

IMPLEMENTING AN INTERPERSONAL THEORY OF SUICIDE TREATMENT APPROACH TO
IMPROVE OUTCOMES IN SUICIDAL YOUTH

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IMPLEMENTING AN INTERPERSONAL THEORY OF SUICIDE TREATMENT APPROACH TO
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Suicide is the second leading cause of death among adolescents in the United States, with rates that have continued to increase over the past several years. Theoretical models of suicide have arisen in order to provide an organizing framework to better understand this phenomenon. Among them, the Interpersonal Psychological Theory of Suicide (IPTs; Joiner, 2005) has gathered significant empirical support. This theory proposes two interpersonal constructs that serve as a final common pathway to understanding suicidal ideation: thwarted belongingness and perceived burdensomeness. There has been limited translation of core themes of this theory to clinical care and there are few theory informed interventions present in the field of suicide prevention overall. We aimed to address this gap in the literature by intentionally targeting cognitions related to perceived burdensomeness with a series of novel interventions by conducting two separate studies. In Study 1 we first gathered information about the manifestation of perceived burdensomeness among suicidal adolescents from teens, their parents, and clinicians working with this population through a series of qualitative interviews. Results from these interviews indicated a need for an enhanced model of perceived burdensomeness highlighting potential mechanisms of change that may be harnessed during therapeutic interventions. Possible clinical interventions operating through these pathways were then developed for examination. In Study 2, a clinical trial was conducted in an intensive outpatient

program (IOP) administering evidence-based care for suicidal youth. Participants were 124 adolescents who completed measures on IPTS variables, depressive symptoms, and suicide risk at intake, discharge, and one-month follow-up. The control arm of the study consisted of the treatment provided by the unchanged IOP and the experimental arm added the study interventions to standard care. Results demonstrated that the intervention did not result in a significant difference in perceived burdensomeness or suicide risk between the control and experimental arms. However, there was a difference between groups on thwarted belongingness, with a greater drop in the experimental condition from intake to discharge. Furthermore, the study interventions indicated a small effect size on the majority of study variables. Feasibility and acceptability ratings from study clinicians were supplemented by qualitative exit interviews with parents and adolescents. Feedback gathered during this stage of the study provided support for several of the study interventions and endorsed them as worthwhile additions to the IOP. During exploratory analyses with a sample combining the experimental and control groups, results indicated that the pathway by which suicide risk changes from intake to discharge is through a change in perceived burdensomeness and depressive symptoms. From discharge to one-month follow-up, the pathway explaining a change in suicide risk includes both a change in thwarted belongingness and perceived burdensomeness with a change in depressive symptoms. This finding supports the notion of IPTS variables contributing unique variance to changes in suicide risk even when depressive symptoms are included in the model. Results also support the trend in the literature emphasizing the proximal role of perceived burdensomeness to suicide risk and capitalizing on the need to better target this construct in a clinical setting. This study adds to the literature by being the first to utilize the construct of perceived burdensomeness in clinical interventions for suicidal youth and effectively translating theory to clinical application.

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CHAPTER ONE

Introduction

STATEMENT OF THE PROBLEM

This dissertation aims to move the literature of intervention science forward by designing and testing novel interventions informed by the Interpersonal Psychological Theory of Suicide for use with depressed and suicidal adolescents. Theory informed interventions are extremely rare in the field of suicide prevention and are the next logical step when bridging the gap between theory and clinical practice. Successfully targeting specific mechanisms of change as identified by theoretical frameworks may strengthen already existing clinical strategies to decrease suicidal ideation and attempts. There are many potential approaches when applying theories of suicide to clinical care and as evidenced by a recent trend in the literature, efforts emphasizing the construct of perceived burdensomeness may be especially promising.

Suicide is one of the leading causes of death among adolescents (CDC, 2017) in the United States, second only to death by unintentional injuries, which claims the lives of more young people. Although there has been much research and thousands of studies on suicide risk factors, rates of death by suicide have not significantly fallen in the past 50 years (National Action Alliance for Suicide Prevention: Research Prioritization Task Force, 2014). Furthermore, attention has recently been drawn to the fact that most research studies have used participants endorsing suicidal ideation alone, which does not fully allow generalizability of findings to those who make suicide attempts (Klonsky et al., 2016). This discrepancy has supported previous calls to emphasize theoretical models of suicide to explain the different mechanisms relevant to suicidal ideation when compared to suicide attempts (Prinstein, 2008).

Many of these theories fall under the ideation-to-action framework that seeks to clarify the progression from thoughts of suicide to a lethal suicide attempt (Klonsky & May, 2014).

Popular among them is Joiner's Interpersonal Psychological Theory of Suicide (IPTS) which suggests a common final pathway through which all risk factors must travel (Van Orden et al., 2010). This pathway is parsimonious, consisting of only three constructs: thwarted belongingness, perceived burdensomeness, and acquired capability (Joiner, 2005). Thwarted belongingness is characterized by an unmet need for connection with others, perceived burdensomeness consists of two components 1) self-hatred and 2) the belief that others would be better off if an individual were to commit suicide, and acquired capability is the ability to overcome the biological drive to survive and make an attempt to end one's life. The theory suggests that high levels of thwarted belongingness and perceived burdensomeness are associated with suicidal ideation and elevated acquired capability is the necessary component to transition to making a suicide attempt. Unlike thwarted belongingness and perceived burdensomeness which are primarily viewed as malleable cognitions, acquired capability is conceptualized as a stable trait that is built up by exposure to painful and provocative events (Van Orden et al., 2010).

While traditionally studied in adults, the IPTS has also demonstrated applicability in samples of clinical adolescents (Horton et al., 2015). Longitudinal research has further supported use of the IPTS in this population, indicating that thwarted belongingness and perceived burdensomeness drop with suicidal ideation over time when being tracked during the course of treatment in an intensive outpatient program for suicidal adolescents (King et al., 2017). In addition, this study also found that of the two constructs, thwarted belongingness dropped more than perceived burdensomeness yet it was perceived burdensomeness that explained more variance in suicidal ideation. This is consistent with a trend in the research emphasizing the role

of perceived burdensomeness over thwarted belongingness in the relationship to suicidal ideation (Hill & Pettit, 2014; Ma et al., 2016).

A recent review identified the clear gap in the literature around the lack of integration between theory based research and clinical interventions (Zullo et al., in review). Much work has been done demonstrating the fit of theoretical models in a variety of populations but relatively little has been done adapting these findings in order to improve patient care. An exception to this is a study by Hill and Pettit (2016) piloting an intervention targeting perceived burdensomeness among community adolescents. This online intervention was successful in lowering levels of perceived burdensomeness but not suicidal ideation.

This dissertation seeks to address the dearth of theory informed clinical interventions for suicidal adolescents. It also serves to continue to build upon the existing longitudinal IPTS research among youth populations to solidify validity of the model. Thus, the first aim of the current study is to design and test a novel set of interventions informed by the IPTS in a clinical sample of depressed and suicidal youth to decrease levels of perceived burdensomeness and suicidal ideation. The second aim is to replicate and extend previous research examining the stability of IPTS variables over time following treatment at an IOP when also considering depressive symptoms and suicidal ideation by adding an additional time point of a one month follow-up.

CHAPTER TWO

Review of the Literature

INTRODUCTION

Terminology

One of the first barriers when integrating results from various studies on suicide is the lack of consistent terminology used to describe acts of self-harm. Phrases such as “suicidal behavior” and “suicidality” lack specificity and often have differing definitions across studies. Suicidal ideation consists of thoughts or desires to die or end one’s life. A suicide attempt is an act taken with the intent to end one’s life, regardless of actual medical lethality. Non-suicidal self-injury (NSSI) is the intentional act of damaging one’s bodily tissue but without the wish to die (Posner et al., 2007).

Prevalence

Suicide is currently the second leading causes of death among adolescents in the United States (CDC, 2017). Suicidal ideation among this age group had been decreasing up until 2009, at which point the trend started to reverse. In 2015, 17.7% of high school students reported that they had seriously considered attempting suicide over the course of the year, 8.6% attempted suicide, and 2.8% made a suicide attempt that required medical attention (Kann et al., 2015). Suicide attempts are most likely between the ages of 16 and 18, with elevated risk continuing into the early 20s (Nock et al., 2008). Prior to puberty, death by suicide is an uncommon event (World Health Organization, 2012). For every adolescent death by suicide in the United States, there are 100-200 non-lethal adolescent suicide attempts (Moskos, Achilles, & Gray, 2004).

Biological Factors

Adolescence is a key developmental period for several cognitive and neurological processes that affect an individual’s ability to cope effectively in times of stress. Specifically, the

prefrontal cortex, which enables cognitive control, has not yet fully developed (Ernst et al., 2005). This is in contrast to the fully developed subcortical limbic system, which processes emotional stimuli (Galvan et al., 2006). This dissonance leads to increased emotional reactivity and risky behavior, including suicide attempts (Casey & Jones, 2010). Combined with a lack of life experiences through which to learn and practice adaptive coping skills, adolescents subsequently are less well equipped and more biologically vulnerable than adults during crisis scenarios. Recent research has also implicated the regions of the brain known as the default mode network in suicide risk (Zhang et al., 2016). Zhang and colleagues (2016) have demonstrated that abnormalities in these structures appear to be linked to suicide attempts among adolescents.

Demographics

It is well established that while adolescent girls are both more likely to experience suicidal ideation and make suicide attempts than boys, adolescent boys are more likely to die by suicide than girls (Gould et al., 2003, Spirito & Esposito-Smythers, 2006). In 2015, 23.4% of high school girls seriously considered making a suicide attempt and 11.6% made a suicide attempt. In contrast, 12.2% of high school boys considered making a suicide attempt and 5.5% made a suicide attempt (Kann et al., 2015). Suicidal ideation has been shown to decrease slightly over the course of high school (18.2% of 9th grade students compared to 16.3% of 12th grade students), similar to the prevalence of suicide attempts (9.9% of 9th grade students compared to 6.2% of 12th grade students). Hispanic youth have been shown to report higher rates of suicidal ideation and attempt than their white or black peers (Kann et al., 2015) while Asian-American adolescents have the highest rates of suicidal ideation and attempts when compared to other ethnic and racial groups (Vander Stoep et al., 2009). Lesbian, gay, bisexual, and transgender

adolescents have also been found to have higher rates of suicide attempts than their heterosexual peers (Mustanski & Liu, 2013.)

Risk Factors

The most common risk factor for a suicide attempt is a preexisting psychiatric disorder. Over 90% of individuals who die by suicide have been found to have a psychiatric diagnosis (O'Connor & Nock, 2014). Depression and bipolar disorder are tied most closely to suicide attempts (Bridge et al., 2006). Additionally, there exist a great many stressors unique to childhood such as bullying, abuse, and divorce that have been linked to suicide attempts (Bruffaerts et al., 2010; Stein et al., 2010). A large study of high school students indicated that the most salient factor in distinguishing youth who made a suicide attempt and those who did not was non-suicidal self-injury (NSSI) (Taliaferro & Muehlenkamp, 2014). This is in contrast to earlier research that stated the strongest indicator of future suicide attempts is a prior suicide attempt, increasing the chances by 10-60 times, with the highest risk occurring 3-6 months after a suicide attempt (Brent et al., 1999; Shaffer et al., 1996). At the same time, adolescents are more likely to die on their first suicide attempt than during subsequent attempts.

Other risk factors include substance use, especially cigarette smoking for males, dating violence victimization, a history of running away from home, lack of parental connectedness, and poor academic functioning (Taliaferro & Muehlenkamp, 2014). Health complications have also been linked to suicidal ideation and attempts (Scott et al., 2010), as well as stressful life scenarios such as low socioeconomic status and poor social/family support (Kposowa, 2001; Wagner et al., 2003). Internal risk factors include personality styles that often have overlapping qualities with depressive patterns, including neuroticism, impulsivity, perfectionism, low self-esteem, and hopelessness (Bridge et al., 2006). Family history of suicide places adolescents at an

increased risk for a suicide attempt, as well as parent psychiatric diagnoses (Agerbo et al., 2002; Gould et al., 1996). In terms of imminent triggers for a suicide attempt among adolescents, it has been demonstrated that interpersonal loss and conflict is especially devastating to this age group (Brent et al., 1999).

Emotion dysregulation and impulsivity among adolescents can lead to risky behaviors such as reckless driving, unprotected sex and/or multiple partners, and substance abuse, all of which are also associated with suicide attempts (Romer, 2010). Due to the biological underpinnings of these traits, adolescents can therefore be at an increased risk for these behaviors solely because of their current developmental stage.

Theories of Suicide

The vast number of risk factors for suicidal ideation and attempts necessitate an organizing framework to best conceptualize this phenomenon. Many theories of suicide have arisen to meet this need, and several fall in the category of a diathesis-stress model (O'Connor & Nock, 2014). Diathesis-stress frameworks posit that pre-existing vulnerabilities can make individuals more susceptible to stressors, leading to the activation of a psychiatric disorder. Examples include the cognitive model of suicidal behavior (Wenzel and Beck, 2008), the integrated motivational-volitional model of suicidal behavior (O'Connor, 2016), and the clinical model of suicidal behavior (Mann et al., 1999). Other theories operate from the ideation-to-action framework and aim to explain the evolution of suicidal ideation into a suicide attempt (Klonsky & May, 2014). Theories of suicide allow for identifiable treatment targets for use in clinical settings, supported by a proposed mechanism of change.

Popular among the ideation-to-action theories is the Interpersonal Psychological Theory of Suicide (IPTS) created by Thomas Joiner (2005). This theory proposes that three core

constructs are at the heart of suicidal ideation and attempts: thwarted belongingness, perceived burdensomeness, and capability for suicide (Van Orden et al., 2010). Thwarted belongingness and perceived burdensomeness load into suicidal ideation and capability for suicide allows an individual to act on these cognitions and make a lethal suicide attempt (Joiner, 2005). One of the strengths of this theory is its parsimony and ability to condense a range of risk factors into a final common pathway (Van Orden et al., 2010). There is an abundance of empirical support for the IPTS in adults, across a variety of populations (examples include Davidson et al., 2011; Davidson et al., 2010; Gauthier et al., 2014; Hill & Pettit, 2012; Van Orden et al., 2008).

Thwarted belongingness draws inspiration from Baumeister and Leary (1995)'s description of a "need to belong" that is central to the human desire for social connectedness. The concept of social isolation being associated with suicidal ideation and attempts has significant empirical support in a variety of populations (Joiner & Van Orden, 2008; Dervic et al., 2008). Thwarted belongingness as a construct has two dimensions: 1) loneliness, or the feeling that one has too few social connections and 2) a lack of reciprocally-caring relationships, which is defined as when an individual cares for another person, and this sentiment is then returned (Van Orden et al., 2010). Thwarted belongingness varies in intensity, with only the highest levels translating into suicidal ideation.

Perceived burdensomeness is based on how specific variables such as unemployment and family conflict have a strong association with suicidal ideation and have the common theme of individuals feeling as if their loved ones would be better off without them. Like thwarted belongingness, this construct also has two components: 1) a strong belief of self-hatred and 2) feelings of being a liability to the point where others would benefit from one's death (Van Orden et al., 2010). Of particular note is that this part of the IPTS cites previous theories of suicide that

are specific to youth populations, including Sabbath's family systems theory of adolescent suicidal ideation and attempts (1969) that emphasizes the cognition some adolescents have of being an "expendable" member of the family. This maps onto perceived burdensomeness well, as the core tenant of this theory is the mistaken belief that an adolescent's family would be better off if the adolescent were to commit suicide.

There has been a recent trend in the literature to study perceived burdensomeness over thwarted belongingness due to its stronger relationship to suicidal ideation (Hill & Pettit, 2014; Buitron et al. 2016). Previous findings have demonstrated that perceived burdensomeness has significantly predicted suicidal ideation in cross sectional studies after controlling for other risk factors in a sample of outpatient adults (Van Orden et al., 2006) and in patients receiving care for chronic pain (Kanzler, et al. 2012). In fact, when looking at a clinical sample of adolescents, thwarted belongingness dropped more than perceived burdensomeness over the course of an intensive outpatient program while perceived burdensomeness explained more variance in suicidal ideation (King et al., 2017).

The third component of the IPTS, capability for suicide, is the ability to overcome the fear of death and make a suicide attempt. In addition to a reduced fear of death, individuals must also habituate to pain through repeated exposures to painful and provocative experiences such as abuse, NSSI, and previous suicide attempts (Van Orden et al., 2010). The theory then suggests that these events increase a person's tolerance to pain, reducing the likelihood that the pain associated with a suicide attempt is viewed as an insurmountable obstacle (Joiner, 2005).

Capability for suicide is different from thwarted belongingness and perceived burdensomeness in that it is associated with suicide attempts, not suicidal ideation, and is conceptualized as a stable trait that once elevated, does not go down (Van Orden et al., 2010).

Capability for suicide is also unique in that various populations such as military personnel and firefighters have been demonstrated to have higher levels of this construct due to experiences in their line of work (Bryan et al., 2010; Chu et al., 2016). While suicide attempts are more common in these populations, the other two components of the IPTS are still necessary and studies have been done to understand the influence of vocational stressors in these samples (Selby et al., 2010).

There is growing evidence for the application of the IPTS among adolescents. At this time, there have been studies on each of the three components of the model in adolescent populations (Stewart et al., 2015). However, a key limitation of these studies has been that analyses of IPTS variables has been done using proxy measures, instead of directly using the Interpersonal Needs Questionnaire (INQ) that was developed specifically for the IPTS (Van Orden et al., 2010). Because one of the strengths of the IPTS is that it is meant to account for all risk factors, this approach undermines the final common pathway of the model by using only one risk factor. Fortunately, recent research (Horton et al., 2015; King et al., 2017) has addressed this issue by utilizing the INQ and the IPTS has been demonstrated to have utility in understanding suicidal ideation and attempts among clinical adolescents. Both of these studies have also demonstrated that perceived burdensomeness has a stronger relationship than thwarted belongingness with suicidal ideation in adolescent populations. Furthermore, Stewart and colleagues (2015) noted in their review that the current literature on the IPTS in adolescence has the most evidence for acquired capability, leaving room for additional research on thwarted belongingness and perceived burdensomeness.

Evidence-Based Interventions

There have been several reviews documenting the various evidence-based treatments for suicidal youth. Ougrin and colleagues (2015) noted that randomized controlled trials with the largest effect sizes utilized dialectical behavioral therapy, cognitive-behavioral therapy, and mentalization-based therapy. Brent and colleagues (2013) described potential “active ingredients” of effective therapies as those that utilize motivational interviewing techniques, promote healthy sleep hygiene, and increase family support. Treatments have spanned various settings such as the emergency department (e.g. Rotheram-Borus et al., 2000; Asarnow et al., 2011; Wharff et al., 2012), outpatient care (Huey et al., 2004; Esposito-Smythers et al., 2011; Asarnow et al., 2017), inpatient units (Katz et al., 2004; Kennard et al., 2017), and even interventions delivered via post card (Carter et al., 2007).

Theory Informed Interventions

Despite there now being substantial research on theories of suicide, little work has been done to translate this information into theory informed interventions for adolescents. In a review of clinical trials developing interventions for suicidal adolescents, Zullo & Hughes (in review) observed that suicide specific theories are not routinely cited in an explicit manner in the description and discussion of treatment options. Several more general psychological theories were instead highlighted and subsequently applied to suicide. The vast number of psychological theories emphasized the role of the family and social environment when addressing suicidal thoughts. These organizational frameworks included social-ecological theory (Huey et al., 2004; Asarnow et al. 2015), social learning theory, and family systems theories (Asarnow et al., 2011; Wharff et al., 2012).

Attachment-based family therapy developed by Diamond and colleagues (2010) for depressed and suicidal adolescents was one of the few treatments to emphasize a strong grounding in theory. The authors discuss how the basis of the therapy is in attachment theory, structural family therapy, and emotion focused therapies (Ewing et al., 2015). Additionally, Ewing and colleagues (2015) explicitly connect quality of family functioning with the IPTS variables of thwarted belongingness and perceived burdensomeness and make the argument that attachment-based family therapy may work through this model of suicide. However, these constructs are not the focus of attachment-based family therapy, as the therapy primarily targets “ruptures” in attachment within family systems (Ewing et al., 2015).

A study by Hill and Pettit (2016) marked the first instance of a clinical intervention that was designed specifically to address the key constructs of the IPTS with an adolescent community sample. The web intervention, titled LEAP (Learn, Explore, Assess Your Options, and Plan), targeted perceived burdensomeness through a variety of online modules. The first module, Learn, provides psychoeducation on the cognitive behavioral model and demonstrates the relationship between thoughts, feelings, and behaviors through a series of vignettes. This module also includes examples of perceived burdensomeness and related cognitions. In the Explore module, the adolescents identify the different contexts where they feel like a burden and then choose an individual who causes them to feel most burdensome. At this point, participants then list the ways in which they feel they burden this person and ways in which they contribute to the life of this individual. The adolescents are also asked to rate the intensity and frequency of feeling like a burden during this module. The third module, Assess Your Options, uses vignette examples to teach teens about how perceptions of being a burden can sometimes be inaccurate. After the vignettes, adolescents are given the opportunity to brainstorm how they might speak

with the individual to whom they feel they are a burden and list ways they might be able to contribute to this person's life. Participants are asked to rate these activities on likelihood of completion. In the final phase, Plan, adolescents choose two activities to complete that will assist them in challenging thoughts of being a burden and are asked to identify specific dates, times, and places to encourage follow through. The LEAP program is completed twice, with a week in between each round and takes 20-30 minutes to complete.

The results of the study indicated that the adolescents who completed all components of the LEAP intervention experienced significantly reduced levels of perceived burdensomeness after finishing the online program. At the six week follow up, participants in the control group also reported reduced perceived burdensomeness, thwarted belongingness, and depressive symptoms. At neither time point did teens report significantly reduced suicidal ideation. The authors in this study primarily attributed this to the fact that the sample used was a cohort of community adolescents and no criteria related to suicidal ideation or attempts were required for inclusion.

The present study seeks to improve upon this past research in several critical ways: 1) the utilization of a clinical sample from an IOP for depressed and suicidal adolescents 2) an initial qualitative study conducted using graduates of the IOP, their parents, and therapists, where potential interventions targeting perceived burdensomeness are discussed for acceptability and effectiveness 3) a prominent family component where parents are included in the interventions administered.

CHAPTER THREE

Study 1: Qualitative Interviews

Prior to conducting the clinical trial testing novel interventions targeting perceived burdensomeness, the study team reviewed the literature to identify any components of previous studies that may be applicable to the current study. After an initial brainstorming phase, possible new and adapted interventions were compiled into a binder to be used during the qualitative interviews.

Five clinicians who work with depressed and suicidal youth were interviewed for the first round of qualitative interviews. The initial questions assessed for whether or not cognitions related to perceived burdensomeness were something that were recognized by these providers. All participants were aware of these thoughts as being prominent among depressed and suicidal adolescents. Interviewers queried as to the manifestation of perceived burdensomeness in this population and the relationship these cognitions have with suicidal ideation. Clinicians were asked about the dynamic relationship these thoughts had with both external and internal factors and what clinical skills were utilized to limit their negative influence on patients.

In the second half of the clinician interviews, participants were shown the binder where the trial interventions were described. Interviewers engaged the providers on the anticipated feasibility and utility of the proposed interventions, discussing any potential barriers. Clinicians were also given the chance to propose their own suggestions or modifications to the interventions targeting perceived burdensomeness.

Five adolescents who had completed the IOP or received care at the Inpatient Psychiatry Unit at Children's Medical Center at Dallas were interviewed by a member of the study team for the second round of interviews. Interviews lasted approximately 45 minutes and began with brief psychoeducation on the CBT triangle of thoughts, feelings, and behaviors. As the teens had

finished the IOP, this information served as a review and primed the participants to distinguish the different ways perceived burdensomeness affected their functioning. Topics covered during the interview included past and current experiences with cognitions related to perceived burdensomeness, specifically whether or not others would agree with the teen's assessment of being a burden, what causes the teen to feel like a burden, and a rating of how intensely the adolescent perceived being a burden, on a scale from 1 (not at all a burden) to 5 (very much a burden). In addition to elements that contributed to feeling like a burden, protective factors were also assessed and teens were asked about what helps with these cognitions and what coping skills they have utilized when being bothered by these thoughts.

Interviewers were careful to be aware of an adolescent's affective state during these interviews and explicitly asked for mood ratings at regular intervals due to the potentially upsetting themes in the questions. To address this, the final questions in the interview asked about a teen's strengths and ways the teen contributes to the lives of others. The conclusion of the interview highlighted how teens can regulate their mood by thinking in a negative or positive manner and allowed the interviewer to briefly provide cognitive restructuring if necessary.

The third round of interviews took place with five parents of adolescents who completed the IOP. Similar to the adolescent interviews, questions first assessed for whether cognitions related to being a burden were something that had been present when their child has been receiving treatment. In all interviews this concept was immediately recognized and the subsequent questions identified how these thoughts had affected their child, what increased and decreased these cognitions, and any strategies they had employed to help their child cope with this perception.

All interviews were audio recorded, transcribed, and later coded with the assistance of a qualitative expert. The software NVivo 10.0 (QSR Australia) was used to organize all coded material in a manner that is easily accessible for analysis. Content from transcripts were sorted into seven main headings, called parent nodes, and thirteen subheadings, titled child nodes. The codebook used consisted of the following nodes: Questionable, Nugget, Perception of Perceived Burdensomeness (Recognize Perceived Burdensomeness-Applicable to Child, Recognize Perceived Burdensomeness-Not Applicable to Child), Influences of Perceived Burdensomeness (Make Perceived Burdensomeness Go Down, Make Perceived Burdensomeness Go Up), Experience of Perceived Burdensomeness (Emotions, Behavior, Cognitions, Parent Opinion of Perceived Burdensomeness), Skills and Directions (Self-Coping Skills, Clinician Strategies, Clinician Intervention Feedback, Clinician Intervention Concerns, Parent Strategies), and Spirituality.

Three members of the study team participated in the coding process. The first three transcripts were coded by all three researchers, who discussed any differences in coding in order to calibrate to one another. The remaining twelve transcripts were coded by two members of the study team each, who met afterwards to reconcile any differences in coding.

After all transcripts had been coded, the information obtained from the qualitative interviews was incorporated into finalizing the interventions to be tested during the clinical trial.

METHODOLOGY

Participants

Participants for this study were 5 adolescents (ages 12-17) who completed the Suicide Prevention and Resilience at Children's (SPARC) Intensive Outpatient Program (IOP) or received care at the Inpatient Psychiatry Unit at Children's Medical Center at Dallas, 5 parents of adolescents who completed the SPARC IOP or received inpatient care, and 5 clinicians who treat depressed and suicidal adolescents.

Inclusion:

- 1) For adolescents: completed SPARC IOP or received inpatient care within 1-2 months, English-speaking
- 2) For parents: have a teen who completed SPARC IOP or received inpatient care within 1-2 months, English-speaking
- 3) For clinicians: treat depressed and suicidal adolescents, English-speaking

Exclusion: None

Procedures

Semi-structured qualitative interviews were conducted with three distinct samples: adolescents who completed the Suicide Prevention and Resilience at Children's (SPARC) Intensive Outpatient Program (IOP) or received care at the Inpatient Psychiatry Unit at Children's Medical Center at Dallas, parents of adolescents who completed the SPARC IOP or received inpatient care, and clinicians who treat depressed and suicidal adolescents.

The interviews lasted 30-45 minutes and were recorded for transcription. Once transcribed, interviews were coded by the study team using a codebook developed with the assistance of a qualitative expert. Initial transcripts were coded by three members of the study

team, who later reconciled any discrepancies. Once calibration had been achieved, two members of the study team coded each transcript and met to ensure consistency in coding. The software NVivo 10.0 (QSR Australia) was used to organize all coded material in a manner that is easily accessible for analysis.

RESULTS

Participant Demographics

A total of fifteen individuals participated in the study interviews (five adolescents, five clinicians, and five parents of adolescents). Of the five adolescents (mean age = 14.2 years), three were girls (60%), two had made suicide attempts (40%), four had private insurance (80%), and all were non-Hispanic and White from a primarily urban setting. All parents were non-Hispanic and White, four were women (80%), and had a mean age of 46.2 years. Of the five clinicians, three had PhDs in clinical psychology, and two were licensed professional counselors with master's degrees.

Recognition of Perceived Burdensomeness

When asked about whether or not they have had thoughts about making life harder for other people, all adolescents immediately recognized the concept of perceived burdensomeness and indicated they have felt like a burden to others over the course of their treatment. Similarly, parents of teens were quick to acknowledge the role of perceived burdensomeness and were aware of its influence on their child. When explicitly asked about the presence of thoughts of being a burden, parents were able to readily give examples (Table 3, Initial Reactions to Perceived Burdensomeness, quotations 1-5). Clinicians also noted the widespread frequency of this cognition among their patients (Table 3, Initial Reactions to Perceived Burdensomeness, quotations 6-10).

All parents strongly disagreed with the concept of teens being a burden, often with an emotionally charged response (Table 3, Parent Opinion of Perceived Burdensomeness, quotations 1-5). Parents drew attention to the notion that while the current demands of treatment are objectively challenging, this does not indicate that an adolescent is unwanted or that they are

unwilling to support their child (Table 3, Parent Opinion of Perceived Burdensomeness, quotations 6-9). Parents also noted that directly telling their adolescent that they are not a burden is often not effective in successfully managing these cognitions. Instead, messages from peers or participating in charitable acts has appeared more helpful (Table 3, Parent Opinion of Perceived Burdensomeness, quotations 10, 11). Some parents were even able to focus on the positives of being in treatment and expressed happiness that this experience has allowed for increased time with their child (Table 3, Parent Opinion of Perceived Burdensomeness, quotation 12).

Manifestation of Perceived Burdensomeness in Adolescents

The majority of adolescents reported isolating themselves from others when feeling as if they are a burden (Table 4, Experience of Perceived Burdensomeness-Behavior, quotations 1-3). Clinicians noted that this behavioral withdrawal was a barrier to teens reaching out to their support systems during a crisis. Teens reported how their withdrawal also inhibited willingness to practice coping skills on their own (Table 4, Experience of Perceived Burdensomeness-Behavior, quotations 4-6). In contrast, a subset of adolescents and clinicians also endorsed teens seeking out excessive reassurance in order to confirm with support figures that they are not a burden (Table 4, Experience of Perceived Burdensomeness-Behavior, quotations 7, 8).

Adolescents often endorsed feelings of being a burden or thoughts of self-hate in an explicit manner. Parents agreed that these themes could be easily observed in their teens (Table 4, Experience of Perceived Burdensomeness-Cognitions, quotations 1, 2). As reported by clinicians, adolescents who perceive themselves as a burden to others endorsed common negative cognitive distortions about the self (Table 4, Experience of Perceived Burdensomeness-Cognitions, quotations 3-5). Adolescents described how entrenched the thoughts of being a burden were for them (Table 4, Experience of Perceived Burdensomeness-Cognitions, quotation

6). Thoughts of being a burden also tended to wax and wane with varying intensity (Table 4, Experience of Perceived Burdensomeness-Cognitions, quotation 7). Adolescents and clinicians described how thoughts around being a burden manifested differently at times, with varying categories in which teens felt they may be inconveniencing others (Table 4, Experience of Perceived Burdensomeness-Cognitions, quotations 8-11).

Guilt was the most prominent emotion triggered by thoughts of being a burden. Teens also reported increased anxiety, stress, and sadness when feeling that they are burdening others (Table 4, Experience of Perceived Burdensomeness-Emotions, quotations 1-5).

Influences Upon Intensity of Perceived Burdensomeness

Adolescents reported awareness of the cost of treatment, both in terms of finances and in time demands, and identified this as contributing to their perceived burdensomeness. Parents and clinicians validated that these factors increased a sense of being a burden in teens (Table 5, Factors Increasing Perceived Burdensomeness, quotations 1-5). Teens also described feeling like an emotional burden on others, especially when needing to repeatedly rely on the same set of support figures. Clinicians noted how these thoughts were connected to the act of reaching out for emotional support (Table 5, Factors Increasing Perceived Burdensomeness, quotations 6-8). Some adolescents felt distress related to the idea of their psychological symptoms limiting their ability to engage in everyday tasks, thereby burdening others who must complete these tasks instead (Table 5, Factors Increasing Perceived Burdensomeness, quotation 9). Thoughts of being a burden were also generalized to events that are not traditionally viewed as inconveniencing others, such as eating food (Table 5, Factors Increasing Perceived Burdensomeness, quotations 10, 11).

Adolescents clearly identified the importance of messages they received from their support figures as most critical to reducing thoughts of being a burden (Table 5, Factors Decreasing Perceived Burdensomeness, quotations 1-3). Recognition of the treatment progress that has been made was specified as being helpful to alleviate thoughts of being a burden (Table 5, Factors Decreasing Perceived Burdensomeness, quotations 4-7). The act of caring for others and contributing to the lives of other people was also reported to reduce these feelings (Table 5, Factors Decreasing Perceived Burdensomeness, quotations 8-10).

DISCUSSION

This study appears to be the first to elucidate perceived burdensomeness among suicidal adolescents using qualitative methods. As such, it fills a critical gap in the literature by demonstrating how theories of suicide may be relevant to different populations. Results can be used to guide and focus treatment targets for existing evidence-based care and create a bridge between theoretical models of suicide and clinical practice.

Findings indicated that perceived burdensomeness was a construct readily recognized by all participants. The most common behavior associated with thoughts of being a burden was for adolescents to isolate themselves, even during times when support was most needed. Domains where teens felt as they were burdening others included financial, time, and emotion related burdens. Cognitions of burdensomeness were primarily characterized by feelings of sadness and guilt. Adolescents identified positive messages from support figures as one of the most powerful factors decreasing perceived burdensomeness. Specifically, having treatment progress acknowledged by family members was noted to be helpful in reducing the strength of this cognition. At the same time, parents also noted that trying to directly counter a teen's belief of being a burden through verbal explanations was often not effective. Instead, messages from peers and allowing teens the opportunity to contribute to the lives of others in a meaningful way was observed to make a difference in the intensity of these thoughts.

Clinicians highlighted the importance of validating the adolescent's perspective of events and acknowledging the increased demands that have been placed on the family. However, they emphasized the need to distinguish between a demand and a burden for the teen to realize a parent's willingness to provide support. The suggestion was made for clinicians to facilitate

opportunities for the adolescent to gather evidence that contradicts the notion of being a burden and to strengthen communication with family members.

Through discussion, the investigative team developed a schematic derived from our findings that links treatment strategies to the different components of perceived burdensomeness. For instance, the self-hate part of perceived burdensomeness may be addressed in a manner similar to that used when restructuring negative cognitive distortions about the self (e.g. increasing a sense of mastery), with an emphasis on behavioral activation around contributing to the lives of others. On the other hand, the notion of being a liability may also stem primarily from maladaptive interactions with and messages received from the adolescent's environment, which may be targeted by interventions focusing on fostering healthy family communication. This conceptualization of perceived burdensomeness is depicted in Figure 1.

LIMITATIONS

There are several limitations to the current study. The sample size is fairly small and may limit generalizability of findings. The sample is also relatively homogenous in terms of sex, race, and insurance coverage of adolescents. As such, it would be beneficial for this study to be replicated with more diverse participants in order to determine if perceived burdensomeness may manifest differently based on demographic factors. In addition, the treatment modality administered to the adolescent participants drew primarily from cognitive-behavioral and dialectical-behavioral therapy. This might have influenced the responses given during the interviews and may have helped adolescents to be more aware of cognitive distortions around perceived burdensomeness. Findings are also limited to the construct of perceived burdensomeness and do not include the other two components of the IPTS.

FUTURE RESEARCH

Results indicate that the construct of perceived burdensomeness is a widespread and powerful cognition that is recognized as being present in the thoughts of suicidal adolescents by teens, parents, and clinicians. The field of adolescent suicide prevention may benefit from the development and testing of interventions tailored specifically to better manage high levels of perceived burdensomeness among at-risk youth.

This study may also provide a framework for the creation of future theory-based interventions. By utilizing qualitative methodology, researchers might better understand the nuances of theoretical models when studied in real-life clinical settings. The information gathered through this methodology could allow certain psychological theories to evolve in novel ways that support the further refinement of evidence-based care.

CHAPTER FOUR

Study 2: Clinical Trial

Location of Study

In November of 2013, Children's Medical Center of Dallas developed an Intensive Outpatient Program (IOP) for youth with suicidal behaviors. The Suicide Prevention and Resilience (SPARC) IOP provides evidence based, suicide specific treatment to teens with suicidal thoughts and behaviors. The program is modeled after one of the few known effective treatments for suicidal adolescents, the Cognitive Behavioral Therapy for Suicide Prevention (Stanley et al., 2009), with core components of Dialectical Behavioral Therapy as well. It is offered as an alternative to inpatient treatment or as step-down after stabilization as an intermediate step to less intensive outpatient care. To be eligible for the IOP program, teens (ages 12-18 years) require a recent suicide attempt or severe worsening of suicidal ideation warranting emergency services. Treatment is delivered for 4-6 weeks, primarily in a group format with the intention of enhancing coping skills and decreasing depressive cognitions with several different treatment modules. The four main components of SPARC are 1) three-hour teen group occurring twice each week, 2) 45-minute individual therapy sessions occurring once each week, 3) one-hour parent group occurring once each week, and 4) three-hour multifamily group occurring twice during the program. The program also includes medication management as needed. Discharge criteria are clinically assessed decrease in suicidal ideation and depressive symptoms, and improved coping skills. A significant reduction in depressive symptoms and suicidal ideation and behavior after treatment in this program was reported by Kennard and colleagues (2019). Prior to the current study, this effective program was not informed by the IPTS.

Design Rationale

A significant gap in psychological care is that most interventions both in the field and in clinical trials take an “omnibus” approach: address as many deficits and shore up as many protective factors as possible with an overall plan that emphasizes the outcome without emphasizing the importance of discovering “how” the outcomes change. All three programs that currently have been shown to be most promising in reducing adolescent suicidality (Bridge et al., 2014) have taken this kind of omnibus approach. This approach to developing an evidence base makes it difficult to enhance the effectiveness of programs, to use the most effective parts, or to inform other programs in different settings that want to selectively target specific mediators of the outcomes. There are several strategies to testing the value of a specific intervention component that include testing one component compared to another component, considering the effects of taking the component away from an omnibus program (“dismantling design”), or adding a component to an existing program and comparing the combination to the original program (“additive design”). In a recent meta-analysis, Bell and colleagues (2013) support the value of the additive design. As such, the clinical trial consists of the standard SPARC IOP functioning as the control arm and the IOP informed by the IPTS as the experimental arm.

As opposed to a laboratory setting with several exclusion criteria, this clinical trial takes place within an already functioning IOP for depressed and suicidal adolescents with few restrictions on study participation. A recent study by Weisz and colleagues (2015) criticizes the field of psychology for having an empirical base consisting of a mix of strategies that target many mediators which are typically delivered in artificial settings such as laboratories to highly selected participants. This study sought to overcome this limitation with its implementation in a real world IOP setting.

Description of Study Interventions

Consistent with the conceptualization of perceived burdensomeness described by Van Orden and colleagues (2010), the trial interventions targeted beliefs of self-hate and views of self as a liability to others through an enhanced clinical model of perceived burdensomeness (Figure 1). Tables 1 and 2 below outline study interventions and the associated mechanisms of change.

Table 1

Interventions Targeting Cognitions of Self-Hate

Intervention	Mechanism of Change
Pie Chart	Address Cognitive Distortions Surrounding Contributions to Others
Thanks Note to Parent	Increase Opportunities to Contribute to Others
Note to Incoming Teens	Increase Opportunities to Contribute to Others
Good Deed for Self/Others	Increase Opportunities to Contribute to Others and Value of Caring for Self
Values Identification and Activity Planning	Increase Opportunities to Contribute to Others and Sense of Mastery
Scale Diagram	Address Cognitive Distortions Surrounding Contributions to Others

Table 2

Interventions Targeting Cognitions of Self as Liability

Intervention	Mechanism of Change
Parent Psychoeducation on Perceived Burdensomeness	Decrease Negative Feedback From Environment
Thanks Note From Parents/Therapist	Increase Positive Feedback From Environment
Letter From Parents	Increase Positive Feedback From Environment
Graduation Notes to Teen	Increase Positive Feedback From Environment
Scale Diagram	Address Cognitive Distortions Surrounding Degree of Burden Imposed by Youth

Interventions Targeting Self-Hate

Pie Chart. Featured in a cognitive behavioral approach to treating adolescent depression (Kennard et al. 2016), the pie chart intervention invites an adolescent to map out their self-beliefs

in the form of different percentages or slices of a pie. The primary aim of this task is to gather information about potential cognitive distortions that may be impacting an adolescent's self-image and how prominent the effects of these thoughts are for a teen. Adolescents completed this intervention on the first and last sessions of the IOP to provide an opportunity to highlight the changes in cognitions over the course of the program.

Thanks Notes to Parent. Adapted from the SAFETY program by Asarnow and colleagues (2015), thanks notes are brief notes exchanged by parents and teens, expressing gratitude for one another's actions. In the context of reducing cognitions of self-hate, the goal of this intervention is to provide an opportunity for the adolescent to contribute to the life of their parent with a small act of kindness. Parents and adolescents were given the goal of exchanging thanks notes on a weekly basis.

Note to Incoming Teens. On the last day of the IOP, adolescents are asked to write a brief letter to be given to an incoming patient welcoming them to the program. Adolescents are then given the letters on their first day in the IOP to help them feel more comfortable interacting with the other adolescents. During this exercise, therapists remind teens how they found the note to be helpful when first joining the IOP and this is their chance to do the same for a peer.

Good Deed for Self/Others. Each teen group begins with a check in consisting of introductions and an icebreaker activity. This intervention asks adolescents to list something recent they have either done for themselves or another person. Group leaders regularly provide the rationale behind this activity and describe how depression can cause teens to neglect self-care and forget how they help others due to cognitive distortions. The emphasis is on small acts (ex. holding the door for another person) and in the event that a teen is unable to think of an example, group leaders facilitate activity planning for the upcoming week.

Values Identification and Activity Planning. Taken from Acceptance and Commitment Therapy (ACT; Hayes et al., 2006), values directed living is a key component of identifying a life worth living. The underlying premise of feeling as if one's actions are consistent with held values is a critical part of the ACT model and experiencing satisfaction with life.

In teen group, adolescents are given a list of values and are asked to select those that are important to who they are as people. Group leaders engage teens in a discussion on values directed living and describe how actions in line with one's values can lead to increased self-esteem. During individual therapy sessions, therapists guide adolescents through completing the ACT values bullseye activity (Harris, 2009). This exercise has teens list four core values and provide self-ratings on how consistent their behavior is with these values (ratings closer to the bullseye indicating value consistent behavior). For any discrepancies between values and actions taken, therapists encourage activity scheduling to close the gap between the two and assist teens in taking a step towards improving their sense of self-efficacy.

Scale Diagram. Drawing upon the basic CBT skill of listing arguments for and against a cognitive distortion (Beck, 2011), this exercise has adolescents examine the evidence for the belief that they are a burden to others. Group leaders introduce the activity by providing a vignette of a fictional teen who feels she burdens others in her life. Therapists use the figure of a scale to list ways the teen contributes to the lives of others on one side, and how she feels she burdens people on the other. The rationale for using the image of a scale instead of the basic listing of evidence on each side of the argument is to include the concept of quality vs. quantity. Specifically, group leaders engage the teens in a discussion of different actions "weighing" more and subsequently tipping the scale in one direction. The goal is to guide teens to the conclusion that even with several examples of how they feel they may burden others, a few examples of how

they contribute to others could easily matter more when determining an overall balance to the scale. This intervention applies to reducing both cognitions of self-hate and of self as a liability because it challenges the assumptions made on each side of the scale.

Interventions Targeting Self as Liability

A key difference in the approach to cognitions related to self-hate in comparison to those related to viewing the self as a liability is a focus on the external messages an adolescent receives from the environment. As the SPARC IOP incorporates significant family components, the primary targets for this set of interventions are the parents of the teen in treatment. Brent and colleagues (2013) have previously demonstrated the importance of involving the family when administering care to depressed and suicidal adolescents and this additional support has been established as a necessary part of treatment.

Parent Psychoeducation on Perceived Burdensomeness. Within the first week in the IOP, the clinicians meet with the parents of the adolescent to provide psychoeducation on perceived burdensomeness. The strategy in doing so is to initially evoke how these cognitions may manifest for each specific teen. If a parent struggles to understand the concept, examples are given such as a teen feeling that reaching out for support is an emotional burden. A discussion is had around how parents have attempted to manage these cognitions before and ways they might be able to modulate the messages they are sending to their teen that may make this perception worse.

Thanks Note From Parents/Therapist. Parents are instructed to write a thanks note to their teen on a weekly basis. This assignment is given after the psychoeducation around perceived burdensomeness and is framed as one way parents can help their teens with these cognitions. The content of the thanks notes is meant to emphasize ways the teens contribute to

the lives of their parents even in small ways (e.g. asking parent how day was at work) as a reminder that they are adding, rather than detracting from the lives of others.

Therapists also write thanks notes to teens after every individual therapy session, thanking them for something they did during teen group or during the individual session. During the qualitative interviews phase of the study, one of the interviewed clinicians related that some of her patients have expressed that they feel like they are a burden to her. This intervention is meant to directly target this belief by highlighting ways the adolescent is adding to group and individual therapy.

Letter From Parents. When adolescents are halfway through the IOP, parents are asked to write their teen a letter expressing how SPARC is a worthwhile investment despite the significant time commitment due to the progress the teen is making. It is also suggested that parents add a statement alluding to how they have enjoyed the additional time together in spite of the difficult situation. Parents are shown a template to model their letter after if necessary but are encouraged to use their own phrasing. This exercise is designed to remind the teens that their self-care is important and to alleviate any concerns that parents are upset or unduly burdened by the costs (financial and/or time) of the IOP.

Goodbye Notes to Teen. At discharge from the IOP, all of the adolescents in the teen group present that day are asked to write a brief note to the teen who has completed the program. The notes are written on a piece of paper for the teen to take with them when they leave and emphasize what the adolescent brought to teen group or what will be missed about their absence. This activity is meant to highlight that even in the context of an IOP, an adolescent has made valuable contributions to their peers and their presence will be missed.

Scale Diagram. See above for application to cognitions of self as liability.

Summary

The IPTS offers an explanation to one of the main questions in the field of suicide prevention: which thought processes lead a person to seriously consider making a suicide attempt? With an abundance of adult research and a growing body of literature with adolescent samples, the answer appears to include cognitions of thwarted belongingness and perceived burdensomeness. This notion has been demonstrated in both cross-sectional and longitudinal studies and now is transitioning into the realm of intervention science.

At this point, only one intervention study utilizing the IPTS has taken place. This used a sample of community adolescents to test an online web intervention targeting perceived burdensomeness. The results from the study indicated that this intervention was successful in lowering levels of perceived burdensomeness but not suicidal ideation. The present study takes place with a clinical sample in an IOP for depressed and suicidal adolescents. A precursor to the clinical trial was a study conducting qualitative interviews to better understand the manifestation of perceived burdensomeness in this population and to generate possible mechanisms of change to target.

This approach of an application directly into a real-world IOP setting readily demonstrates the clinical utility of novel interventions and the feasibility of implementing new components into an already functioning treatment program. Future studies aiming to translate theory into practice may benefit from considering the ways in which a construct differs between populations and subsequently the best ways to manage this factor.

PRIMARY AIMS AND HYPOTHESES

Aim I: To measure perceived burdensomeness and suicide risk over the course of treatment (i.e. from entry to discharge) to determine the effectiveness of the interventions being tested.

Hypothesis Ia: Levels of perceived burdensomeness will drop from entry to discharge and adolescents placed in the experimental group will improve significantly more than those in the control condition.

Hypothesis Ib: Suicide risk will drop from entry to discharge and adolescents placed in the experimental group will improve significantly more than those in the control condition.

Aim II: To measure depressive symptoms over the course of treatment (i.e. from entry to discharge) to determine the effectiveness of the interventions being tested.

Hypothesis II: Depressive symptoms will drop from entry to discharge and adolescents placed in the experimental group will improve significantly more than those in the control condition.

Aim III: To measure perceived burdensomeness, depressive symptoms, and suicide risk from entry to one-month follow up to determine the long-term effects of the interventions being tested.

Hypothesis IIIa: Perceived burdensomeness will drop from entry to one-month follow up and adolescents placed in the experimental group will improve significantly more than those in the control condition.

Hypothesis IIIb: Depressive symptoms will drop from entry to one-month follow up and adolescents placed in the experimental group will improve significantly more than those in the control condition.

Hypothesis IIIc: Suicide risk will drop from entry to one-month follow up and adolescents placed in the experimental group will improve significantly more than those in the control condition.

Aim IV: To measure suicide attempts between discharge and one-month follow up.

Hypothesis IV: The dichotomous outcome, presence/absence of suicide attempt during the one-month period following discharge will be an exploratory outcome. The frequency of this event is very low and the study will not be powered to detect differences.

METHODOLOGY

Participants

Inclusion:

- 1) Age 12 – 18 and school active
- 2) May be receiving any medication(s), other treatment(s), or none
- 3) English-speaking participants and their parents

Exclusion:

- 1) Concurrent mental retardation, active psychosis, neurological disorders that would impact ability to complete questionnaires
- 2) Concurrent acute substance/alcohol intoxication
- 3) Delayed more than two years from age-appropriate grade level
- 4) Dropped out of IOP prior to completion of five teen groups
- 5) Previously completed IOP

Procedures

This study collected interview and survey data on adolescents who presented for treatment at the Suicide Prevention and Resilience at Children's (SPARC) Intensive Outpatient Program (IOP) at three different time points for the purposes of evaluating a set of novel interventions targeting perceived burdensomeness.

The questionnaires administered at intake and discharge were already obtained for clinical purposes and assess Interpersonal Theory of Suicide constructs (Interpersonal Needs Questionnaire), depressive symptoms (Quick Inventory of Depressive Symptomology-SR-A-17), and suicide risk (Concise Health Tracking Self Report). Participants in the IOP provided consent to let researchers have access to these measures and to administer the measures via an online REDCap questionnaire at the one-month follow up sent through email. At the one-month follow

up, parents of adolescents also receive a telephone call in order to track care needed since discharge, and ask about the presence of suicide attempts since leaving the IOP. Upon completion of measures at the one-month follow up, participants were given a \$30 gift card.

The program is structured so that each patient consistently attends either a morning or an afternoon track, with different therapists running each track. This allows for separate programs in each track, reducing the likelihood of contamination from the experimental arm to the control arm. Thus, patients were not randomized at the individual level, but rather their time slot (usually made based on opening within the program) determined placement.

Measures

Perceived Burdensomeness and Thwarted Belongingness

Perceived burdensomeness and thwarted belongingness were measured by a refined version of the Interpersonal Needs Questionnaire (INQ, El-Behadli et al., 2018). El-Behadli and colleagues (2018) created a shorter version of the original INQ (Van Orden et al., 2012) using Item Response Theory with five items each measuring thwarted belongingness and perceived burdensomeness, for a 10-item INQ. Anchors were also collapsed into a four item Likert scale from 1 (“not at all true of me”) to 4 (“very true for me”). The sample used for scale development was a group of suicidal adolescents receiving care at the inpatient and outpatient level of care. Internal consistency was very strong for perceived burdensomeness ($\alpha = .94$) and thwarted belongingness ($\alpha = .90$).

Depressive Symptoms

The Quick Inventory of Depressive Symptomatology – Adolescent Version Self-Report (QIDS-A-SR-16; Bernstein et al., 2010) was used to measure depressive symptoms. The QIDS-A-SR-16 is a 16-item self-report measure designed to assess the severity of the nine core

symptoms of Major Depressive Disorder, as defined in the DSM-V, prompting adolescents to respond to items based on how they have been feeling the past week.

The QIDS-A-SR-16 has strong internal consistency ($\alpha = .84$) and acceptable reliability ($\alpha = .78$) (Haley, 2009). The 16-item QIDS-SR has been found to be comparable to measures of depression rated by clinicians ($\alpha \geq 0.8$) (Bernstein et al., 2010).

Suicide Risk

The Concise Health Risk Tracking scale Self-Report (CHRT SR; Trivedi et al., 2011) was used to assess suicide risk. In an adult clinical sample, this scale has shown excellent goodness of fit (.99) for the three-factor solution, consistent with the authors' design. The three factors have been used as sub-scales, and internal consistency reliability for all scales and the total score was reported as good to excellent ($\alpha = .77$ to $.92$) in a clinical adolescent sample (Mayes et al., 2017). A sub-scale of this measure (Active Suicidal Thoughts and Plans) consists of three items that are combined to serve as a measure of imminent suicide risk (Trivedi et al., 2011). The scale shows good discriminant validity, with highest associations with the Positive and Negative Suicide Ideation Inventory and the Hamilton Depression Rating Scale, and weak associations with a measure of medical comorbidity in a clinical sample of adults (Trivedi et al., 2011). This sub-scale has been previously used with clinical adolescent samples, and shows a relationship to depressive symptoms and IPTS variables both in cross-section and over time (King et al., 2017) providing initial evidence for construct validity.

The sub-scale of this measure to be used (Active Suicidal Thoughts and Plans) consists of three items that are combined to serve as the outcome measure of suicide risk. The three items are: 1) I have had thoughts of killing myself; 2) I have thoughts about how I might kill myself;

and 3) I have a plan to kill myself. The items are scored on a five point Likert scale from 0 (“*strongly disagree*”) to 4 (“*strongly agree*”).

Fidelity

All members of the study team met for a weekly hour-long case consultation where implementation of the trial interventions was discussed. Each team member administering the interventions used a checklist to keep track of which have been conducted with each adolescent in individual therapy. In addition, study clinicians rated themselves on how much each individual session focused on targeting cognitions of perceived burdensomeness. Self-ratings ranged from 1-10, with higher numbers indicating more time spent discussing perceived burdensomeness (i.e. 1 = a key strategy or concept was introduced but discussed for less than five minutes; 10 = clinician and patient worked on key strategy or concept for 40 minutes or more). These ratings were discussed with the rest of the study team and modifications were suggested when appropriate.

External ratings of teen groups were also conducted, both in the control and experimental arms of the study. The purpose of these ratings was to determine the level of intervention dose present in teen groups in the experimental arm and to also track any possible targeting of perceived burdensomeness that may be present in the control arm teen groups. Five teen groups in each study arm were rated, for a total of 10 teen groups. The rating scale was a slightly modified version of the one used for self-ratings in individual therapy sessions, with anchors adjusted for a three-hour teen group. Specifically, raters evaluated the amount of time spent on interventions targeting perceived burdensomeness during the teaching of new content. Teen groups are typically split into a review of previous content, recreational therapy, and new

content. The teaching of new content was most likely to contain interventions specific to cognitions of perceived burdensomeness and was therefore prioritized during group ratings.

Intervention Feasibility and Acceptability

Exit interviews were conducted with 20 adolescents and their parents during discharge from the SPARC IOP. Interviews lasted approximately 10-15 minutes in duration and asked the following open-ended questions: 1) What did you find to be most helpful about the SPARC IOP? 2) Did you notice any material in the SPARC IOP related to cognitions of perceived burdensomeness? 3) How did this material help you to manage cognitions of perceived burdensomeness? Participants were then asked about utility of study interventions. Interviews were audio recorded and analyzed for key themes.

Each study therapist (N = 5) was asked to provide quantitative and written qualitative feedback on the trial interventions. Rating options included 1 (low), 2 (medium), and 3 (high) to indicate levels of feasibility (logistical ease of implementation) and acceptability (contribution to treatment). Cutoffs consisted of average scores above 2.5 (ready for use), above 2 (use with edits), and below 2 (do not use).

RESULTS

The final sample consisted of 63 adolescents in the study arm and 61 adolescents in the control arm of the clinical trial. With data collected at three time points, baseline (Time 1), discharge (Time 2), and one-month follow up (Time 3), there were a total of 372 time points for data collection in the full study sample. Data were missing at 31 time points, for a total of 8% missing data. In the study arm, 56 participants had complete data, indicating 11% did not have measures for all three time points. In the control arm, 45 participants had complete data, indicating 26% did not have measures for all three time points. Two participants in the control arm turned 18 between discharge and one-month-follow up and were not able to be reached in order to obtain reconsent for analysis of Time 3 data. Full breakdown of data collection can be found in Figure 2. Multiple imputation (Jakobsen et al., 2017) was utilized in order to estimate the values of the missing data so that analyses could be conducted with a total sample size of 124 participants.

Differences between study group demographics were not significant when running a Chi Square Independence Test and Fisher's Exact Test. No systematic differences between groups on baseline measures were found when running an Independent Samples t-Test. Descriptive data and intercorrelations among study variables are presented in Tables 6, 7, and 8. Change was in the expected direction in both groups for all variables. The sample was primarily non-Hispanic Caucasian girls with a diagnosis of Major Depressive Disorder.

Primary Aims

Change in Perceived Burdensomeness and Suicide Risk Over the Course of Treatment

Two separate one-way ANCOVAs were conducted to examine the first aim, with age, sex, number of groups, and respective baseline (Time 1) measure included as covariates and

perceived burdensomeness (Time 2) and suicide risk (Time 2) as outcomes. There was no significant difference between the two intervention groups on change in perceived burdensomeness, $F(1, 118) = 2.04, p = .16$, Cohen's $d = .26$ (Table 4). There was no significant difference between the two intervention groups on change in suicide risk, $F(1, 118) = 1.08, p = .30$, Cohen's $d = .19$ (Table 9). Guidelines defined by Cohen (2013) describe effect sizes as small at .2, medium at .5, and large at .8. Therefore, the study intervention was close to achieving a small effect size on change in perceived burdensomeness and suicide risk from intake to discharge.

Secondary Aims

Change in Depressive Symptoms Over the Course of Treatment

A one-way ANCOVA was conducted to examine the second aim, with age, sex, number of groups, and baseline depressive symptoms (Time 1) included as covariates and discharge depressive symptoms (Time 2) as the outcome. There was no significant difference between the two intervention groups on change in depressive symptoms, $F(1, 118) = 1.07, p = .30$, Cohen's $d = .19$ (Table 9). The study intervention was close to achieving a small effect size on change in depressive symptoms from intake to discharge.

Change in Perceived Burdensomeness, Depressive Symptoms and Suicide Risk From Entry to One-Month Follow Up

Three separate one-way ANCOVAs were conducted to examine the third aim, with age, sex, number of groups, and respective baseline (Time 1) measure included as covariates and one-month (Time 3) perceived burdensomeness, depressive symptoms, and suicide risk as outcomes. There was no significant difference between the two intervention groups on change in perceived burdensomeness, $F(1, 116) = .25, p = .64$, Cohen's $d = .09$, depressive symptoms, $F(1, 116) =$

.02, $p = .90$, Cohen's $d = .03$, or suicide risk, $F(1, 116) = 2.41$, $p = .12$, Cohen's $d = .28$ (Table 10). The study intervention had a small effect size on change in suicide risk.

Difference in Suicide Attempts Between Discharge and One-Month Follow-Up

A binomial logistic regression was conducted to evaluate the fourth aim, with age, sex, past suicide attempt, and number of groups included as covariates. The frequency of this event was extremely low, with three suicide attempts in the control arm and two in the study arm.

Although not statistically significant, the logistic regression indicated that those who received the study intervention were less likely to have a suicide attempt at one-month follow up (OR = 0.56, 95%: 0.09 to 3.61, $p = 0.54$, AUC = 0.77) than those in the control arm (Table 11).

In summary, neither the primary or secondary aims of the study demonstrated statistical significance, although a small effect size on certain variables was observed.

Exploratory Analyses

1) What effect does the study intervention have on change in thwarted belongingness?

Despite not specifically targeting thwarted belongingness with the study intervention, we were interested in learning how this variable changed over the course of treatment depending on study group status due to its role as the other key cognitive construct in the IPTS. Thwarted belongingness and perceived burdensomeness were significantly correlated at all three time points, in both the intervention arm and control arm of the study (Intervention: T1 $r = .67$, T2 $r = .57$, T3 $r = .53$; Control: T1 $r = .59$, T2 $r = .60$, T3 $r = .48$, Table 8).

Two separate one-way ANCOVAs were conducted to replicate the second and third aims of the study with thwarted belongingness at Time 2 and Time 3 as outcomes. Age, sex, number of groups, and baseline (Time 1) thwarted belongingness were covariates for both ANCOVAs. There was a significant difference between the two intervention groups on change in thwarted

belongingness from intake (Time 1) to discharge (Time 2), $F(1, 118) = 5.33, p = .02$, Cohen's $d = .41$ (Table 12). The study intervention had a small to moderate effect size on change in thwarted belongingness at this time point.

There was no significant difference between the two intervention groups on change in thwarted belongingness from intake (Time 1) to one-month follow-up (Time 3), $F(1, 116) = 1.05, p = .31$, Cohen's $d = .19$ (Table 13). The study intervention was close to achieving a small effect size on change in thwarted belongingness at this time point.

2) What effect does the study intervention have on change in outcomes from discharge to one-month follow-up?

We were interested in learning if the effects of the study intervention persisted after completion of treatment. Four separate one-way ANCOVAs were conducted to explore the effect of the study intervention on change in outcome variables from discharge (Time 2) to one-month (Time 3). Covariates included age, sex, number of groups, and respective discharge (Time 2) measure. There was no significant difference between the two intervention groups on change in perceived burdensomeness, $F(1, 116) = .15$, Cohen's $d = .07$, thwarted belongingness $F(1, 116) = .10$, Cohen's $d = .06$, depressive symptoms, $F(1, 116) = .17$, Cohen's $d = .07$, or suicide risk $F(1, 116) = 1.41$, Cohen's $d = .22$ (Table 14). The study intervention had a small effect size on change in suicide risk at this time point.

3) What effect does the study intervention have on change in perceived burdensomeness from intake to discharge when controlling for change in thwarted belongingness?

We re-ran the one-way ANCOVA from the first aim of the study testing the intervention effect on change in perceived burdensomeness from intake (Time 1) to discharge (Time 2) while

controlling for change in thwarted belongingness. The rationale for this analysis was to determine if by removing the possible overlapping component of thwarted belongingness with perceived burdensomeness that was targeted by the study intervention, an effect on perceived burdensomeness may arise. In this ANCOVA, the effect of the study intervention was not significant, with a minimal effect size.

4) Does level of intervention dose predict change in outcome measures?

We were interested in whether the clinician self-rated intervention dose variable measuring amount of perceived burdensomeness targeted per session predicted change in outcome measures from intake (Time 1) to discharge (Time 2). Because it became apparent that we were instead targeting thwarted belongingness with our study intervention, we wanted to learn if the level of the intervention administered was therefore associated with change in other outcome variables.

Four separate hierarchical multiple regressions were conducted, using the intervention group sample only, to determine effect of intervention dose on change in perceived burdensomeness, thwarted belongingness, depressive symptoms, and suicide risk. Covariates included age, sex, number of groups, and respective baseline (Time 1) measure. Intervention dose was not found to be significant in predicting change in any of the four outcome variables.

5) Is treatment effect moderated by level of baseline measures?

Another area of interest was whether the treatment effect was moderated by level of baseline (Time 1) perceived burdensomeness, thwarted belongingness, suicide risk, or depressive symptoms. Four separate one-way ANCOVAs were conducted to explore possible moderation effects on change in outcome measures from baseline (Time 1) to discharge (Time 2). Age, sex, number of groups, and respective baseline (Time 1) measure were included as covariates.

Baseline measures were transformed into a dichotomous variable via a median split for an interaction with study group. No moderation effects were observed, indicating that level of baseline measures (high/low) did not influence change in respective outcome measure via interaction with study group.

6) What is the pathway by which suicide risk changes across time points in the overall study sample?

Our next question was to determine the pathway by which suicide risk changed from Time 1 to Time 2 and Time 2 to Time 3, regardless of study group, in order to better understand which factors contribute to the reduction of this variable. We conducted two separate hierarchical multiple regressions, using the total sample of study group and control group combined. Covariates included age, sex, number of groups, study group status, and baseline (Time 1) suicide risk for the first regression. Step one results indicated that these covariates accounted for a significant amount of the change in suicide risk from baseline to discharge. Depressive symptoms (Time 1 and Time 2) were included in step two to account for change in depressive symptoms. This step accounted for an additional 24% of the variance. Thwarted belongingness (Time 1 and Time 2) were included in step three to account for change in thwarted belongingness. This step accounted for an additional 5% of the variance. Perceived burdensomeness (Time 1 and Time 2) were included in step four to account for change in perceived burdensomeness. This step accounted for an additional 6% of the variance in change in suicide risk from baseline (Time 1) to discharge (Time 2). Change in perceived burdensomeness and depressive symptoms were significantly related to change in suicide risk in the final model (Table 15).

For the second regression, covariates included age, sex, number of groups, study group status, and discharge (Time 2) suicide risk. Step one results indicated that these covariates accounted for a significant amount of the change in suicide risk from discharge to one-month follow-up. Depressive symptoms (Time 2 and Time 3) were included in step two to account for change in depressive symptoms. This step accounted for an additional 20% of the variance. Thwarted belongingness (Time 2 and Time 3) were included in step three to account for change in thwarted belongingness. This step accounted for an additional 4% of the variance. Perceived burdensomeness (Time 2 and Time 3) were included in step four to account for change in perceived burdensomeness. This step accounted for an additional 2% of the variance. Change in perceived burdensomeness, thwarted belongingness, and depressive symptoms were all significantly related to change in suicide risk from discharge to one-month follow-up in the final model (Table 16).

7) Does the interaction between thwarted belongingness and perceived burdensomeness predict change in suicide risk?

A core piece of the IPTS is the predictive power of the interaction between thwarted belongingness and perceived burdensomeness (Van Orden et al., 2010.). We were therefore interested in learning whether an interaction between the two variables at Time 1 would predict the change in suicide risk from Time 1 to Time 2. We wanted to then replicate this analysis while looking at the interaction between thwarted belongingness and perceived burdensomeness at Time 2 when predicting the change in suicide risk from Time 2 to Time 3. Two separate hierarchical multiple regressions were conducted, using the total sample of study group and control group combined. Covariates included age, sex, number of groups, study group status, baseline suicide risk (Time 1), and baseline (Time 1) and discharge (Time 2) measures of

thwarted belongingness and perceived burdensomeness for the first regression. For the second regression, covariates included age, sex, number of groups, study group status, discharge suicide risk (Time 2), and discharge (Time 2) and one-month (Time 3) measures of thwarted belongingness and perceived burdensomeness. The interaction between IPTS variables was not significant when predicting change in suicide risk at either time point.

8) Is there a bidirectional effect between change in IPTS variables and change in suicide risk?

In order to understand whether a change in suicide risk also predicts a change in IPTS variables, indicating a bidirectional effect between IPTS variables and suicide risk, four separate hierarchical multiple regressions were conducted using the total sample of study group and control group combined. The first two regressions examined change in suicide risk from baseline (Time 1) to discharge (Time 2) with Time 2 thwarted belongingness and perceived burdensomeness as outcomes. Covariates included age, sex, number of groups, study group status, and respective baseline (Time 1) measure. Change in suicide risk was measured by adding baseline (Time 1) and discharge (Time 2) measures of suicide risk. Both regressions indicated a significant relationship between change in suicide risk from baseline (Time 1) to discharge (Time 2) and change in both IPTS variables over the course of treatment.

The next two regressions replicated these analyses but from discharge (Time 2) to one-month follow-up (Time 3). Covariates included age, sex, number of groups, study group status, and respective discharge (Time 2) measure. Change in suicide risk was measured by adding discharge (Time 2) and one-month (Time 3) measures of suicide risk. The regressions indicated a significant relationship between change in suicide risk from discharge (Time 2) to one-month

follow up (Time 3) and change in perceived burdensomeness. No significant relationship was found between change in suicide risk and change in thwarted belongingness at this time point.

Summary of exploratory analyses highlight a significant effect of the study intervention on change in thwarted belongingness from intake (Time 1) to discharge (Time 2). Notable findings also include a better understanding of the factors influencing a change in suicide risk across several time points. Results emphasize the role of a change in perceived burdensomeness and change in depressive symptoms in affecting the change in suicide risk from intake (Time 1) to discharge (Time 2). Findings then point towards the importance of a change in perceived burdensomeness, thwarted belongingness, and depressive symptoms when predicting a change in suicide risk from discharge (Time 2) to one-month follow-up (Time 3). Change in both IPTS constructs also demonstrated a bidirectional relationship with change in suicide risk from intake (Time 1) to discharge (Time 2) but this relationship was retained only for perceived burdensomeness when looking at the time frame of discharge (Time 2) to one-month follow-up (Time 3).

Fidelity

Study therapists reported an average rating of 4.8 (approximately 15 minutes per session) on time spent in individual therapy targeting thoughts of being a burden. External ratings of teen groups indicated an average score of 3.4 (approximately 10-15 minutes per group) for those in the study arm and of 0 (no time spent) in the control arm.

Intervention Feasibility and Acceptability

Responses to Open Ended Questions

When asked what was most helpful about the SPARC program during the exit interviews, parents and adolescents often emphasized the group structure of the IOP, which allowed teens to

realize they are not alone in having thoughts of depression and suicide. Specific skills were also mentioned and usually drew from themes of emotion regulation, validation, and improving family communication. Study interventions, specifically the values exercise and thanks notes were also among those mentioned when asked what was most helpful about the IOP. When asked about whether they noticed content related to perceived burdensomeness in SPARC, almost all adolescents endorsed learning interventions targeting this construct. Several parents readily mentioned that their teens had thoughts of being a burden during treatment and shared that this topic came up during individual therapy, which they found to be helpful. When asked how interventions helped them to manage thoughts of being a burden, teens noted the role of perspective taking and strengthening communication with parents. Both parents and adolescents highlighted increased family activities over the course of SPARC and practicing how to have conversations around self-beliefs teens may hold that are stemming from cognitive distortions.

Pie Chart

Adolescents described the pie chart exercise as helpful to use with the unhelpful thinking styles module of SPARC. One teen noted “it was helpful to see how far I’d come” when completing the pie chart again at discharge and comparing it to the one created at the start of the IOP. Other teens specified how it allowed for the identification of targets around negative self-beliefs and goal setting during IOP.

In their written feedback, clinicians noted the ease of using this intervention at the beginning and end of the IOP and highlighted how it was helpful for initial information gathering during the start of treatment. Clinicians shared how this intervention was useful for the purpose of treatment planning and was most effective for adolescents who think more abstractly.

The average acceptability score across clinicians was 2.6 (ready for use) and the average feasibility score was 2.8 (ready for use).

Thanks Notes

Teens uniformly found the thanks notes received from clinicians to be helpful. Likewise, clinicians noted how adolescents would save most of the notes received and found the activity to strengthen the therapeutic relationship. Some clinicians described how the notes could be used to reinforce positive behavior during teen group. Adolescents described the notes as boosting their mood and providing validation. The main feasibility barrier for this intervention was for clinicians to write notes on a weekly basis when their case load increased.

Feedback from teens and parents around thanks notes between adolescents and parents was more mixed. Overall, feedback was positive and highlighted how the exchange of thanks notes strengthened communication between parent and child, which allowed for the teen to feel more comfortable reaching out for support despite potential cognitions of burdensomeness. Adolescents noted how the physical nature of the notes was especially helpful and several teens described rereading past notes and storing the notes in their hope kit. Parents also reported satisfaction with this intervention and related how the notes could function as conversation starters around how parents didn't view a teen reaching out for support as a burden. Clinicians found these thanks notes to be a simple but powerful intervention that allowed adolescents to strengthen their support systems; sometimes including friends and other family in this activity.

Parents and teens also noted difficulties with the thanks notes, specifically that both parents and adolescents didn't want to write notes to each other at times. Some teens reported not reading thanks notes or throwing notes away when received from parents. Clinicians expressed concern as to whether most parents actually completed thanks notes on a weekly basis and

described finding it challenging to involve disengaged parents on this intervention. Moreover, clinicians reported that teens would discount the content of the notes if the parental relationship was under strain.

The average acceptability score across clinicians was 2.8 (ready for use) and the average feasibility score was 2.8 (ready for use) when the intervention was delivered from the therapist. The average acceptability score across clinicians was 2.4 (use with edits) and the average feasibility score was 1.6 (do not use) when the intervention occurred between parents and teens.

Values Exercise

Adolescents noted the primary utility of the values bullseye intervention as a way to plan for the future and rearrange one's priorities. Teens reported enjoying the visual aspect of the exercise and identifying a concrete goal that may inspire hope for the future. Clinicians also reported satisfaction with this activity both in individual therapy and teen group. Clinicians provided feedback on how the visual component of the exercise was helpful for the adolescents to recognize the discrepancy between their value goals and their actions. Barriers were described as some teens not being interested in discussing values and therefore not being engaged during the intervention.

The average acceptability score across clinicians was 2.6 (ready for use) and the average feasibility score was 2.6 (ready for use).

Scale Diagram

Feedback from adolescents about the scale diagram intervention was mixed. Several teens noted that this activity was helpful for taking perspective of daily events and ensuring not to disqualify the positive ways in which they contribute to the lives of others. Other comments included how teens used the scale to determine the next course of action based on how they

viewed events up until that point. On the other hand, some teens struggled to apply this intervention due to its abstract nature and didn't find it to be especially helpful as a result.

Clinician feedback indicated that for some teens this was a helpful intervention to draw out cognitions of perceived burdensomeness and was most effective in a group setting. Clinicians observed that this activity paired well with the cognitive distortions model of SPARC to facilitate cognitive reframing and was structured to support future activity scheduling. Clinicians noted that this intervention was helpful for therapists to better conceptualize a patient's cognitions but some teens found it challenging to grasp the metaphor of a scale.

The average acceptability score across clinicians was 2.2 (use with edits) and the average feasibility score was 1.8 (do not use) when the intervention was delivered during individual therapy. The average acceptability score across clinicians was 2.2 (use with edits) and the average feasibility score was 2 (use with edits) when the intervention took place during teen group.

Midpoint Measure

Feedback from clinicians provided strong support for the administration of measures at the halfway point of the IOP. Clinicians noted that this facilitated a transition into the scale intervention when thoughts of burdensomeness were high. Clinicians also shared how these measures were helpful to gauge how well a teen was responding to SPARC and if specific cognitions were still causing distress. On the other hand, when a teen was reporting symptom improvement, a clinician was able to start a conversation around what interventions had been helpful in bringing about this change.

The average acceptability score across clinicians was 2.6 (ready for use) and the average feasibility score was 2.6 (ready for use).

Note to Incoming Teen

Teens indicated that it was very helpful to receive a welcome card on their first day of the IOP from another adolescent who had already finished the program. One teen noted that she “didn’t know what to expect” and receiving the card helped her to feel welcome. She also stated that it was “nice to give back at the end since I remember what it was like on my first day.” Clinicians similarly stated that adolescents enjoyed both receiving and writing the welcome cards. One clinician shared that an adolescent cited the welcome letter as the reason she decided to give treatment a chance since she was able to hear from another patient who had finished the program. The only barrier identified for this intervention was that when there was an influx of new patients, the supply of welcome cards written by patients who had already left would sometimes run out.

The average acceptability score across clinicians was 3 (ready for use) and the average feasibility score was 2.4 (use with edits).

One Good Thing

Several adolescents referenced how the ‘one good thing’ activity was an exercise they looked forward to when attending teen group and one teen shared that it was her favorite part of teen group. Feedback highlighted how this exercise served as a reminder to teens about the positive ways they may have helped others between teen groups and also encouraged activity scheduling so that adolescents would have content to share during the ‘one good thing’ exercise. A common theme that arose among adolescents was the concept that they often forget to give themselves “credit” for their actions and this activity allowed them to do so. Clinicians reinforced these themes in their own feedback. A possible obstacle to implementation noted by clinicians was the tendency for younger teens to describe a positive event that had occurred

instead of a way they contributed to the life of another or engaged in self-care. Clinicians attributed this to younger teens having difficulty distinguishing the difference between generally positive events and ones they initiated themselves.

The average acceptability score across clinicians was 3 (ready for use) and the average feasibility score was 2.8 (ready for use).

Graduation Notes

One of the most popular interventions among both clinicians and adolescents was for a teen to receive hand-written messages from the other adolescents upon graduation from the IOP. Teens shared how these notes “highlight things about yourself that you can sometimes forget.” Several adolescents expressed an intent to keep these messages as part of their hope kit so they can reflect back on them after leaving the IOP. Clinicians drew attention to the importance of adolescents receiving feedback from their peers and the weight that they gave to these messages as a way to challenge distortions around self-beliefs. Clinicians observed that some teens still struggled to fully believe any compliments they may have received if their cognitive distortions were still entrenched at the time.

The average acceptability score across clinicians was 3 (ready for use) and the average feasibility score was 3 (ready for use).

Psychoeducation on Perceived Burdensomeness

Clinicians reported how the most helpful aspect of providing psychoeducation on perceived burdensomeness to parents was to link this conversation to the concept of adolescents being reluctant to reach out for support in times of need due to thoughts of burdening caregivers. Clinicians shared that about half of the parents were already aware of their teen feeling like a burden during treatment and some responded defensively when given information on these

cognitions. Overall feedback summarized this intervention as a helpful transition to the use of thanks notes and a discussion around helpful communication styles.

The average acceptability score across clinicians was 2.2 (use with edits) and the average feasibility score was 2 (use with edits).

Letter to Teen From Parents

The implementation of the letter written by parents to adolescents was the most varied of the interventions. Clinicians and parents noted how it was challenging for some parents to remember to write the letter and some stated they would do so after finishing the SPARC IOP. Other parents reported enjoying the opportunity to write to their teen about the progress seen in the program so far and teens described finding the letter to be very meaningful in providing evidence against the thought that treatment was a burden on their parents. When the letter was completed, adolescents would frequently keep the letter and cited this intervention as strengthening communication within the family.

The average acceptability score across clinicians was 2.2 (use with edits) and the average feasibility score was 2 (use with edits).

Average acceptability and feasibility ratings by study intervention are displayed in Table 17.

Variability Among Clinicians

There was variability between the intervention ratings provided by each clinician. Clinician 1's average acceptability score across interventions was 2.25 (use with edits) and average feasibility score was 2.17 (use with edits), Clinician 2's average acceptability score was 2.58 (ready for use) and average feasibility score was 2.33 (use with edits), Clinician 3's average acceptability score was 2.92 (ready for use) and average feasibility score was 2.83 (ready for

use), Clinician 4's average acceptability score was 2.58 (ready for use) and average feasibility score was 2.17 (use with edits), and Clinician 5's average acceptability score was 2.5 (ready for use) and average feasibility score was 2.33 (use with edits). These results are displayed in Table 18.

DISCUSSION

This study contributes to the literature by designing novel study interventions targeting perceived burdensomeness for use with suicidal adolescents. These interventions were first developed after being informed by an initial qualitative study exploring the manifestation of this construct as described by adolescents, their parents, and clinicians working with suicidal youth. Feasibility and acceptability data were also gathered about the implementation of these interventions in an existing IOP for suicidal youth. Results indicated that the study intervention was not successful in targeting perceived burdensomeness, but instead had an impact on a change in thwarted belongingness from intake to discharge. The study intervention also did not have a statistically significant effect on change in depressive symptoms or suicide risk. During exploratory analyses including the combined sample of both study group and control group, results demonstrated that a change in perceived burdensomeness and depressive symptoms contributed significant independent variance to prediction of change in suicide risk from intake to discharge. When predicting change in suicide risk from discharge to one-month follow up, results indicated that a change in perceived burdensomeness, thwarted belongingness, and depressive symptoms all contributed significant independent variance to prediction of change in suicide risk. These findings support the trend in the literature emphasizing the close relationship between perceived burdensomeness and suicide risk. Study findings also underscore the difficulty in targeting perceived burdensomeness in a sample of suicidal adolescents.

COMPARISON OF FINDINGS TO THE LITERATURE

To the best of our knowledge, this is the second intervention study to target cognitions from the IPTS among adolescents, with Hill and Pettit (2016) being the first. Hill and Pettit (2016) were able to successfully target levels of perceived burdensomeness with an online

intervention among a community sample of adolescents. The results from their study indicated a medium effect size on perceived burdensomeness at posttreatment when compared to a control group that received an email containing psychoeducational information on mental health and suicide risk factors. There have also been previous efforts to target IPTS constructs in the context of a clinical trial with adults. Allan and colleagues (2018) utilized a three-session intervention featuring psychoeducation and cognitive bias modification with adults screened for elevated levels of thwarted belongingness and perceived burdensomeness using the Interpersonal Needs Questionnaire (INQ). The intervention took place online and presented examples of cognitive distortions around connecting to and burdening others, followed by suggestions on how to challenge these misconceptions through behavioral experiments. The intervention was successful in reducing levels of perceived burdensomeness and through this change, suicidal ideation. The study intervention did not have a significant effect on thwarted belongingness and the effect of the intervention on suicidal ideation was determined to not operate through a change in thwarted belongingness. Similar to Hill and Pettit's study, this intervention did not use a sample endorsing elevated suicidal ideation.

Kyron and colleagues (2019) examined the effects of an online team-based task on participants' desire to leave the study when levels of thwarted belongingness and perceived burdensomeness were experimentally manipulated. Unlike Allan and colleagues (2018), Kyron and colleagues did not use the INQ to directly assess IPTS variables for study outcomes. However, the study authors did use the measure to screen incoming participants to create a sample of adults with moderately elevated levels of thwarted belongingness and perceived burdensomeness. Instead of using the INQ, several proxy items specific to the team-based task were created which asked participants to rate whether they felt like an outsider or an asset to the

team. The outcome of interest was how participants rated their desire to quit the task, which served as a proxy to considering suicide. Levels of thwarted belongingness and perceived burdensomeness were manipulated by receiving positive or negative messages from “teammates” (targeting belongingness) and by being notified of strong or poor performance on the task (representing being a burden or an asset to the team). Kyron and colleagues found that elevations of both interpersonal variables resulted in an increased desire to quite the task. Likewise, a positive or negative manipulation of only thwarted belongingness resulted in either a decreased or increased desire to quit the task when perceived burdensomeness was held constant. While the entire nature of the task is a proxy to real-life experiences, the results indicate that direct manipulation of interpersonal constructs do significantly impact an individual’s desire to leave or stay in a given situation.

In comparison to these three studies that used a community sample without elevated suicidal ideation, ours utilized a clinical sample of adolescents with high levels of depression and suicidal ideation. The purpose of the IOP in which the study took place is to serve as a step down from inpatient care or to provide services to those with a significant increase in suicidal thoughts who are no longer appropriate for standard weekly therapy in the community. In addition to being significantly more complex as a sample overall, these adolescents likely had several entrenched cognitive distortions that may limit learning of new material. Challenging family dynamics associated with acutely suicidal youth were also a factor in how our study interventions were delivered. From a theoretical standpoint, Rogers and Joiner (2017) also note that the relationship between IPTS variables and suicidal ideation changes depending on the level of suicidal ideation. They note that the relationship is strongest at high levels of suicidal ideation, and weaker at lower levels. Therefore the dynamics of these variables appear to change

depending on their elevations, which may have influenced our results. Furthermore, previous studies have labeled themselves as attempts at *prevention* for a community sample whereas our study was an attempt at *treatment* for an acute clinical sample. Since our sample is significantly different in this way than previous samples used in clinical trials and the approach of our study is also fundamentally different, it is not surprising that we would have different findings about the effectiveness of our intervention efforts.

A notable difference between our study and many other clinical trials is that we compared two active treatment arms with the goal to demonstrate potential superiority of an additive treatment in comparison to the base program. The base program of SPARC is already established as an evidence-based treatment for suicidal youth (Kennard et al., 2019) and demonstrated medium to large effect sizes on outcomes in the present study, which set an especially high bar for comparison.

A study design with two active treatments is more common in equivalence (testing whether a new treatment is similar to an existing treatment) or noninferiority (testing whether a new treatment is not worse than an existing treatment by an acceptable amount) trials (Piaggio et al., 2006). As such, the effect size between the two treatments is expected to be much smaller than comparison with a treatment as usual control group. For example, Wagner and colleagues (2014) compared two methods of administering CBT for depression, an internet based delivery vs. an in-person one. There were no significant differences between groups and the internet based arm demonstrated an effect size of 1.27 on depressive symptoms, with the in-person arm indicating an effect size of 1.37, demonstrating a difference of .10. The authors noted not being adequately powered detect difference between two active treatments (total sample 62) yet felt these results were promising for a larger future study.

Similarly, Rossello & Bernal (1999) compared CBT, interpersonal psychotherapy treatment (IPT), and a wait list control group in a clinical trial with depressed adolescents. Both active treatments were significantly better than the control group in treating depression but were not statistically different from one another. Effect size on depressive symptoms was .73 with IPT and .43 for CBT, demonstrating a difference of .30 between treatments. In comparison, the difference in effect size between our control and study group ranged from .19 to .41 on outcome measures at the Time 1 to Time 2 analyses.

Another difference between the present study and other clinical trials is the duration of follow-up. With a follow-up of only one month, this period is relatively short in comparison to other studies that follow participants for several months or up to a year. This is important to consider, especially when looking at the outcome of suicide attempts in a clinical trial so as to have an adequate window of time to capture possible events. For example, Kennard and colleagues (2019) tracked outcomes for six months and noted that 48% of reported suicide attempts occurred during the first month after treatment. Since this is the same program upon which the current study is built, it is possible that our short follow up resulted in missing over half of subsequent suicide attempts that may have otherwise been recorded with a longer follow up, leading to increased power when analyzing this outcome.

Follow up duration is also a factor when measuring how long an intervention's effect persists. Unfortunately, our results did not indicate a statistically significant difference in treatments at one-month follow up (Time 3). Other clinical trials have noted diminishing effects of study interventions over time, such as Asarnow and colleagues (2017), who also only observed treatment effects at the end of the intervention period, which appeared as a reduction in suicide attempts. The same effect was described by McCauley and colleagues (2019) who saw a

significant effect of DBT on suicide attempts and self-harm at the end of treatment but the difference between study arms was no longer significant during the follow-up time frame. However when looking at the effects of the intervention by Hill and Pettit (2016), the authors observed significantly lower levels of perceived burdensomeness at the follow up period among treatment completers. It is essential to note once more that the sample used by Hill and Pettit (2016) was a community one, and may therefore respond differently over time to a study intervention than a sample with elevated levels of depressive symptoms and suicidal ideation. There was no indication that our study intervention functioned in a way similar to the one designed by Hill and Pettit (2016), as there were no significant effects on change in outcome measures during this time frame.

IMPLICATIONS FOR IMPLEMENTATION

Despite only achieving statistical significance for the change in thwarted belongingness from intake (Time 1) to discharge (Time 2), there were several findings for effect size at different time points worth highlighting. Effect sizes between study arms that were small (.20) or above included change in perceived burdensomeness (Time 1 to Time 2), thwarted belongingness (Time 1 to Time 2), and suicide risk (Time 1 to Time 3 and Time 2 to Time 3). These results are especially promising because this trial is underpowered to detect a difference among two active treatments and the study arm is being compared to an active control that has already been proven to be an extremely effective program. Findings therefore appear to warrant further investigation to better understand the impact of these new interventions.

In order to be conservative with the conclusions drawn around effect sizes in smaller clinical trials as suggested by Kraemer and colleagues (2006), weight is also given to the

feasibility and acceptability outcomes provided by the exit qualitative interviews and quantitative ratings completed by the study clinicians.

From a quantitative standpoint, the interventions that obtained scores of above 2.5 (ready for use) for both acceptability and feasibility were: pie chart, thanks notes (from therapist only), values exercise, administering midpoint measures, one good thing activity, and notes from other adolescents written to graduating teens during discharge. Only two interventions received scores of below 2 (do not use) and only received them for feasibility ratings: scale diagram (individual therapy only) and thanks notes (to/from parents only).

Qualitative feedback largely supported the quantitative results. However, the nature of low scores was elucidated as not indicating interventions that were necessarily entirely flawed but instead as indicating those that failed to demonstrate universal application across adolescents. Often these interventions were still useful for several adolescents but were also not well received by others. Therefore, they potentially have merit as interventions they may be implemented on a circumstantial basis but are probably not best suited to be incorporated as a staple in the SPARC IOP.

A key theme that arose from the exit interviews with adolescents was the concept that one of the most effective ways to address cognitions of burdensomeness was to strengthen family communication. Adolescents reported that talking about thoughts of being a burden in teen group was helpful in order to validate the idea that others are experiencing the same cognitions, which then made conversation with parents around the topic seem less intimidating. Teens also replied that skills allowing for perspective taking helped to manage cognitions of perceived burdensomeness (i.e. scale activity). When asked directly about what interventions were most helpful to lower thoughts of being a burden, study interventions were often spontaneously cited.

It thus appears to be especially worthwhile to focus on interventions targeting family communication and perspective taking when aiming to address cognitions around burdensomeness.

As evidenced above, even when discussing thoughts of being a burden in the exit interviews, adolescents often referenced themes that overlapped with the construct of thwarted belongingness. For instance, the response that it is helpful to meet other teens who are also struggling with thoughts of being a burden ties into the social connectedness aspect of belongingness. Furthermore, this is then linked to increased comfort around discussing thoughts of being a burden with parents, which strengthens a teen's support system. This also loads strongly onto the construct of belongingness. One of the interventions cited as the most effective, thanks notes, operates through this pathway as well. Yet in their responses, adolescents endorsed these approaches as ways to combat cognitions of burdensomeness. It therefore seems that the constructs of perceived burdensomeness and thwarted belongingness are significantly entangled for many teens when these concepts manifest in a clinical context.

When the qualitative and quantitative findings are taken together, there appears to be evidence for implementing several of the study interventions into the SPARC IOP. Satisfaction among adolescents and their parents was high and clinicians noted several strengths to the study interventions. Although there is only a significant study effect upon change in thwarted belongingness from Time 1 to Time 2, results from qualitative exit interviews shed light on why this may be the case and how adolescents experienced relief from distressing cognitions due to study interventions.

IMPLICATIONS FOR THE THEORY

The question of whether thwarted belongingness and perceived burdensomeness are best understood as separate or combined constructs among a clinical adolescent sample has arisen in past studies (King et al., 2017; Horton et al., 2015). In addition, in our study sample, these two variables were highly correlated at all three time points. Due to the fact that we achieved change in thwarted belongingness instead of our intended goal of perceived burdensomeness, this question arises once more due to our inability to impact perceived burdensomeness separately. As mentioned above, there was significant overlap in the description of these constructs in the exit interviews of the clinical trial when participants were asked about the effectiveness of study interventions. Perplexing is the fact that this overlap did not come up with any frequency during the initial qualitative study intended for intervention development. Only during the explanation provided by adolescents on the manner in which interventions targeted perceived burdensomeness did this overlap arise.

This then brings up the question of whether there is a flaw in the method in which we captured the construct of perceived burdensomeness. Although the INQ was originally developed for use with adults, we used a refined version specifically for suicidal adolescents (El-Behadli et al., 2019). While this may be the case, the refined INQ did not modify the wording of any of the items on the scale and may not be sufficient to measure change in adolescent cognitions. Additional items worded for the adolescent experience (e.g. “my friends are burdened by me,” “I am not much fun to be around,” “my parents have had to make sacrifices without adequate payback”) may have been able to more adequately capture change brought about by our study interventions.

Results from our study indicate that there are likely overlapping components of perceived burdensomeness and thwarted belongingness. For instance, in our efforts to increase positive feedback from the environment, identified as a mechanism of change for addressing cognitions of being a liability to others, we may have been more directly increasing a sense of belonging. In addition, our approach to targeting cognitions of self-hate emphasized creating opportunities to contribute to others, which could have also strengthened communication and a feeling of belongingness in a more pronounced way. In fact, when hypothesizing potential ways to better target thwarted belongingness among adolescents, possible clinical pathways have much in common with those proposed in this study. With this explanation in mind, the most probable circumstance is that what was being implemented was instead a series of interventions targeting primarily thwarted belongingness, and to a lesser extent perceived burdensomeness. This is supported in the statistically significant reduction in thwarted belongingness at discharge (Time 2) and a small effect size on perceived burdensomeness at the same time point. In our clinical setting it was challenging for us to target perceived burdensomeness without also targeting thwarted belongingness. More work appears to be needed in order to understand how these constructs can be separated during intervention and how to differentially target perceived burdensomeness.

Results from exploratory analyses are somewhat mixed in regards to recent literature on the predictive power of IPTS variables. In our study, change in depressive symptoms and change in perceived burdensomeness predicted a change in suicide risk from intake (Time 1) to discharge (Time 2). A change in both thwarted belongingness and perceived burdensomeness, in addition to a change in depressive symptoms, then predicted a change in suicide risk from discharge (Time 2) to one-month follow-up (Time 3). This violates the final common pathway

clause of the IPTS, which proposes that all other variables travel through either thwarted belongingness or perceived burdensomeness in the development of suicidal ideation (Van Orden et al., 2010). These findings are also inconsistent with a study by Hains and colleagues (2018), which found that the effects of changes in depression and hopelessness upon suicide risk in a sample of young people were mediated by changes in perceived burdensomeness.

King and colleagues (2017) drew a sample from the same IOP used in this study and findings from the two studies are identical. Although King and colleagues (2017) did not include a third time point in their study, when looking at intake to discharge from the SPARC program they found a change in depressive symptoms and perceived burdensomeness explained the change in suicide risk. In our study, the effect of a change in depressive symptoms upon a change in suicide risk was equal to that of a change in perceived burdensomeness upon a change in suicide risk ($\beta = .55$) from intake (Time 1) to discharge (Time 2). The effect of a change in depressive symptoms upon a change in suicide risk was greater than that of a change in either of the interpersonal variables from discharge (Time 2) to one-month follow up (Time 3) ($\beta = .49$). In comparison, change in thwarted belongingness had a slightly weaker relationship with change in suicide risk from Time 1 to Time 2 ($\beta = .42$). From Time 2 to Time 3, change in thwarted belongingness had a minimal relationship with change in suicide risk ($\beta = .03$) and change in perceived burdensomeness had a relationship slightly less strong than that of change in depressive symptoms ($\beta = .38$). These findings violate the final common pathway clause of the IPTS, and suggest that both depressive symptoms and perceived burdensomeness are worthwhile treatment targets when weighing how to maximize therapeutic gains in a clinical setting.

These findings are also contradictory to results from Rogers and Joiner (2018) who note that relationships between IPTS variables and suicidal ideation are strongest at elevated suicide

risk. Suicide risk is at its lowest at the one-month follow-up, yet changes in both thwarted belongingness and perceived burdensomeness were significant in predicting suicide risk at this time point, whereas only change in perceived burdensomeness is significant at predicting suicide risk at discharge, which is more elevated than values at one-month follow-up. At the same time, correlations between IPTS variables and suicide risk steadily drop across time points, as suicide risk decreases. One possible way of understanding this paradox is that even though the correlations drop over time, non-overlapping aspects of the IPTS variables still retain their predictive power, which explains their significance when predicting risk at one-month.

Our tests around the predictive role of an interaction between thwarted belongingness and perceived burdensomeness resulted in nonsignificant findings. The lack of a significant interaction between IPTS variables is consistent with the observation by Rogers and Joiner (2018) who noted that this relationship is only significant at low to moderate levels of suicidal ideation. Since data were drawn from a program for suicidal youth, levels of suicide risk were quite elevated. While this may be the case, this is different than findings by King and colleagues (2017) who found a significant interaction effect when predicting change in suicide risk, using a similar study sample. Our study findings are also inconsistent with the IPTS (Van Orden et al., 2010). Since the only systematic difference between the current sample and the one used by King and colleagues (2017) is the administration of our study interventions, it may be possible that these results could be attributed to the attempted manipulation of perceived burdensomeness.

Similarly, our tests around whether the study intervention would be more effective for participants with higher or lower levels of IPTS variables also produced nonsignificant results. Since the development of clinical trials targeting IPTS variables is still in its early stages, there are no previous studies to cite where this effect was observed. Findings indicate that there is no

difference in the effectiveness of the study intervention for those with higher vs. lower levels of thwarted belongingness or perceived burdensomeness.

Our findings documenting the reciprocal relationship between changes in IPTS variables and a change in suicide risk was consistent with a study by Kyron and colleagues (2018). However, this was only the case during the change in symptoms from intake (Time 1) to discharge (Time 2). From discharge (Time 2) to one-month follow-up (Time 3), only change in perceived burdensomeness demonstrated a reciprocal relationship with suicide risk; thwarted belongingness did not. This is consistent with previous findings that thwarted belongingness has a more distal relationship with suicide risk than perceived burdensomeness (Hains et al., 2018; Ma et al., 2016).

LIMITATIONS

There are several limitations to the current study. First is that due to being located in an existing clinical program, a randomized controlled design was not feasible. Families receiving services at the IOP decided which time slot worked best for their schedules and were then assigned to a study condition accordingly. There was also significant missing data in the control arm of the study. Because clinicians in the control arm were not part of the study team and delivered standard care, the administration of clinical duties was the priority for these therapists over a rigorous approach to data collection. Even though the collection of measures is standard practice for this program, there are occasionally situations where clinicians in the control arm did not administer measures, such as when a family arrived late to an intake and the clinician did not want to further push back their schedule. This study was also significantly underpowered to detect differences between two active treatments and would have benefited from a much larger sample size.

A primary limitation of the study is the nature of the SPARC IOP as a program that targets overall suicide risk through a DBT and CBT informed approach. It is by no means focused solely on IPTS constructs and is already filled with many evidence-based interventions. A concern was about displacing or shortening interventions that have already proven to be effective with those that are untested. Because of this, the experimental arm of the study still retained an overall approach to a reduction in suicidal thoughts but with a significant component of content targeting perceived burdensomeness. Since the overarching focus of the treatment was not on IPTS variables, even in the study arm, there is room for discussion on how to best integrate strategies targeting thwarted belongingness and perceived burdensomeness with other core modules of treatment.

In terms of limitations around the delivery of the study intervention, the clinical trial was only able to target two of the four settings in which care was administered in the IOP: teen group and individual therapy. Missing from the study was the ability to target parents directly during parent group and family units as a whole during multifamily group. The reason for this limitation was a shortage of study staff who could be kept entirely separate between study arms. This limitation is problematic because a core approach of the IOP is parent support of new skills at home and it would have been very helpful to have study interventions reinforced at all levels of SPARC for a maximum dosage effect. In addition, results from the initial qualitative study indicated a need for parents to receive support around how to manage cognitions of being a burden their teen may have due to the high potential of this impacting the parent/child relationship.

The concern around adequate dose is reinforced by the results of the fidelity portion of the study. The average self-rated individual session rating was 4.8 (approximately 15 minutes per

session) and the average rating for teen groups was 3.4 (approximately 10-15 minutes per new module). The average rating for teen groups in the control arm of the study was 0 (no time spent on perceived burdensomeness). Important factors to consider when viewing this information is that it was not uncommon to have a ‘crisis’ individual therapy session where imminent safety concerns needed to be addressed. The self-ratings displayed here are averages across sessions and ‘crisis’ sessions usually had a rating of 0 since the majority of the time was spent on safety planning. These ratings therefore significantly brought down the overall scores. In regards to the teen group rating, it is necessary to understand that not every module of the SPARC IOP contained study interventions. Raters were not assigned to observe only groups containing trial interventions and thus had lower ratings for the unchanged components of the program, impacting the average score as a result.

The methodology around fidelity could also have been improved. While the study team met for one hour each week to discuss barriers around implementation of study interventions, fidelity ratings of dosage in individual therapy were self-rated. There were confidentiality barriers inherent to the structure of the IOP that prohibited recording of individual therapy sessions for fidelity purposes. The external rating of teen groups was also a significant demand on study personnel since it required an observer for a three-hour teen group session, which limited the number of groups that could be rated.

The final limitation is not specific to our study but instead to the methodology of using self-report measures at three time points to record changes in suicide risk. Because adolescents were contacted via a phone call in the event that their one-month measures of suicide risk were elevated, the reason for the elevation was often identified. Several instances were revealed to be acute stressors that resolved days or even hours later. The implication of this for our data is that

many of our most elevated scores would have been drastically different in the event that a teen had waited 24 hours to complete their measures. This is consistent with findings by Kleiman and colleagues (2017) who note significant fluctuations in suicidal thoughts in a very short time span and who advocate for another more frequent way of measuring this variable.

FUTURE RESEARCH

Results from the primary aims of the clinical trial emphasize the challenge in successfully targeting perceived burdensomeness in an adolescent clinical sample. Even though we conducted an initial qualitative study, from which we enhanced the model of perceived burdensomeness to incorporate possible clinical pathways by which to change the level of this construct, we were instead only able to have a statistically significant effect on levels of thwarted belongingness. Although there have been examples of clinical trials that were able to meaningfully target levels of perceived burdensomeness in community samples, there are none that have been able to do so in a clinical sample with elevated suicidal ideation. Because of this trend, it would be beneficial to see if future research could achieve a statistically significant change in perceived burdensomeness among a clinical group of suicidal adolescents. This is particularly important since the core of the IPTS is that a change in thwarted belongingness and perceived burdensomeness will reduce suicidal ideation, which is reinforced by our study findings. To properly harness this concept in a clinical setting would be of significant value to the field of intervention development.

To further explore the extent of how well the INQ captures the constructs of thwarted belongingness and perceived burdensomeness among clinical adolescents, a possible approach is to utilize the methodology of cognitive interviews. Cognitive interviews have been used as a way to improve the design of a questionnaire by evaluating information gathered during cognitive

tasks that take place during live responding to scale items (Willis, 1999). The tasks analyzed include: comprehension, retrieval, decision, and response (Schwarz, 2007) in relation to questionnaire items. It is possible that one of these cognitive tasks may reveal additional information about the way adolescents respond to items on the INQ, which could inform other ways to assess IPTS constructs.

The findings from our exploratory analyses identifying the pathway through which suicide risk changes are mostly consistent with the current state of the literature in how it highlights the importance of perceived burdensomeness in this relationship. However, in our study this pathway was strongest during the change in symptoms from intake (Time 1) to discharge (Time 2), making room for thwarted belongingness during the change in symptoms from discharge (Time 2) to one-month follow-up (Time 3). Additional research is therefore needed to better understand the relationship between IPTS variables and suicide risk over several time points since it appears to possibly vary. Also worth noting is the fact that a change in cognitive factors (i.e. depressive symptoms and IPTS variables) only account for a total of 35% of the variance when explaining a change in suicide risk from Time 1 to Time 2. This value drops to 26% when looking at the change in suicide risk from Time 2 to Time 3. This indicates there is still much work to be done in identifying other factors that contribute to a change in suicide risk over the course of treatment since the current variables of interest do not account for even a majority of the variance in the study sample.

The difficulties in measuring outcomes support the conclusions drawn by Kleiman and colleagues (2017). In several instances, it seemed more up to chance about whether a teen would report their current mood at the time of follow-up or the average of their symptoms over a period of time, as requested by the study measures. Since the study done by Kleiman and colleagues

(2017) uses an adult sample, this variability in reporting does not appear to be a phenomenon that is contained to adolescents.

Figure 1. Enhanced Clinical Model of Perceived Burdensomeness

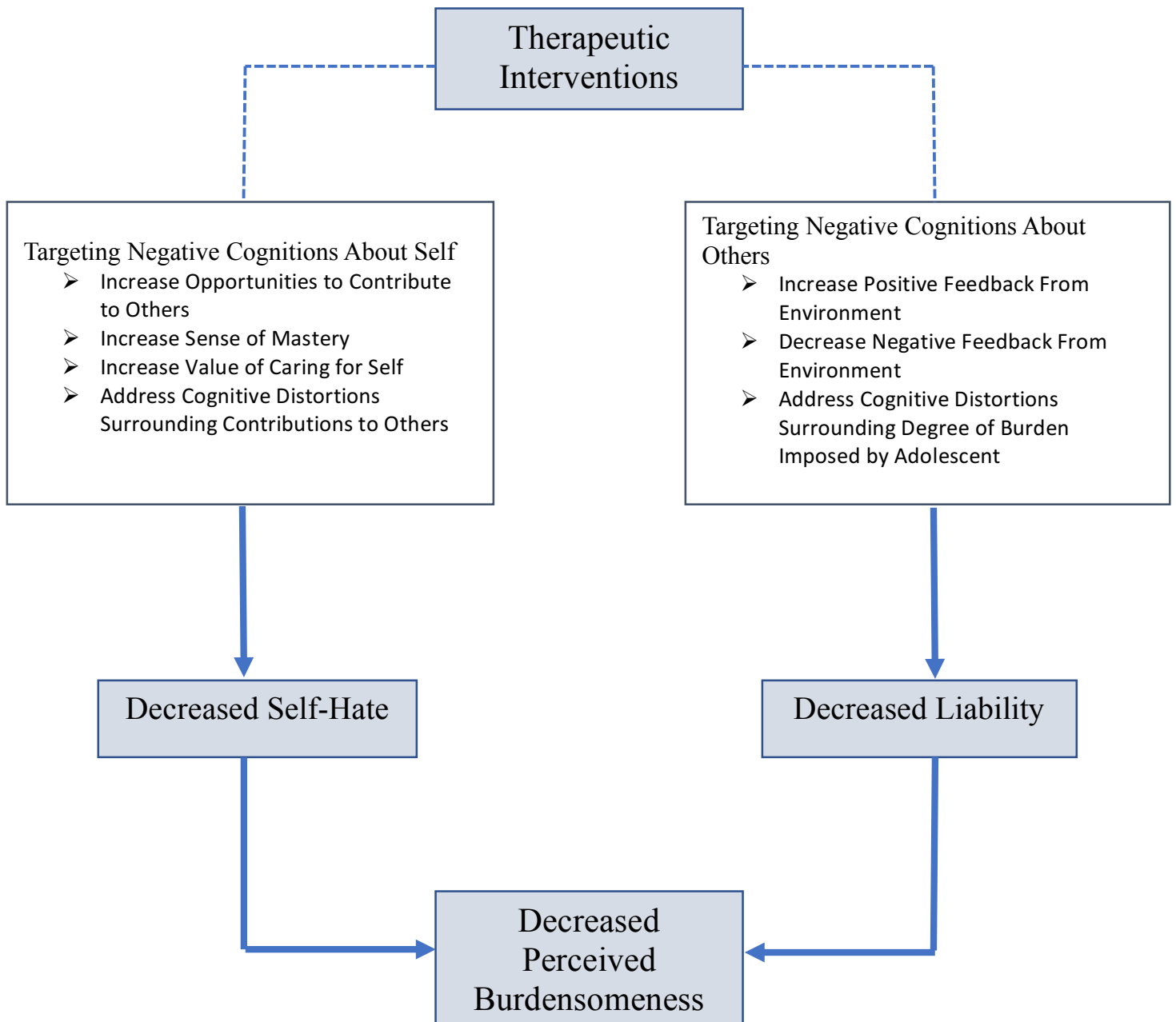


Figure 2. Consort Diagram

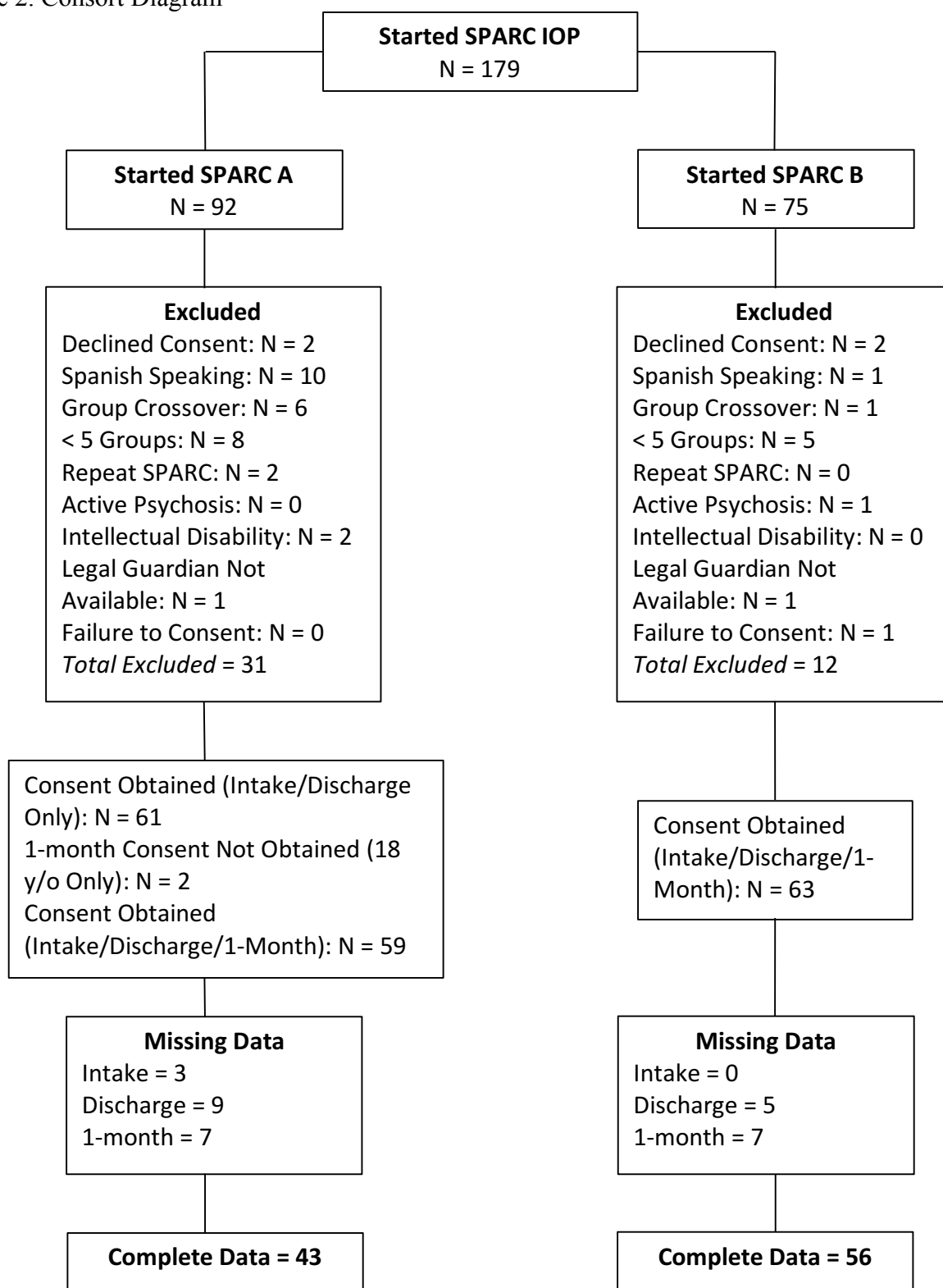


Table 1.

Interventions Targeting Cognitions of Self-Hate

Intervention	Mechanism of Change
Pie Chart	Address Cognitive Distortions Surrounding Contributions to Others
Thanks Note to Parent	Increase Opportunities to Contribute to Others
Note to Incoming Teens	Increase Opportunities to Contribute to Others
Good Deed for Self/Others	Increase Opportunities to Contribute to Others and Value of Caring for Self
Values Identification and Activity Planning	Increase Opportunities to Contribute to Others and Sense of Mastery
Scale Diagram	Address Cognitive Distortions Surrounding Contributions to Others

Table 2.

Interventions Targeting Cognitions of Self as Liability

Intervention	Mechanism of Change
Parent Psychoeducation on Perceived Burdensomeness	Decrease Negative Feedback From Environment
Thanks Note From Parents/Therapist	Increase Positive Feedback From Environment
Letter From Parents	Increase Positive Feedback From Environment
Graduation Notes to Teen	Increase Positive Feedback From Environment
Scale Diagram	Address Cognitive Distortions Surrounding Degree of Burden Imposed by Youth

Table 3.
Recognition of Perceived Burdensomeness

Construct	Quotation
Initial Reaction to Perceived Burdensomeness	<p>“I can tell you flat out...she felt like a burden from, you know, from the beginning of this process.” (1-P)</p> <p>“He tries to work around to make sure nobody else is being put out once he got into this big situation and realizing how deep this was and how much help needed to go on around it, you could definitely see that sense of being a burden.” (2-P)</p> <p>“Yeah. A lot...they always feel like financially it’s a burden...we have to go take them and go do all the stuff, so they feel like that’s a burden.” (3-P)</p> <p>“I think that he kind of was born thinking that he’s a burden. He has a lot of self-hatred.” (4-P)</p> <p>“Yes...she felt like some of my sadness was her fault.” (5-P)</p> <p>“It does come up in individuals, it comes up in groups, a lot of them are very aware...of the cost of this.” (6-C)</p> <p>“Yes. We call it personalization. They tend to blame themselves for just being here or for things that they have nothing to do with or that it was not solely their responsibility and they kind of take that on themselves.” (7-C)</p> <p>“There are kids who do feel like they’re a burden because they’re having to miss so much school, you know, interfere with their parents, or that no one else in the family needs this much attention.” (8-C)</p> <p>“When I work with teens who have a long history of suicidality, or who have had multiple suicide attempts or self-harm behaviors, they’ll talk about feeling like a burden.” (9-C)</p> <p>“Yes, many of them. I would say most of them feel that they are just too much to handle and since they can’t really regulate themselves, how can they expect anybody else to be able to help them.” (10-C)</p>
Parent Opinion of Perceived Burdensomeness	<p>“I hate that. I don’t ever want him to think he’s a burden or feel like he’s a burden.” (1-P)</p> <p>“I don’t see this as a burden. I see this as...I don’t see her as a burden – I just see this as a trial that she’s going through that she’s going to learn from – it’s a growth experience, and I keep trying to tell her that.” (2-P)</p> <p>“Yeah, she’s absolutely not. She’s precious and talented, and she draws beautifully, sings beautifully, plays her instruments beautifully, and she lights up a room. She’s absolutely not a burden. She adds not subtracts.” (3-P)</p> <p>“They feel like that’s a burden, but, you know, we do it, so I tell them if it was a burden, I wouldn’t do it... I think hard is something that you need to do and you want to do to help them. A burden is something you have to do.” (4-P)</p>

“She felt guilty for being a burden and costing money and causing problems, and she doesn’t see that I don’t care – that’s not important – I love her – I want her to springboard into, you know, a healthy adulthood.” (5-P)

“Sometimes things are inconvenient cause that’s life, but that doesn’t mean I wouldn’t do it over and over.” (6-P)

“Families, we go through hard times, we go through good times, but we fight through this together. I think if you look at it like that, it’s going to be someone else’s turn one day.” (7-P)

“I mean everybody needs help at some point. Everybody needs someone to be the strong one for them, because one day it will be their turn to be the strong one.” (8-P)

“Yeah. It is hard, though. It’s not that it’s not hard, but it’s not a burden.” (9-P)

“I’m not really sure how well she internalizes those things. I could tell her, but, um, you know, again, if it’s my mama, it doesn’t count, kind of thing... And they wrote all these things that I say to her all the time – you are so funny, you are so kind – mama says it and eyes get rolled, but it had validity coming from that peer group.” (10-P)

“Communication, but also just...volunteering or giving back... it’s the dynamic of give and take and learning more about yourself through reflecting.” (11-P)

“I haven’t told her, but I’ve enjoyed, you know, I’ve enjoyed this pocket of time with her, driving to and from, and just trying to help support her through this. So, you know, maybe communicating that, okay, you know, maybe just communicating that – that I’m not actually enjoying that she’s having a hard time, but I’m enjoying the time that I’m getting to spend with her.” (12-P)

Note. A = adolescent quote, P = parent quote, C = clinician quote

Table 4.
Manifestation of Perceived Burdensomeness in Adolescents

Construct	Quotation
Experience of Perceived Burdensomeness-Behavior	<p>“Sometimes when I do that, I isolate a lot...So I don’t have to bother anybody.” (1-A)</p> <p>“Yeah, definitely isolate, won’t talk to anyone at all even if they’re like please, I need to talk to you...it will get to the point where like I won’t talk to them for weeks.” (2-A)</p> <p>“I tend to isolate myself away from what everybody else is doing, and I kind of am in my own world so I’m not a burden to anybody else.” (3-A)</p> <p>“I think that prevents them a lot of times from reaching out for emotional support because they’re thinking oh, they’re already providing me with physical support, so I don’t want to bother them for anything else.” (4-C)</p> <p>“The kids who seem to have more of that burdensomeness thinking toward their parents really seem to struggle with that step with actually reaching out and when you later kind of look back at that even or do a chain analysis with the teen, they’ll say things like I don’t want to bother them anymore or they already took up so much of their time yesterday, I don’t want to do that.” (5-C)</p> <p>“I know that I’m like dying to do something, but at the same time I’d be like nope, just going to be a burden, we’re just not going to be good.” (6-A)</p> <p>“I try to ask people sometimes...I ask them if I’m a burden or not... so I know. I’d rather know than not know, so... I’d try to not be as needy.” (7-A)</p> <p>“It can be to withdraw and sometimes it’s the other extreme as well as someone who is continuously texting a friend, trying to make sure there’s not a problem and then that also can lead to more interpersonal difficulties.” (8-C)</p>
Experience of Perceived Burdensomeness-Cognitions	<p>“I don’t know why you guys spend this much time you know we definitely don’t deserve all this.” (1-A)</p> <p>“He thinks that it’s a burden – like he won’t go to a neighbor’s house and ask if they’ll come outside to play, when they’ll come to our house all the time and ask, but it’s like he thinks no I’m embarrassed and they don’t really want to play. He’s always kind of thought that he’s a burden. Like people won’t want to do things with him.” (2-P)</p> <p>“Typically it tends to follow a lot of varying traditional depressive cognitions so I always mess this up or I’m a failure, feeling that they are letting people down, disappointing people, sometimes it’s also something that’s just intrinsic to them so you know I’m not worth the time.” (3-C)</p> <p>“So for the kid who feels that they’re a burden, maybe they</p>

Experience of Perceived
Burdensomeness-Emotions

withdraw more, then people stop asking or checking. That tends to reinforce the belief that see well I am a burden, this is why people are leaving.” (4-C)

“They tend to blame themselves for just being here or for things that they have nothing to do with or that it was not solely their responsibility and they kind of take that on themselves.” (5-C)

“Just to like get that idea in my head, but it’s very much changing your morals almost, like you have to completely change your facts. Like that was a fact for me...like 2+2 is not four, it’d be like, no, you’d argue with it for the end of the world, but definitely changing that and finding proof of how you’re not a burden, so it’s not just you’re saying it over and over and over again, like you have proof that you’re not.” (6-A)

“It will be like whole days that it happens, and then another day I’ll be fine, and the next day it will happen, or maybe like a week later.” (7-A)

“It was like highly unrealistic expectations for me. It was like I’m not going to be a burden when I’m literally a billionaire – like giving people money all the time. It was very, like, I have to do everything for this person not to be a burden.” (8-A)

“Many of them have for example one or two friends that they lean on the most, they tend to have that fear that if they continue to lean on them, that may kind of drive that person away.” (9-C)

“Sometimes, they’re like I don’t want to burden you, so I have to explain, no, that’s kind of my job.” (10-C)

“So kind of a functional burden and then I hear a lot of that I sometimes feel like my parent’s lives would be better if I weren’t here.” (11-C)

“It just like makes me more sad and upset, and that’s when my suicidal thoughts increase because I think if I wasn’t there, there’s wouldn’t be no burden.” (1-A)

“Just like kind of that empty, sinking feeling that was in the background constantly. Just sort of ...anxiety that was always just kind of in the back of my mind.” (2-A)

“They make me feel like I can’t control it, but they make me feel selfish.” (3-A)

“Depressed and sad and alone.” (4-A)

“Just me being like locked up in my room all the time, and my mom always worrying, especially after I let her know, how much she would stress about things. I always just felt really bad about doing that to my parents.” (5-A)

Note. A = adolescent quote, P = parent quote, C = clinician quote

Table 5.
Influences Upon Intensity of Perceived Burdensomeness

Construct	Quotation
Factors Increasing Perceived Burdensomeness	<p>“They have to pay for all the hospitalizations, like they had to pay for SPARC and a bunch of programs, and that’s so much money...I just feel bad for that.” (1-A)</p> <p>“She would talk financial and didn’t realize it was like bad, so I’d hear all the time ‘medical bills are really expensive’, and I was like oh, okay, cool. So, it was kind of like I would like avoid help because I was like I’m not about to spend that much money on like a therapy session.” (2-A)</p> <p>“I got out of [the hospital], they wouldn’t let me clean up anything, they constantly spent money on me, they tiptoed around me, wouldn’t say certain things that would set me off.” (3-A)</p> <p>“I hear from the teens, yeah, my parents were talking about this financial burden that I’m putting on them, or how much of pain it is driving me here and getting stuck in traffic, especially if the parents themselves are struggling with a mental or physical diagnosis.” (4-C)</p> <p>“She thought that she overheard me talking about how much it cost, or whatever, my insurance was a thing, and she was like am I worth this?” (5-P)</p> <p>“Whenever I kind of let my parents know about me feeling depressed, my mom started bawling and thinking it was her fault, which added a lot of stress to me and made me feel like I added a bunch of stress.” (6-A)</p> <p>“When they disclose for example having really bad urges to self-harm or they are having severe suicidal thoughts and disclosing that to the parents because that tends to lead to them worrying about the parents worrying.” (7-C)</p> <p>“They may have a smaller support network. So fewer people to go to, that can create more strain and I think many of them are self-aware that they realize – and maybe some of them have actually suffered through that of losing a friend partially due to kind of that over reliance on them and really straining it.” (8-C)</p> <p>“Somebody asking me to do one thing and, like, doing another, like, you know, clean up your room and just not doing it just because I didn’t have the energy to. I felt like that was being like really big of a burden.” (9-A)</p> <p>“Like, I would come out of my room and eat, and I’d be like – I’m wasting all the food, and all that, so even like normal stuff would be like just feeling like I’m a burden.” (10-A)</p> <p>“Even just witnessing other people arguing, like if their parents are arguing or other siblings, they can even personalize that and say oh, well, if I weren’t here, it’s be one less thing for them to</p>

Factors Decreasing Perceived Burdensomeness

argue about.” (11-C)

“Just like they come and they tell me...they tell me that they love me...they talk to me, and so...they don’t treat me like I’m a burden, so it’s really getting that reasoning.” (1-A)

“Well, there was...like, I felt...I went to the hospital, and I think I just realized that they came every day for me, and they came to visit me every day, and they brought me stuff that I really needed, so that really helped. I felt like, okay, maybe I’m not such of a burden if they’re bringing me stuff...if they bring me stuff, they tell me they care...they come here.” (2-A)

“My best friend is kind of like a new one...she’s very like vocal about being like oh, “I’m glad you’re here”, and it’s like...she’s like an hour away, so she’ll still drive like almost every weekend just to see me, and it’s just nice because...I can see the effort, and it’s nice.” (3-A)

“I just feel like I’ve gotten better, so I know that people love me and that even if I’m a little bit of a burden, I’m not the hugest burden.” (4-A)

“Slowly, like whenever I was starting to get better, just working around the house and helping my parents do things whenever I had the energy to, whenever I was in a good mood, and slowly but surely, it definitely worked.” (5-A)

“It’s just nice to see her like be happy that I’m getting better, and it’s better than just money, so it’s better for her.” (6-A)

“So, having those family members and parents and peers recognize when they’re doing well...affirming them for things they do well rather than always talking about what’s going poorly for them.” (7-C)

“Just if I see somebody kind of down, just checking in. Because I know what it’s like – being in that place and having somebody check on you. It’s a really, really good feeling.” (8-A)

“It is helping around the house or helping take care of a sibling or kind of trying to be a better role model for those siblings...just having their support people reach out to them. I think a lot of times it’s really hard for them to reach out, but if other people reach out to them initially, they feel...less like a burden and more of wanting to have a relationship.”

(9-C)

“And I think especially when that maps on to their values or things that they’re particularly interested in helping in this world, like animals or the earth or whatever, whatever kind of social justice right that the teen is into, sometimes even just connecting in small activities that way, it seemed like was pretty powerful for helping some of those kids who worry they were a burden.”

(10-C)

Note. A = adolescent quote, P = parent quote, C = clinician quote

Table 6.
Sample Demographics and Clinical Characteristics of Study Sample

Variables	Study Arm (n = 63)	Control Arm (n = 61)
Age	15 (1.65)	15 (1.59)
Admitting Diagnosis		
Major Depressive Disorder	60 (95.2%)	60 (98.4%)
Bipolar Disorder	1 (1.6%)	0
Other	2 (3.2%)	1 (1.6%)
Female	46 (73.0%)	45 (73.8%)
Ethnicity		
Hispanic	15 (23.8%)	15 (24.6)
Non-Hispanic	48 (76.2%)	46 (75.4)
Race		
Caucasian	54 (85.7%)	50 (82%)
African American	4 (6.3%)	3 (5%)
Asian	1 (1.6%)	6 (9.8%)
Other	4 (6.3%)	2 (3.2%)
Past Suicide Attempt	35 (55.6%)	41 (67.2%)
History of Self-Harm	45 (71.4%)	46 (75.4%)

Note. Data are presented as Mean (Standard Deviation) or n (Percent). Differences between groups were not significant when running a Chi Square Independence Test and Fisher's Exact Test

Table 7.

Means and Standard Deviations of Measures at Intake (Time 1), Discharge (Time 2), and 1-Month (Time 3)

Variable	Intake (T1)	Discharge (T2)	1-Month (T3)	<i>p, d</i> (T1/T2)	<i>p, d</i> (T2/T3)	<i>p, d</i> (T1/T3)
Study Arm						
PB	2.31 (.90)	1.54 (.69)	1.58 (.77)	<.001, .96	.63, .05	<.001, .87
TB	2.52 (.75)	1.91 (.65)	1.91 (.72)	<.001, .87	.97, 0	<.001, .83
QIDS Total ^a	14.38 (5.38)	8.86 (5)	8.52 (5.58)	<.001, 1.06	.64, .06	<.001, 1.07
CHRT Risk ^b	5.41 (3.19)	2.43 (2.79)	1.51 (2.18)	<.001, .99	.002, .37	<.001, 1.43
Control Arm						
PB	2.26 (.87)	1.70 (.78)	1.63 (.72)	<.001, .68	.37, .09	<.001, .79
TB	2.45 (.70)	2.14 (.72)	2.00 (.77)	.003, .44	.14, .19	<.001, .61
QIDS Total ^a	13.38 (5.91)	9.11 (5.81)	8.20 (5.41)	<.001, .73	.27, .16	<.001, .91
CHRT Risk ^b	5 (3.15)	2.70 (3.05)	2.05 (2.39)	<.001, .74	.08, .24	<.001, 1.06

Note. PB = Perceived Burdensomeness; TB = Thwarted Belongingness; No systematic differences between groups were found when running an Independent Samples t-Test. Measure ranges: Perceived Burdensomeness (1-4), Thwarted Belongingness (1-4), QIDS (0-27), CHRT Risk (0-12). Cohen's *d* interpretation: .2 (small), .5 (medium), .8 (large) (Cohen, 2013)

^aCalculated using the QIDS-A-SR (Bernstein et al., 2010), Score Interpretation: 6-10 (mild depression), 11-15 (moderate depression), 16-20 (severe depression), 21-27 (very severe depression)

^bSuicidal ideation calculated using the CHRT Risk factor (Trivedi et al., 2011)

Table 8.

Intercorrelations Among Outcome Measures

	Variable	Age	Sex ^a	PB	TB	QIDS Total ^b	CHRT Risk ^c
Intake (T1)	Age	--	.11	.10	.15	.06	.12
	Sex ^a	.09	--	-.13	-.04	-.19	-.21
	PB	.18	-.01	--	.67**	.69**	.64**
	TB	-.04	.04	.59**	--	.65**	.53**
	QIDS Total ^b	.08	-.24	.65**	.65**	--	.61**
	CHRT Risk ^c	-.13	-.23	.41**	.36**	.62**	--
Discharge (T2)	Age	--	.11	-.03	-.02	.10	.07
	Sex	.09	--	-.10	-.03	-.10	-.001
	PB	.10	-.11	--	.57**	.47**	.60**
	TB	.17	.07	.60**	--	.55**	.37**
	QIDS Total ^a	.18	-.05	.633**	.42**	--	.38**
	CHRT Risk ^b	.10	.10	.53**	.46**	.70**	--
1-month (T3)	Age	--	.11	.07	.09	.08	-.09
	Sex	.09	--	-.21	.07	-.10	-.15
	PB	.05	-.03	--	.53**	.70**	.54**
	TB	-.04	.03	.48**	--	.71**	.30*
	QIDS Total ^a	-.02	-.12	.61**	.54**	--	.55**
	CHRT Risk ^b	.14	.03	.44**	.25	.55	--

Note. PB = Perceived Burdensomeness; TB = Thwarted Belongingness; Study arm variables are shaded.

* $p < .05$. ** $p < .01$.

^aSpearman's rho reported

^bCalculated using the QIDS-A-SR (Bernstein et al., 2010)

^cSuicidal ideation calculated using the CHRT Risk factor (Trivedi et al., 2011)

Table 9.

Analysis of Covariance Equation Predicting Effect of Study Intervention on Change in Outcome Variables From Time 1 to Time 2

	LSM (SE)	95% CI	LSM Group Difference (SE)	95% CI for Group Difference	F Statistic (df)	p-value	d
Variable							
PB							
Study Group	1.52 (.09)	1.34 to 1.71					
Control Group	1.71 (.09)	1.53 to 1.90					
			-.19 (.13)	-.45 to .07	2.04 (1, 118)	.16	.26
QIDS Total ^a							
Study Group	8.53 (.63)	7.29 to 9.76					
Control Group	9.46 (.64)	8.20 to 10.71					
			-.93 (.90)	-2.71 to .85	1.07 (1, 118)	.30	.19
CHRT Risk ^b							
Study Group	2.31 (.35)	1.62 to 2.99					
Control Group	2.83 (.35)	2.13 to 3.53					
			-.52 (.50)	-1.51 to .47	1.08 (1, 118)	.30	.19

Note. PB = Perceived Burdensomeness; Covariates included Age, Sex, Number of Groups, and respective baseline (Time 1) measure; Cohen's *d* interpretation: .2 (small), .5 (medium), .8 (large) (Cohen, 2013)

^aCalculated using the QIDS-A-SR (Bernstein et al., 2010)

^bSuicidal ideation calculated using the CHRT Risk factor (Trivedi et al., 2011)

Table 10.

Analysis of Covariance Equation Predicting Effect of Study Intervention on Change in Outcome Variables From Time 1 to Time 3

	LSM (SE)	95% CI	LSM Group Difference (SE)	95% CI for Group Difference	F Statistic (df)	p-value	<i>d</i>
Variable							
PB							
Study Group	1.57 (.09)	1.39 to 1.75					
Control Group	1.64 (.10)	1.45 to 1.83					
			-.07 (.13)	-.33 to .20	.25 (1, 116)	.62	.09
QIDS Total ^a							
Study Group	8.31 (.67)	6.98 to 9.64					
Control Group	8.43 (.69)	7.06 to 9.81					
			-.12 (.98)	-2.05 to 1.81	.02 (1, 116)	.90	.03
CHRT Risk ^b							
Study Group	1.46 (.29)	.88 to 2.03					
Control Group	2.11 (.30)	1.51 to 2.70					
			-.65 (.42)	-1.48 to .18	2.41 (1, 116)	.12	.28

Note. PB = Perceived Burdensomeness; Covariates included Age, Sex, Number of Groups, and respective baseline (Time 1) measure; Cohen's *d* interpretation: .2 (small), .5 (medium), .8 (large) (Cohen, 2013)

^aCalculated using the QIDS-A-SR (Bernstein et al., 2010)

^bSuicidal ideation calculated using the CHRT Risk factor (Trivedi et al., 2011)

Table 11.

Binomial Logistic Regression Predicting Effect of Study Intervention on Suicide Attempts Between Time 2 and Time 3

Variable	S.E.	Wald	df	<i>p</i>	Odds Ratio	95% CI for Odds Ratio
Age	.56	.40	1	.15	.81	.81 to 3.82
Sex	.53	.97	1	.58	.25	.25 to 11.45
Number of Groups	.05	.24	1	.85	1.05	.65 to 1.67
Study Group	-.57	.95	1	.54	.56	.09 to 3.61

Table 12.

Analysis of Covariance Equation Predicting Effect of Study Intervention on Change in Thwarted Belongingness From Time 1 to Time 2

	LSM (SE)	95% CI	LSM Group Difference (SE)	95% CI for Group Difference	F Statistic (df)	p-value	<i>d</i>
Variable							
TB							
Study Group	1.89 (.08)	1.72 to 2.05					
Control Group	2.16 (.08)	1.99 to 2.33					
			-.27 (.12)	-.51 to -.04	5.33 (1, 118)	.02	.41

Note. TB = Thwarted Belongingness; Covariates included Age, Sex, Number of Groups, and Baseline Thwarted Belongingness (Time 1); Cohen's *d* interpretation: .2 (small), .5 (medium), .8 (large) (Cohen, 2013)

Table 13.

Analysis of Covariance Equation Predicting Effect of Study Intervention on Change in Thwarted Belongingness From Time 1 to Time 3

	LSM (SE)	95% CI	LSM Group Difference (SE)	95% CI for Group Difference	F Statistic (df)	p-value	<i>d</i>
Variable							
TB			-.13 (.13)	-.39 to .13	1.05 (1, 116)	.31	.19
Study Group	1.89 (.09)	1.71 to 2.07					
Control Group	2.03 (.09)	1.84 to 2.21					

Note. TB = Thwarted Belongingness; Covariates included Age, Sex, Number of Groups, and Baseline Thwarted Belongingness (Time 1); Cohen's *d* interpretation: .2 (small), .5 (medium), .8 (large) (Cohen, 2013)

Table 14.

Analysis of Covariance Equation Predicting Effect of Study Intervention on Change in Outcome Variables From Time 2 to Time 3

	LSM (SE)	95% CI	LSM Group Difference (SE)	95% CI for Group Difference	F Statistic (df)	p-value	<i>d</i>
Variable							
PB							
Study Group	1.63 (.08)	1.47 to 1.79	.05 (.12)	-.19 to .28	.15 (1, 116)	.70	.07
Control Group	1.58 (.08)	1.41 to 1.75					
TB							
Study Group	1.98 (.08)	1.81 to 2.14	.04 (.12)	-.21 to .28	.10 (1, 116)	.75	.06
Control Group	1.94 (.09)	1.76 to 2.11					
QIDS Total ^a							
Study Group	8.56 (.64)	7.29 to 9.83	.39 (.93)	-1.46 to 2.24	.17 (1, 116)	.68	.07
Control Group	8.17 (.66)	6.85 to 9.48					
CHRT Risk ^b							
Study Group	1.56 (.25)	1.06 to 2.06	-.43 (.37)	-1.16 to .29	1.41 (1, 116)	.24	.22
Control Group	1.99 (.26)	1.48 to 2.51					

Note. PB = Perceived Burdensomeness; TB = Thwarted Belongingness; Covariates for each outcome included Age, Sex, Number of Groups, and respective baseline (Time 1) measure; Cohen's *d* interpretation: .2 (small), .5 (medium), .8 (large) (Cohen, 2013)

^aCalculated using the QIDS-A-SR (Bernstein et al., 2010)

^bSuicidal ideation calculated using the CHRT Risk factor (Trivedi et al., 2011)

Table 15.

Hierarchical Multiple Regression Equation Predicting Association Between Change in Depressive Symptoms, Change in Thwarted Belongingness, and Change in Perceived Burdensomeness with Change in Suicide Risk From Time 1 to Time 2

Predictors entered in step	F for set	R ²	R ² Δ	β	t for predictors	df	p
<u>Step 1</u>	4.06	.15	.15			5, 118	.002
Age				.002	.03		.98
Sex				.13	1.71		.09
Number of Groups				.004	.05		.96
Study Group				-.04	-.59		.56
CHRT Risk (T1) ^b				.35	3.72		<.001
<u>Step 2</u>	10.69	.39	.24			7, 116	<.001
QIDS Total (T1) ^a				-.17	-1.77		.08
QIDS Total (T2) ^a				.55	6.84		<.001
<u>Step 3</u>	9.81	.44	.05			9, 114	<.001
QIDS Total (T1) ^a				-.11	-.96		.34
QIDS Total (T2) ^a				.46	5.24		<.001
TB (T1)				-.16	-1.64		.10
TB (T2)				.24	2.83		.01
<u>Step 4</u>	10.17	.50	.06			11, 112	<.001
QIDS Total (T1) ^a				-.05	-.46		.65
QIDS Total (T2) ^a				.32	3.54		.001
TB (T1)				-.07	-.71		.48
TB (T2)				.08	.86		.39
PB (T1)				-.16	-1.53		.13
PB (T2)				.35	3.69		<.001

Note. PB = Perceived Burdensomeness; TB = Thwarted Belongingness

^aCalculated using the QIDS-A-SR (Bernstein et al., 2010)

^bSuicidal ideation calculated using the CHRT Risk factor (Trivedi et al., 2011)

Table 16.

Hierarchical Multiple Regression Equation Predicting Association Between Change in Depressive Symptoms, Change in Thwarted Belongingness, and Change in Perceived Burdensomeness with Change in Suicide Risk From Time 2 to Time 3

Predictors entered in step	F for set	R ²	R ² Δ	β	t for predictors	df	p
<u>Step 1</u>	9.35	.29	.29			5, 116	<.001
Age				-.02	-.28		.78
Sex				-.10	-1.24		.22
Number of Groups				.04	.42		.67
Study Group				-.10	-1.19		.24
CHRT Risk (T2) ^b				.52	6.44		<.001
<u>Step 2</u>	15.17	.48	.20			7, 114	<.001
QIDS Total (T2) ^a				-.22	-2.50		.01
QIDS Total (T3) ^a				.49	6.54		<.001
<u>Step 3</u>	13.77	.53	.04			9, 112	<.001
QIDS Total (T2) ^a				-.22	-2.43		.02
QIDS Total (T3) ^a				.61	7.02		<.001
TB (T2)				.14	1.76		.08
TB (T3)				-.28	-3.03		.003
<u>Step 4</u>	11.96	.55	.02			11, 110	<.001
QIDS Total (T2) ^a				-.22	-2.49		.01
QIDS Total (T3) ^a				.51	5.21		<.001
TB (T2)				.09	1.06		.29
TB (T3)				-.29	-3.18		.002
PB (T2)				.002	.02		.99
PB (T3)				.20	2.07		.04

Note. PB = Perceived Burdensomeness; TB = Thwarted Belongingness

^aCalculated using the QIDS-A-SR (Bernstein et al., 2010)

^bSuicidal ideation calculated using the CHRT Risk factor (Trivedi et al., 2011)

Table 17.
Average Acceptability and Feasibility of Study Interventions by Intervention

Intervention	Acceptability Average Score	Feasibility Average Score
Individual Therapy		
Pie Chart	2.6	2.8
Thanks Notes (from therapist)	2.8	2.8
Values and Bullseye	2.6	2.6
Scale Diagram	2.2	1.8
Midpoint Measure	2.6	2.6
Note to Incoming Teen	3	2.4
Teen Group		
One Good Thing	3	2.8
Scale Diagram	2.2	2
Graduation Notes	3	3
Parent Component		
Psychoeducation on PB	2.2	2
Thanks Notes (to/from parents)	2.4	1.6
Letter to Teen From Parents	2.2	2

Note. PB = perceived burdensomeness; Scoring: 2-2.49 (use with edits); 2.5-3 (ready for use)

Table 18.

Average Acceptability and Feasibility of Study Interventions by Study Clinician

	Acceptability	Feasibility
Clinician 1	2.25	2.17
Clinician 2	2.58	2.33
Clinician 3	2.92	2.83
Clinician 4	2.58	2.17
Clinician 5	2.5	2.33

Note. Scoring: 2-2.49 (use with edits); 2.5-3 (ready for use)

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