treatments (Weisz et al., 2006). The limited number of studies in this area along with work conducted on treatment engagement of youth and families receiving community-based mental health services show that a range of factors, involving youth clinical and nonclinical characteristics (Burns, Cortell, & Wagner, 2008; Garland et al., 2005), parental characteristics, perceptions and behaviors (Bannon & McKay, 2005; Brannan, Heflinger, & Foster, 2003) as well as sociocultural factors, such as poverty and stigma (Johnson, Mellor, & Brann, 2008) affect treatment engagement and continuity (Gopalan et al., 2010). Informal data from follow-up interviews with youth and families in our program suggest that transportation (e.g., long distances, gas prices) constituted a considerable challenge for many families. However, the identification of primary contributors to early withdrawal from this DBT program will need to be further investigated. Besides being at greater risk for early withdrawal from treatment, the grant-funded group had a substantially higher percentage of minority youth who also presented with an elevated risk factor score compared to private insurance youth. However, neither risk factor score nor race/ethnicity were statistically related to reason for discharge.

Limitations and Strengths

This was a naturalistic study with all its accompanying limitations. First, the overall effectiveness of DBT cannot be determined with certainty given the study's pre-experimental design. However, for purposes of investigating the question of interest we were able to compare DBT's effectiveness for two naturalistically derived groups. The two groups - grant-funded youth and private insurance youth - were similar on most variables, and in the three areas where differences were determined, statistical adjustment occurred, yielding two relatively comparable groups.

Secondly, given the "real life" nature of the data, the size of the sample used in these analyses was affected by missing data. While sensitivity analyses determined no differences between the eligible and analytic samples on almost all key variables, the higher rate of non-completers among youth who were not included in the analytic sample introduced bias and prompts a cautionary note about findings related to treatment completion. Missing data also affected the utility of parent-report clinical functioning scores.

Thirdly, the lack of comprehensive measures in several areas is a weakness in this early work. For instance, determination of clinical eligibility for DBT treatment was based on clinical judgment by trained clinicians about recent and/or current occurrences of DSH, not based on standardized assessment. While this is an area of needed attention for our program, it should be noted that many studies continue using single-item assessments of self-harm and that variability in the assessment of self-harm continues to be matter of much debate in the field (Jacobson et al., 2012). Standardized assessment should also include symptom severity inventories and provide detailed diagnostic information. Relatedly, indicators of risk were weak and incomplete as we had to rely on data collected as part of the clinical assessment process. Future studies should also expand the range of outcomes.

Finally, while the program followed Miller's adolescent version of DBT, some adaptations were made to facilitate implementation of the program into the intensive outpatient treatment setting likely affecting fidelity. Efforts have since been made to achieve fidelity of the model (e.g., piloting of coaching calls). Future work needs to focus on formally measuring treatment fidelity in accordance with DBT guidelines (Linehan, 1993b).

Despite these limitations, multiple strengths need to be noted. We were able to evaluate treatment effects for a comparably large sample of youth in DBT. The facility, which has a long and rich clinical and teaching tradition succeeded in implementing a new and complex treatment while administering a standardized protocol to evaluate its outcomes. By doing so, it responded to a community need while extending treatment to a group of high-risk adolescent patients who would have been unable to otherwise receive this treatment.

Conclusion

Results from this evaluation are encouraging, supporting DBT's effectiveness in improving clinical functioning for youth engaged in self-harm regardless of insurance type. Findings further suggest the need for efforts that will keep youth and their families engaged in treatment to prevent early withdrawal, and to examine determinants of treatment success, specific to DBT. The DBT program at the index site has experienced relative stability and growth since its inception while continuing to wrestle with issues of implementation in the face of real-world constraints. The prevalence of DSH among adolescents and communities' struggles to effectively respond to this problem provide great urgency for the implementation of effective treatments for DSH. However, much more remains to be learned about how to implement DBT into community mental health settings. DBT is a complex intervention with multiple salient treatment elements. While the need for more rigorous study designs is not questioned, findings from naturalistic studies, such as this, can be helpful in shaping the practice and research agenda for DBT.

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