Reach for Success:

An Initial Evaluation of Implementation Quality in School Settings

by

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A Dissertation Presented in Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

Approved August 2016 by the
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August 2017

ABSTRACT

Anxiety is one of the most common psychiatric disorders among children yet characterized by lower use of mental health services. Preventive efforts have demonstrated promise in the ability to reduce anxiety symptoms. However, as evidence-based interventions move into real-world settings, there is a need to systematically examine potential implementation factors that may affect program outcomes. The current study investigates the relations between different aspects of implementation and their effect on outcomes of a school-based preventive intervention targeting anxiety symptoms. Specifically, the study examines: (1) the measurement of quality of delivery, (2) specific relations among implementation components, (3) relations between these facets and anxiety program outcomes. Implementation data were collected from nine school-based mental health staff and observer ratings. Program outcomes (pretest and immediate posttest) were measured from 59 participants and their parents (mostly mothers) in the intervention condition. Implementation components included adherence, quality of delivery, time spent, participant responsiveness, and perceived usefulness of program materials. Program outcomes included child-reported emotional expressivity, physiological hyperarousal, negative cognitions, social skills, self-efficacy, and child and parent reported levels of child anxiety. Study findings indicated that quality of delivery was best captured as two facets: skillful presentation and positive engagement. Adherence and quality of delivery were associated with greater participant responsiveness, although time spent was not. Significant relations were found between some implementation components and some program outcomes. Further efforts can be used to optimize the translation of evidence-based programs into real-world settings.

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DEDICATION

To the people in my life (especially my parents),

who instill in me a passion to make some amount of difference in this world.

And, to the people who were in this world with me for too brief a time,

who made all the difference in my world.

ACKNOWLEDGMENTS

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INTRODUCTION AND BACKGROUND LITERATURE

Anxiety disorders are among the most common psychiatric problems in youth, with rates ranging from 2% to 19% for individual diagnoses and as high as 32% by late adolescence (Beesdo-Baum & Knappe, 2012; Costello, Egger, & Angold, 2005**;** Kessler, Ruscio, Shear, & Wittchen, 2010**;** Merikangas et al., 2010). Anxiety typically begins in early to middle childhood (Beesdo-Baum & Knappe, 2012; Keller et al., 1992), is often recurrent (Beesdo-Baum & Knappe, 2012; Costello, Mustillo, Erkanli, Keeler, & Angold, 2003; Keller et al., 1992), and associated with maldaptive outcomes from childhood through adulthood. Morevoer, children and adolescents who suffer from anxiety tend to face difficulties with social, academic, and physical functioning such as sleep-related problems (Alfano, Ginsburg, & Kingery, 2007; Ginsburg, LaGreca, & Silverman, 1998; Muris & Meesters, 2002; Mychailyszyn, Mendez, & Kendall, 2010). And, there are data showing that child and adolescent onset anxiety is related to greater likelihood of substance abuse for some youth (Weissman et al.,1 999; Zimmerman, Wittchen, Höffler, Pfifster, Kessler, & Lieb, 2003) as well as the development of other anxiety and comorbid psychiatric disorders (Bittner, Egger, Erkanli, Costello, Foley, & Angold, 2007). Despite the sequela associated with anxiety, evidence suggests there is a great disparity between the number of youth with anxiety disorders and those actually receiving treatment for anxiety. According to the Centers for Disease Control and Prevention's *National Health and Nutrition Examination Survey* (2015), data suggest that only about a third of youth with an anxiety disorder received services within the past year. In fact, children with anxiety disorders were the least likely to have received services (32.2%), as compared to children with ADHD (50.6%), conduct disorder

(46.4%), and mood disorders (43.8%). Given these estimates, a lack of utilized services highlights the importance of preventive efforts to disrupt the onset and development of anxiety (Craske, & Zucker, 2002; Kendall, Safford, Flannery-Schroeder, & Webb, 2004).

Anxiety Prevention Programs

Preventive anxiety interventions have the potential to reduce and offset the negative correlates associated with anxiety disorders. The Institute of Medicine (Mrazek & Haggerty, 1994; Muñoz, Mrazek, & Haggerty, 1996) outlined three major models of prevention programs: universal, selective, and indicated preventive interventions, which respectively target increasing levels of symptoms. Universal interventions target whole populations and do not identify people based on risk. Selective interventions target subgroups based on identified biological or psychosocial risk factors for developing a mental disorder. Indicated interventions target those that are high-risk and present with subclinical levels of symptoms or biological predispositions. Each model is associated with unique advantages and disadvantages (Offord, Kraemer, Kazdin, Jensen, & Harrington, 1998). Universal programs have the potential to reach a larger number of individuals as they are intended to target an entire population. Additionally, universal programs are not usually associated with stigmatization because everyone is a participant. However, applying such broad-reaching programs can be costly if evaluation measures are implemented (Barrett & Pahl, 2006). One advantage of both selected and indicated models is the ability to target those most in need of services, which can be economically more attractive to funders. Targeting a smaller number of individuals is associated with reduced costs devoted to recruiting, training, and delivery of evidence-based programs (Barrett & Pahl, 2006). Another critical advantage of selected and indicated programs is

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the ability to more intensively provide services to children with elevated levels of anxious symptoms, which may more effectively reduce symptoms compared to a universal approach.

In order to evaluate available anxiety prevention programs, a literature search was conducted for empirical studies presenting data on anxiety prevention programs for children and adolescents (5 to 18 years old). Using PsycInfo and Google Scholar, I searched for peer-reviewed articles using anxiety-related key words: anxi-, fear, worr-. These words were crossed with prevention-related key words: prevent-, universal, selected, indicated, and intervention. Articles generated using the term "intervention" were then manually classified as prevention or treatment. Within this search, one literature search (Neil & Christensen, 2009) and two meta-analyses pertaining to anxiety prevention programs were identified (Fisak, Richard, & Man, 2011; Mychailyszyn, Brodman, Read, & Kendall, 2012). Each prevention article included in these reviews was individually examined to confirm that the program's primary aim was to prevent (not treat) the onset or maintenance of anxiety symptoms (not stress or depression) in children and adolescents and that findings were documented in a peer-reviewed article (two of the reviews did not exclude unpublished findings, such as dissertations). Overall, thirty-one empirical trials describing 28 prevention studies were identified. Of the 28 studies, 17 were universal programs; 14 were variations of *FRIENDS*; 12 were implemented in Australia.

The literature search results suggest two main findings. First, the majority of existing evidence-based universal, selected, and indicated preventions share a common cognitive-behavioral approach to preventing anxiety in children and adolescents (see

Fisak, Richard, & Mann, 2011; Neil & Christensen, 2009). Cognitive-behavioral

treatment interventions have been identified in the literature as efficacious and effective

(Reynolds, Wilson, Austin, & Hooper, 2012; Silverman, Pina, & Viswesvaran, 2008),

and existing preventive interventions utilize similar techniques (e.g., exposure, relaxation,

cognitive strategies, contingency management) (e.g., Ginsburg, 2009; Mifsud & Rapee,

2005; Pina, Zerr, Villalta, & Gonzales, 2012). Second, evidence-based anxiety

prevention programs are largely based on the universal model of prevention (e.g., Aune

& Stiles, 2009; Barrett, Farrell, Ollendick, & Dadds, 2006; Calear, Christiansen,

MacKinnon, Griffiths, & O'Kearney, 2009; Essau, Conradt, Sasagawa, & Ollendick,

2012; Miller et al., 2011), the majority of which are adaptations of the same program,

FRIENDS (e.g., Barrett & Turner, 2001; Fukishama-Flores & Miller, 2013; Lock &

Barrett, 2003; Stallard et al., 2005). FRIENDS is adapted from the Queensland Early

Intervention and Prevention of Anxiety Project (Dadds, Spence, Holland, Barrett, &

Laurens, 1997; Dadds et al, 1999), an intervention based on The Coping Koala

prevention (Barrett, Dadds, & Holland, 1994), which is identical to The Coping Koala

treatment (Barrett, Dadds, & Rapee, 1991), an Australian adaptation of Kendall's (1990)

Coping Cat anxiety program for children (Kendall, 1994). Thus, the available selected,

indicated, and universal prevention trials and effectiveness studies (e.g., Barrett, Moore,

& Sondregger, 2000; Cooley, Boyd, & Grados, 2004; Hunt, Andrews, Crino, Erskine, &

Sakashita, 2009; Rapee, Kennedy, Ingram, Edwards, & Sweeney, 2005) are largely

variations or adaptations from the same program. This potentially limits the amount of

information that can be extracted regarding actual versus observed influences of anxiety

prevention programs. That is, it might be that we limit the scope of understanding of the

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development and disruption of anxiety in children and adolescents if we are only exposed to adaptations of the same content and process. Despite this consideration, evidence suggests the benefits of implementing and disseminating anxiety prevention programs to children and adolescents at-risk for developing anxiety disorders. Conitnued implementation efforts are needed in order to determine the effectiveness of anxiety prevention models in settings that can optimally reach those at risk.

Anxiety Preventive Interventions in the School Setting

Schools have been identified as an optimal setting for the implementation of evidence-based interventions (Barrett & Paul, 2006; Masia-Warner, Nangle, & Hansen, 2006; Paternite, 2008; U.S. Department of Health and Human Services, 1999) and may be particularly valuable in preventing anxiety disorders. One benefit is the ability to draw from a general population source that allows for the identification of at-risk youth that may otherwise go unidentified (Masia-Warner et al., 2006). Youth with anxiety often go untreated and are less likely than youth with externalizing problems to be flagged as a concern, perhaps due to the less overt manifestation of some anxious symptoms (Tomb & Hunter, 2004). Additionally, commonly identified barriers to receiving services (e.g., location, cost, transportation) can be eliminated if programs are delivered within the structure of in-school or after-school programs (Barrett & Pahl, 2006; Domitrovich et al., 2008). Another benefit is that the school environment can provide a range of opportunities to practice skills taught during each session (Barrett & Pahl, 2006). Children and adolescents with anxiety commonly report fears or worries relevant to the school setting, including social interactions with peers and adults and performance on academic tasks (Last, Francis, & Strauss, 1989). Overall, the benefits associated with

implementation of school-based interventions may be particularly relevant for anxiety

prevention programs.

While the school setting is marked by considerable advantages, there are also

noteworthy challenges or obstacles inherent to the school environment and organization

(Elias, Zins, Graczyk, & Weissberg, 2003). For instance, successful implementation

typically requires collaboration with a range of school professionals (e.g., principals,

teachers, school mental health professionals) who often face various demands and

pressures, have limited time and resources, and may have different priorities than

program developers and researchers (Domitrovich et al., 2010a; Evans & Weist, 2004;

Miller, 2008; Owens & Murphy, 2004). Program facilitators must also be identified and

be willing to administer a program and receive appropriate training. Considering these

barriers, it is important to underscore that child anxiety interferes with school attendance,

participation, and performance including test scores (King et al., 1998; Ma, 1999; Wood,

2006). Thus, schools should have a commitment to addressing child anxiety because it

corresponds with their own personal and academic priorities, that is, to promote child

well-being, attendance and test scores (attached to funding), and to maximize school staff

roles (e.g., school psychologists, school social workers). Fortunately, the literature

suggests schools are receptive to collaboration despite these challenges (Owens &

Murphy, 2004) and there have been significant individual-level and policy-level efforts to

collaborate with the school system and make school-based implementation feasible.

Research suggests implementation of preventive programs in the school setting is

not only feasible but predictive of positive gains in various domains of psychosocial

adjustment, including anti-bullying preventions (Williford et al., 2012), social problem

solving (Elias et al., 1986), positive coping strategies (Cunningham, Brandon, & Frydenberg, 2002), disruptive behaviors (see Greenberg, Domitrovich, & Bumbarger, 2001; Reid, Eddy, Fetrow, & Stoolmiller, 1999; Stormshak, Dishion, Light, & Yasui, 2005), depression (see Calear & Christensen, 2010), and anxiety (e.g., Aune & Stiles, 2010; Calear et al., 2009; Kiselica, Baker, Thomas, & Reedy, 1994; Rose, Miller, & Martinez, 2009). Focusing on anxiety programs, the literature has generally demonstrated improved outcomes associated with the implementation of universal, selected, and indicated preventive interventions in the school setting, with the previously discussed caveat that the majority of available anxiety preventive interventions are universal (e.g., Barrett, Sonderegger, & Xenos, 2003; Barrett & Turner, 2001; Stallard et al., 2008). However, two considerations must be noted: 1) Two FRIENDS trials, one universal (Miller et al., 2011) and one indicated (Hunt, Andrews, Crino, Erskine, & Sakashita, 2009), did not demonstrate intended reduced anxiety ratings as a function of intervention condition. Miller and colleagues (2011) implemented a "culturally-enriched" version of FRIENDS (universal school-based prevention program) in Canada and results indicated both conditions (intervention or waitlist control) were associated with reduced anxiety symptoms at six months follow-up. Hunt and colleagues (2009) implemented an indicated version of FRIENDS in Australian schools and results indicated no significant differences between intervention and monitoring control conditions. 2) Additionally, some school-based anxiety prevention programs demonstrating positive outcomes did not include a comparison group or randomly controlled trial (RCT) (e.g., Bokhorst et al., 1995; Fukushima-Flores & Miller, 2013; Stallard et al., 2005, 2007). For instance, a social anxiety prevention program implemented in the Netherlands (Bokhorst et al.,

1995) and FRIENDS trials implemented in Canada (Fukushima-Flores & Miller, 2013) and England (Stallard et al., 2005, 2007) did not employ RCT methods. Studies that do not include randomly controlled trials are limited in their ability to infer causality (Chambless & Hollon, 1998). Thus, although current findings generally indicate favorable outcomes associated with school-based prevention programs targeting anxiety, there are noteworthy limitations to consider.

Importantly, even evidence-based programs marked by successful outcomes are subject to a fundamental issue inherent to the translation of research into real-world settings (e.g., schools). Specifically, a challenge associated with implementation in the real-world settings is the reality that a program may not be implemented as intended or tested in efficacy trials (Berman, 1976; Cohen et al., 2008; Dusenbury et al., 2003; Mildon & Shlonsky, 2011). Facilitators may vary in the extent to which a program is implemented as intended, their clinical skill, etc. Any changes in implementation may potentially affect program outcomes and thus compromise the integrity of results. Failure to systematically report these findings can lead to a mismatch between effects reported as an intervention was described versus how it was actually delivered. This mismatch is referred to as Type III error (Dobson, 1980) and is the foundation for evaluating implementation efforts in real-world settings. Without measurement of external factors that may influence program outcomes, it is impossible to comprehensively determine a program's ability to affect change.

Possible Implications for Anxiety Prevention Implementation

Current implementation research has outlined specific facets, or dimensions, that can impact the extent to which an evidence-based program is delivered as intended.

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Although different studies have used different terms to describe these facets, the taxonomy discussed by Durlak and Dupre (2008) has been widely referenced and delineates important distinctions between facets: 1) *Adherence, or fidelity,* is the most common measurement of implementation and describes the extent to which objectives were taught and specific components or procedures were implemented as intended (Fagan, Hanson, Hawkins, & Arthur, 2008; Perepletchikova, Treat, & Kazdin, 2007). 2) *Dosage* typically refers to delivery of the required number, duration, or frequency of sessions (August et al., 2006; Dane & Schneider, 1998; Durlak & DuPre, 2008; Fagan al., 2008a,b). 3) *Quality of delivery,* also described as *competence*, broadly refers to the style and process by which implementers deliver material (Durlak & Dupre, 2008; Dusenbury, Brannigan, Falco, & Hansen, 2003), and has been defined by a range of behaviors including: the ability to use relationship and alliance building behaviors (Creed & Kendall, 2005), ability to tailor the session as needed (Creed & Kendall, 2005), knowledge of program, preparedness to teach, support and enthusiasm, confidence, pacing of the session, and interactive teaching methods (Fagan et al., 2008a, b). The variability in this dimension is reflected by its conceptualization, which has been discussed as a single latent construct (e.g., Fagan et al., 2008a,b; Smith et al., 2013) as well as a higher-order construct (Berkel et al., 2011; Sandler et al., in press). 4) *Participant responsiveness* refers to understanding of materials and the degree to which participants appear interested or actively involved in the session (Durlak & Dupre, 2008; Fagan et al., 2008a,b). Each dimension has been conceptualized as a distinct facet of implementation that may vary across facilitator and influence program delivery and outcomes. Additional factors that are conceptually and empirically discussed as

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predictors of implementation include facilitator attitudes or perceptions concerning the program or curricula being implemented and years of previous experience (Ringwalt et al., 2003; Spoth, Guyll, Lillehoj, Redmond, & Greenberg, 2007).

Focusing on anxiety, each of these components might have an influence for evidence-based anxiety programs in particular. In keeping with a cognitive-behavioral framework, as the currently established efficacious programs for anxiety predominantly utilize cognitive-behavioral techniques (Neil & Christensen, 2009), it seems intuitive that *adherence* to CBT-specific activities and discussion should be linked to reduced anxiety symptoms in youth. Similarly, the amount spent teaching CBT-specific skills to counter or prevent anxious thoughts and behaviors should be linked to reduced anxiety symptoms in youth. Additionally, the ability to skillfully cover CBT techniques while building and maintaining rapport (*quality of delivery)* may be especially important when working with a population characterized by worries, somatization, and avoidance-symptoms (American Psychiatric Association, 2013), symptoms which underscore the importance of eliciting *participant responsiveness*. That is, in order to actively engage children whose inclination is to avoid situations that may induce anxiety, a clinician must demonstrate clinical skill that encourages children to participate by confronting their fears and rejecting their avoidant tendencies.

The current understanding of the specific relations between these dimensions of implementation, in general and for anxiety in particular, is limited by a lack of available, consistent empirical findings examining multiple facets at once. Although it is generally accepted that the different dimensions represent distinct but related constructs (Dusenbury et al., 2003; Leff, Hoffman, & Gullan, 2009; Power et al., 2005; Reinke et

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al., 2013), their interrelations are not well documented but there is theory about how they might relate. One promising conceptual model (Berkel, Mauricio, Schoenfelder, & Sandler, 2011) has proposed specific relations between adherence, quality of delivery, participant responsiveness and program outcomes:

Adherence, quality of delivery, and participant responsiveness. Berkel and colleagues (2011) emphasize the importance that participant responsiveness has on successful program outcomes and highlights the relation between quality of delivery and participant responsiveness as instrumental to program outcomes. Findings (Dillman Carpentier et al., 2007; Eddy, Dishion, & Stoolmiller, 1998; Patterson & Forgatch, 1985; Shelef, Diamond, Diamond, & Little, 2005; Rohrbach, Gunning, & Sussman, 2010) support this link, with characteristics such as facilitator skill related to the promotion of group cohesion and attendance (Dillman Carpentier et al., 2007) and relationship quality linked with indicators of participant responsiveness including active participation (Shelef et al., 2005). However, other evidence has also failed to establish a significant relation between quality of delivery and participant responsiveness. Instead, evidence has demonstrated significant links between adherence and quality as well as between adherence and some measures of participant responsiveness (Knoche et al., 2010). This would suggest the relation between adherence and participant responsiveness may be important to consider in the conceptualization of the interrelation among these aspects of implementation. Given the typical core content associated with anxiety prevention programs (e.g., exposure, relaxation, cognitive strategies, and contingency management), facilitator adherence likely influences the degree to which a participant is responding to the intervention as a function of the quality of delivery. Children at risk for developing

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anxiety disorders may be inclined to avoid experiencing discomfort that might be associated with the content of an anxiety prevention group and subsequently display low responsiveness. However, students may be more likely to evidence increased responsiveness if a facilitator is successful at implementing the protocol as intended while establishing rapport and demonstrating skillful delivery. The moderating role of quality of delivery must be further examined and may inform specific proposed links to program outcomes targeting anxiety symptomatology.

Implementation predictors of program outcomes. Literature has demonstrated inconsistent findings between implementation components and program outcomes across a range of psychosocial and educational outcomes (Barber, Sharpless, Klostermann, & McCarthy, 2007; McHugh, Murray, & Barlow, 2009; Smith, Schneider, Smith, & Ananiadou, 2004), with some studies demonstrating significant relations (Chiapa et al., 2015; Flannery, Fenning, McGrath Kato, & McIntosh, 2014; Kalafat, Illback, & Sanders, 2007) and others demonstrating limited or no relations (Gullan, Feinberg, Freedman, Jawad, & Leff, 2009; Spoth, Guyll, Trudeau, & Goldberg-Lillehoj, 2002; Wickstrom, Jones, LaFleur, & Witt, 1998). Although varying results may in part be due to methodological differences, inconsistent findings may also be a function of a misconceptualization of important dynamics. Berkel and colleagues (2011) theorize that the relation between adherence and program outcomes is moderated by participant responsiveness, as programs high in adherence but low in participant responsiveness are unlikely to achieve successful outcomes. Additionally, quality of delivery is presented as a moderator on the relation between adherence and program outcomes as behavioral changes depend on the delivery of critical program components, yet recognition that

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weak relations between adherence and program outcomes may be due to poor quality of implementation. Finally, the model proposes that quality of delivery is indirectly related to program outcomes through participant responsiveness. Recent findings partially support this model, demonstrating significant relations between higher fidelity ratings (i.e., a combined adherence *and* competence measure) and improvements in program outcomes *indirectly* through participant responsiveness (Smith, Dishion, Shaw, & Wilson, 2014). However, given support that adherence and competence are conceptually separate dimensions, and have both been linked to participant responsiveness, it may be that adherence and quality of implementation interact and affect participant responsiveness, which subsequently affects change in program outcomes. Among children with indicated levels of anxiety, the very act of participating in a group-based program may provoke fear, making participant responsiveness and subsequent program outcomes perhaps especially sensitive to the interaction between adherence and quality of implementation.

Other characteristics not formally included in this conceptual model are dedicated time spent delivering activities and skills and facilitator attitudes. Time spent has been presented as its own dimension of implementation, with the idea that 'sufficient' time is necessary for an intervention to have an effect (August et al., 2006; Ennett et al., 2001; Nation, 2003). Conceptually, time spent may be similar in function to adherence, in that they are both measuring the degree to which an intervention is implemented (Ennett et al., 2001). However, whereas adherence typically measures the degree to which core content was covered, time spent is generally a time-based measure of objective time spent covering material. Similar to the variable relations found between adherence and

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program outcomes in the literature, the relation between dedicated time spent and program outcomes is likewise significant in some studies (Allen et al., 1990; Weinman et al., 1992) and nonsignificant in others (Malvin, Moskowitz, Schaeffer, & Schaps, 1984), and sometimes variable within the same study (Aber, Jones, Brown, Chaundry, & Samples, 1998). This lack of consistency may similarly be a function of the lack of studies examining the interplay between multiple indicators of implementation (e.g., the interaction between dedicated time spent and quality of delivery on participant outcomes). Similar to adherence, it may be that anxious and subclinical anxious youth are especially sensitive to the interplay between a facilitator's ability to spend an appropriate amount of time covering potentially uncomfortable topics while also being able to competently implement CBT-specific strategies and activities.

Additionally, it is important to consider personal factors that may affect or predict implementation. Facilitator attitudes regarding the curricula taught or perceived effectiveness of program content may influence levels of adherence. For instance, curriculum adherence has been positively linked with how much instructors liked teaching substance use prevention lessons and how effective implementers believed curriculum to be (Ringwalt et al., 2003). Although not a dimension of implementation, facilitator attitude can be conceptualized as an important predictor to implementation and it is equally important to identify factors that affect these critical dimensions.

In sum, we are still in the nascent stages of establishing consistent findings concerning the role that implementation dimensions may have on program outcomes. Although the literature does clearly indicate a relation between factors that can affect implementation and program outcomes, the exact relations and nuances influencing these

relations remain to be identified. Moreover, given the prevalence and burden of suffering associated with child anxiety, these relations must be understood within the context of anxiety prevention programs. The current dissertation seeks to examine these relations based on the conceptual and extant empirical literature.

Measurement of Implementation

Currently, measurement ranges from self-report checklists to more complex video coding (e.g., August, Egan, Realmuto, & Hektner, 2003; Fagan et al., 2008a,b; Knutson, Forgatch, & Rains, 2003; McLeod & Weisz, 2010), each of which has advantages and disadvantages. The use of video coding, for example, allows for observational ratings, which have been described as having more reliability and validity than self-report of implementer behaviors (Hansen, Graham, Wolkenstein, & Rohrbach, 1991; Harachi, Abbott, Catalano, Haggerty, & Fleming, 1999). Benefits include an ease of establishing inter-rater reliability and some evidence suggests greater likelihood of observer-report implementation to be linked to outcomes than self-report (Hansen et al. 1991; Hogue et al. 2008; Lillehoj, Griffin & Spoth, 2004). However, there are significant advantages associated with self-report measures that are particularly attractive given barriers of school-based implementation. Self-report measures are typically low in cost, easy to administer, and time-efficient, qualities not typically assigned to observational measures (Cross & West, 2011). It can be incredibly tedious to implement an accurate coding system that measures components of implementation. For instance, in order to effectively code, one must understand the key content as well as the interpersonal dynamics of the specific intervention (Stiles, Honos-Webb, & Surko, 1998). This type of understanding requires the availability of resources to provide effective training and ensure

sustainability, and stake-holders at the national or local level may not be inclined to use already limited funds towards this purpose. While it is imperative that school facilitators be provided psychometrically sound measures of process evaluation, it is equally necessary to ensure feasible monitoring of implementation. Thus, a multi-method, multi-report assessment may be the most practical compromise to balancing the demands of science and practice (Leff, Hoffman, & Gullan, 2009; Schoenwald et al., 2011).

Additionally, the quality of delivery construct merits further methodological investigation as it is notably the most variably measured construct. This variability is partly due to the different items used to describe measure (see previous section). Another potential contribution to the variability in this construct is a difference in how this construct is conceptualized. For instance, although quality of delivery is typically measured as one scale, there is evidence to suggest the existence of a higher-order construct of quality made up by distinct, yet related, facets. For instance, Sandler and colleagues (in press) have identified three factors (positive engagement, skillful feedback, skillful presentation) that make up quality of delivery within the context of a program for divorcing and separating parents. However, these findings may not extend to the evaluation of anxiety implementation programs. Measures of quality of delivery should be related to the process theory of the program. Unfortunately, the status of the present literature precludes our knowledge of the construct of quality of delivery of anxiety prevention programs because studies minimally, if at all, tap into this construct as it is discussed in other prevention literature (e.g., Fagan et al., 2008a, b; Hansen et al., 1991; Knoche et al., 2010). Instead, implementation evaluation of anxiety prevention programs has been limited to self-report and observational measurement of adherence (e.g., Aune

& Stiles, 2010; Barrett & Turner, 2005; Dadds & Roth, 2004) or perceptions regarding the program itself (Stallard et al., 2005; Lowry-Webster, Barrett, & Lock, 2003). More research is needed to identify the specific items and potential sub-facets comprising this complex component of implementation, both broadly and as related to anxiety prevention programs.

Current Literature on Anxiety Prevention Implementation

To date, implementation research has largely focused on educational, general mental health, and externalizing behavioral problems (e.g., August et al., 2003; Backer, 2001; Cross, 2005; Fagan, A., & Mihalic, 2003; Forgatch, Patterson & DeGarmo, 2005; Paulsell, Kisker, Love, & Raikes, 2003; Robarch et al., 1993; Spoth et al., 2002), which potentially limits the applicability of these findings to preventive programs targeting anxiety symptoms. In fact, of 162 prevention studies evaluated by Dane and Schneider (1998) and 59 promotion and prevention programs evaluated by Durlak and DuPre (2008), no preventive anxiety disorders were included. Recent reviews (Fisak et al., 2011; Mychailyszyn, Brodman, Read, & Kendall, 2012; Neil & Christensen, 2009) have demonstrated an increase in anxiety-prevention studies, yet findings related to implementation (adherence, quality) have been primarily limited to descriptive ratings (Aune & Stiles, 2009; Barrett, Lock, & Farrell, 2005; Barrett & Turner, 2011; Essau, Conradt, Sasagawa, & Ollendick, 2012; Miller et al., 2011; Roberts, Kane, Cross, Fenton, & Hart, 2010). For instance, adherence and competence are typically reported as a percentage of content covered or by reporting mean values from Likert-type scales asking the extent to which content was covered (Aune & Stiles, 2009; Barrett et al., 2005; Calear et al., 2009; Essau et al., 2012) but these findings are not typically linked to other

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implementation components or program outcomes. Measures of "social acceptability",

including participant and implementer's perceived usefulness and attitude toward

program have also been measured, but likewise not analyzed in relation to

implementation or program outcomes (Lowry-Webster, Barrett, & Lock, 2003; Stallard et

al., 2005). Moreover, there are no known anxiety prevention studies that have examined

the relations among the multifaceted dimensions of implementation or their link to

participant outcomes. Continuing the current efforts to understand and advance rigorous

yet sustainable program implementation, the current dissertation seeks to empirically test

the relations among previously identified dimensions of implementation of a streamlined,

school-based, child-focused anxiety prevention program.

REACH for Success

Literature suggests the effectiveness of implementing evidence-based anxiety

prevention programs in the school setting is not mutually exclusive to their sustainability.

In order to promote the sustainability of a rigorously designed prevention program in the

real-world, currently identified barriers must be addressed into effectiveness trials. For

instance, an intervention must be a) acceptable to schools and teachers, b) effective, c)

feasible to implement with minimal resources and d) flexible and adaptable (Evans &

Weist, 2004; Miller, 2008; Han & Weiss, 2005). REACH for Success is a preventive

intervention for youth anxiety disorders which incorporates critical features that make it

distinct from other anxiety interventions and from the primary anxiety prevention to date,

FRIENDS for Life. A principal goal in the development of REACH focused on

scalability as many programs have not been successfully sustained by schools. The lack

of established sustainable interventions is surprising given the previously described

advantages of minimizing barriers to services, reaching diverse groups of children, and

providing relevant opportunities to practice cognitive-behavioral strategies in an

environment particularly relevant to anxious populations. In order to address barriers to

implementation and promote sustainability, data was collected from school staff members

involved in delivering interventions to students with social and emotional difficulties.

Staff members informed REACH developers that the classic design of evidence-based

prevention programs (including FRIENDS) is not feasible due to the number and length

of sessions, extensive manuals, and the amount of training and preparation required.

Currently, school-based anxiety prevention programs range from approximately 8 to 15

sessions and each session lasts 60-90 minutes (e.g., Brrett & Turner, 2001; Cooley et al.,

2004; Kiselica et al., 1994; Mifsud & Rapee, 2005; Roberts et al., 2010). For instance,

Cool Kids is an Australian, indicated school-based prevention program that consists of

eight 1-hour sessions for children and an additional two 2-hour sessions for parents

(Mifsud & Rapee, 2005). The Aussie Optimism Program, a universal school-based

prevention targeting low Socio-Economic Status (SES) areas consists of 16 hours of

group teacher training and twenty 60-minute lessons implemented over 20 weeks

(Roberts et al., 2010). FRIENDS typically consists of ten 60-75-minute sessions (e.g.,

Barrett & Turner, 2001; Lock & Barrett, 2003 Lowry-Webster et al., 2001). Additional

factors associated with failure to initiate and sustain implementation included: some

administrators might not know how anxiety affects academics and attendance; difficulty

implementing screens, training and feedback outside the available infrastructures is too

demanding, lack of outcome reports for stakeholders, and lack of quality monitoring

tools.

REACH was developed from theory and existing cognitive-behavioral anxiety

protocols (FRIENDS, Coping Cat, SET-C (Barrett & Turner, 2001; Beidel, Turner, &

Morris, 2000, Kendall, 1994). REACH combined a cognitive-behavioral theoretical and

empirically driven top-down approach with a bottom-up approach by collaborating with

school opinion leaders who participated in various focus groups. These efforts resulted in

a 6-session (versus the typical 10-15), 20-30 minute in length (versus the typical 60 to 90

minutes) program including a practical and easy-to-follow manual (each session is

condensed into one page front and back while FRIENDS, for example, has an 89-page

manual). A key distinction of REACH from other anxiety interventions lies in REACH's

exclusive focus on theorized mechanisms of change in anxiety symptoms (e.g., social

skills, negative cognitions, physiological arousal). FRIENDS, for instance, includes

content on identification of positive role models, empathy, and support building, which

add length and may distract from affecting key mechanisms of change. Importantly,

REACH's measure to monitor implementation can be completed by various sources of

report (self, observer) in 5 minutes after each session, while capturing various

components of implementation (adherence, dedicated time spent, quality of delivery,

participant responsiveness) as well as usefulness.

Sustainability of a school-based program is predicated on a feasible model, and

REACH has demonstrated encouraging strides towards the sustainability of an effective

anxiety prevention program. Notably, 88% (8/9) of schools involved in the pilot

effectiveness trial of REACH described in the present study adopted the program, and

one entire school district has now made REACH its official anxiety prevention program

(unlike with FRIENDS participant schools who chose not to continue to implement the curriculum in the four years of follow-up (Hunt et al., 2009, p. 303).

Pilot effectiveness data suggests REACH is related to improved program targets.
Program outcome findings suggest REACH is a promising intervention (manuscript in preparation). At 1-yr follow-up, baseline child anxiety levels moderated the effects of REACH compared to control in that for youth with higher anxiety levels, REACH resulted in significantly lower anxiety levels on anxiety outcome measures. Anxiety levels also moderated the effects of REACH compared to control based on parent report of child anxiety; at lower anxiety levels at baseline REACH resulted in significantly lower child anxiety levels; whereas at higher anxiety levels at baseline, significantly lower child anxiety levels were found for the control, probably because handouts that described strategies for managing high child anxiety levels were provided to parents in the control. At 1-yr follow-up, main effects were found favoring REACH compared to control on measures of negative cognition, self-efficacy in anxiety-provoking situations, and social skills. Reductions on children's physiological hyper-arousal at the 1-yr follow-up were moderated by higher levels of baseline anxiety scores. There also was a mediated effect of REACH on test anxiety at the 1-yr follow-up through reductions on negative cognition observed at the 1-yr follow-up. Lastly, although stigma was generally low, higher child-reported stigma predicted fewer posttest reductions on anxiety levels and physiological hyper-arousal. None of these results were moderated by Spanish language or Hispanic ethnicity. Thus, REACH appears very promising for the prevention of child anxiety.

Current Study

        The current dissertation will describe several theoretically based dimensions of implementation and evaluate the associations between implementation dimensions and program outcomes for an anxiety prevention program delivered in the school setting. The current study is designed to examine three specific aims: (1) To empirically test two measurement models representing the 'quality of delivery' dimension, (2) To investigate the relations among specific components of implementation and, (3) To evaluate the relations between these key facets of program implementation and program targets of a group-based anxiety prevention pilot study (see Figure 1 for conceptual model of Aims 2 and 3).

        Aim 1. Testing the Conceptual Construct of Quality of Delivery. The current study will determine whether the items comprising the quality of delivery dimension are best represented by a single factor or two factor model according to current theoretical models outlined in the literature (see Figure 2). That is, quality of delivery, comprised of items typically used to measure a facilitator's clinical competency (e.g., clarity of explanations, rapport), will be tested as a single factor and also as a two factor indicated by two domain specific factors, positive engagement and skillful presentation, to determine the most accurate representation of this complex dimension.

        Aim 2. Relations between Specific Components of Implementation. The current study will examine the relations between key implementation dimensions (see Figures 3-5).

        a. It is hypothesized that adherence to implementation and quality of delivery will be related to participant responsiveness. Additionally, it is hypothesized

that the relations between adherence and participant responsiveness (understand materials, active participation) will be moderated by quality of delivery, such that adherence will be positively related to participant responsiveness at high levels of quality of delivery and that this relation will be attenuated at lower levels of quality of delivery.

b. It is hypothesized that dedicated time spent delivering program components and quality of delivery will be related to participant responsiveness. It is also hypothesized that the relation between dedicated time spent covering program content and participant responsiveness will be moderated by quality of delivery, such that time spent will be positively related to participant responsiveness at high levels of quality of delivery.

c. Finally, it is hypothesized that greater levels of facilitator-reported perceived usefulness of program materials will be significantly related to greater levels of adherence.

Aim 3. Relations between Implementation and Program Outcomes. The current study will examine links between implementation components and levels of program targets (see Figures 6-8).

a. It is hypothesized that greater levels of adherence will be associated with improvements in program targets and that this relation will be partially mediated by participant responsiveness.

b. Next, it is hypothesized that dedicated time spent covering program content will be associated with improvements in program targets and that this relation will be partially mediated by participant responsiveness.

c. Given the limited sample size and limited power, it is not feasible to examine the moderating effects of quality of delivery on the mediated relations hypothesized in aims 3 a and b. As such, a modified hypothesis is proposed, such that the quality of delivery will be associated with improved levels of program outcomes and that this relation will be partially mediated by participant responsiveness.

METHODS

Participants

The proposed study will use data from a preventive intervention trial investigating a school-based anxiety prevention program that targets 4th and 5th graders in the southwestern region of the United States. Participants in the intervention condition consisted of 59 students (*M* age = 9.76 years; 54% Hispanic/Latino (mostly Mexican origin), 37% Caucasian, 9% Other) and their primary caregivers (mostly mothers). Full demographic information including participant age, gender, ethnicity, family income, parent education level, and parent marital status for intervention and control conditions are listed in Table 1. Program facilitators were nine school staff members (three school social workers, six school psychologists) from nine schools across four school districts. Each facilitator led one or two groups (2 to 6 children per group) for a total of 84 sessions.

Procedures

All study procedures were approved by the university's Institutional Review Board. Children were recruited from nine public elementary schools after the primary caregiver (or legal guardian) provided consent to participate in an intervention study. A full consort diagram is depicted in Figure 9. With parent consent and assent from child, a battery of questionnaires was administered in English in the classroom to all participating children. Children who met the "at risk" cutoff score (Barrett & Turner, 2001) on the Spence Children's Anxiety Scale (SCAS; Spence, 1997; 1998) during this screening were invited to participate in the school-based anxiety prevention program (n = 109). Parents and children who chose to participate were randomized to intervention (6-week

intervention; n = 59) or control (self-study; n = 50) conditions at the classroom level. For these families a more extensive battery of questionnaires was administered via telephone interviews before the 6-week intervention. The interview lasted about one and a half hours. All children completed the interview in English; approximately 32% of caregivers completed the interview in Spanish. Program outcome measures used in the current study were pulled from this more extensive, pre- and post-intervention battery.

Selection of program facilitators and observers. Nine school-based mental health staff members were selected to implement the intervention because they had been nominated by their colleagues within their professional network as being popular opinion leaders (POLs). POLs were nominated based on perceived helpfulness, being knowledgeable about interventions for students with emotional difficulties, and identified using social network metrics and peer-report indices. Additionally, doctoral students involved in the development of the program and familiar with the content and dynamics of the intervention assisted as observers to provide assistance *in vivo* as needed.

Training. Program facilitators were required to participate in a group-based training session, in which program facilitators were grouped according to their affiliated school district. Training sessions were led by the first co-chair of this dissertation, doctoral students, and trained research assistants. All program materials were electronically sent in advance to provide facilitators ample time to become familiar with the content. The training session lasted approximately six hours and involved didactic and interactive coverage of the six program modules. Previously recorded video segments introduced the overarching goals for each module, followed by a more detailed discussion of program content. The training session was designed to elicit active participation among group

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facilitators and consisted of various role-play scenarios in which facilitators took turns assuming the role of 'leader' or 'student' and enacting different sections of each module. Feedback was provided if content was not implemented as intended and group facilitators were encouraged to ask for clarification.

Intervention. The REACH for Success intervention is a group, school-based targeted (selective/indicated) child anxiety intervention comprised of six modules. Parent and teacher tips were provided at the end of each module to provide a brief overview of the content covered. Each module includes activities and discussion intended to target theoretically and empirically-based change mechanisms associated with reduction of anxiety levels (see Table 2).

Module 1: Introduction and Relaxation. Module 1 consists of an introduction to the group, in which students come up with a group name and take turns reading group rules to foster rapport and encourage active participation. Next, students learned to identify anxiety-related emotions (e.g., scared, afraid, worried) and physiological and behavioral manifestations (e.g., stomachache, sweating, staying away) through two interactive activities. Students then listened to the How-2-Relax CD, consisting of child-tailored relaxation exercises (progressive muscle relaxation, deep breathing, guided imagery). At the end of Module 1, blue wristbands inscribed with "1, 2, 3, 4...and Relax" were handed out for the students to wear that week.

Module 2: Worryheads. The key components of the first module (learning emotions, relaxation tools) were reviewed by asking students to recall the information learned and having facilitators clarify and praise students' efforts. Students were then taught the definition of worrying and introduced to the acronym STOP, a tool used to

change worry thoughts by teaching children to generate alternative plans to the negative outcome faced from the feared situation. Students practiced using STOP in the Worryheads board game, requiring students to draw Worry Challenge cards and generate alternative solutions in order to move forward towards the Amygdala Vortex end point. At the end of Module 2, the blue wristbands were collected and red wristbands inscribed with "Other Thoughts?" were handed out for the students to wear that week.

Module 3: Conversations. The STOP acronym was reviewed and the facilitator asked students to share if they used STOP the past week. Students then engaged in an interactive activity to discuss how to start, maintain, and change a conversation, an important skill in making and keeping friendships. Students applied these conversation skills to a role-play activity, the Make-Believe Game, in which each student chose a character card and took turns starting and maintaining a conversation. At the end of Module 3, facilitators encouraged students to continue using their red "Other Thoughts?" wristbands to keep practicing STOP, particularly as related to conversations.

Module 4: Assertiveness. Students reviewed how to start, keep, and change conversations and were encouraged to commit to practicing these skills. Facilitators then introduced the concept of being assertive without violating another's rights and introduced the SAFE acronym, a tool used to teach children to speak their mind in a kind but assertive manner. Students practiced being SAFE in the Stand-Up! activity, in which the facilitator and students generated situations that might require a student to be assertive. At the end of Module 4, the red wristbands were collected and green wristbands inscribed with "Speak your mind!" were provided for students to wear that week.

Module 5: Show That I Can.   Relaxation, STOP, and SAFE (from the first four modules) were reviewed by asking the participants to explain each tool. Facilitators clarified and praised students' efforts. Facilitators then taught students the importance of learning to face difficult situations. Students identified a difficult situation and rated the level of fear (0 = not at all difficult to 8 = very difficult) associated with that situation and were taught to practice facing a situation given a rating of 4 or 5 (i.e., a situation that elicits some fear, but is not overwhelming to encourage successful experiences in facing one's fear). Students then practiced facing a school-related situation in the classroom or on the school campus and were encouraged to use the previously taught skills if they felt nervous or scared.   The Show That I Can (STIC) challenge game was assigned to participants to play over the course of the week. STIC cards contained several challenges and students were encouraged to earn points by facing as many challenges as possible. The green wristbands were collected and yellow wristbands inscribed with "Show That I Can" were provided.

Module 6: Practice Makes Perfect.   STIC challenges were reviewed, followed by a review of all of the tools previously learned from Modules 1-5. Students identified their favorite tools and the facilitator emphasized the importance of practicing these tools in elementary school, middle school, high school, etc. The yellow wristbands were collected and a REACH diploma was presented in a mini-ceremony to each student.

Control. Although not included in the present study, the control group received three books ("What To Do When You Are Scared and Worried", "How To Do Homework Without Throwing Up", and "Getting Organized Without Losing It"), which are commercially available and discuss strategies on organization, homework completion,

perfectionism, and self-control. Additionally, an abbreviated version of Testbusters (Beidel, Turner, & Taylor-Ferreira, 1999), a study-skills and test-taking strategy for students between 8 and 12, was provided. Tips include establishing good study habits, the use of study contracts, helping the student learn with purpose, and test preparation including how to answer multiple-choice and true/false questions and reviewing test-taking mistakes.

Measures

Implementation Assessment Instruments. The *Quality Matters* measure was developed specifically to assess implementation of the present pilot intervention program. *Quality Matters* was adapted from Fagan et al. (2008a,b) to measure: (a) adherence to the program components and content, (b) quality of delivery, (c) dedicated time spent (i.e., length of core content covered) and (d) participant responsiveness for each session. Fagan and colleagues derived their integrity monitoring tools from various program developers and created their own tools according to extensive review of core components and processes administered by community programs. The current study adapted these implementation/predictors of implementation measures to create the *Quality Matters* questionnaire and reflect the content and structure of the intervention described in the present study as described below.

Adherence. Immediately following each session, program facilitators were asked to rate the extent to which session-specific content and activities were taught. For example, Module 5 begins with a review of the content covered in the previous session, followed by a psychoeducational discussion of the importance of exposure to anxiety-provoking experiences, "Learn to face situations". Participants then engaged in an

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exposure-based activity, "Show That I Can (STIC)". Adherence items for Module 5 included: "Please rate your coverage of: "Review relaxation, S.T.O.P., and S.A.F.E.";

"Learn to face situations"; "Show That I Can (STIC) Game", using a response scale from 0 to 4, with anchors of 0 = *Not Covered*, 2= *Covered Adequately*, and 4 = *Covered Well*.

Thus, items were specific to each session but used the same response set in order to capture overall adherence to the program at the session level. It is important to note that the measurement of adherence in the present study is not a pure construct of adherence, as the anchor "Covered Well" denotes an evaluative component. Although intraclass correlation between observer and facilitator was poor (-.15), interrater agreement (calculated as agreement if ratings were within 1 point of each other) between facilitator and observer report was 85.9%.

Quality of Delivery. Observers were asked to rate quality of delivery according to seven items: clarity of explanations, pacing of presented materials, knowledge of the problem, level of enthusiasm, confidence, rapport with students, and effectiveness of addressing questions/concerns. Responses are scored from 1 to 5, with anchors of 1 = *Not/Poor*, 3 = *Somewhat/Average*, and 5 = *Very/Excellent.* In the present sample, alpha reliability across sessions was .77.

Time Spent. Each session consists of specific activities and material to cover, with a break-down of how much time should be spent on each activity or section. Research assistants viewed the video-taped sessions and recorded the actual amount of time spent on these activities. A score was then calculated by dividing the amount of time spent on the total primary session-specific activities from the total intended amount of time as indicated by the manual.

Participant Responsiveness. Observers rated participant responsiveness according to two items: "To what extent did the students appear to understand the material?"; "How actively did the students participate in discussions and activities?" Responses are scored from 1-5, with anchors of 1 = *Not*, 3 = *Somewhat*, and 5 = *Very*. In the present sample, alpha reliability across sessions was .41.

Usefulness of Program Materials. Facilitators were asked whether they used session-specific materials and, if so, to rate the extent to which they perceived the materials to be useful. For example, Module 4 uses a laminated, "Green Pie Piece" to teach participants how to be "SAFE": Speak your mind, Ask nicely, Firm but kind voice, Eye contact. One of the usefulness items asks the extent to which the "Green Pie Piece" was useful, using a response scale from 0 to 4, with anchors of 0 = *Not Useful*, 2 = *Somewhat Useful*, and 4 = *Very Useful,* as well as an option to indicate *Not Used at All*.

Child anxiety symptoms. Caregivers and children completed the Multidimensional Anxiety Scale for Children (MASC; March et al., 1997, 1999), a 39-item measure designed to assess child anxiety symptoms across four domains: physical symptoms, harm avoidance, social anxiety, and separation anxiety/panic. For each item*,* respondents report the extent to which each statement is true for them (or their child): 0 (*never true*), 1 (*rarely true*), 2 (*sometimes true*), or 3 (*often true*). Internal consistencies of the MASC have been reported as ranging from 0.87 to 0.90 and estimates of concurrent validity have been found to range from (*r*s) 0.60 to 0.69 (March et al., 1997; Rynn et al., 2006).

Program target measures. Children completed the Emotion Expressivity Scale for Children (EESC; Penza-Cyve & Zeman, 2002), a 16-item measure designed to assess

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children's poor emotional awareness and expressivity. Respondents indicate how true each item is using a 5-point scale, with anchors of 1 = *not at all true* and 5 = *extremely true*. The correlation between EESC and child anxiety was .36 in Suveg, Sood, Comer, and Kendall (2009) with an alpha of .69. In the present sample, alpha reliabilities were .81 at pre and .88 at post.

Children completed the Physiological Hyperarousal Scale for Children (PHSC; Laurent, Catanzaro, & Joiner, 2004), an 18-item measure designed to assess children's bodily manifestation of automatic arousal. For each item, respondents indicate the extent to which they experienced physiological symptoms using a 5-point scale, with anchors of 1 = *very slightly or not at all* and 5 = *extremely*. Correlations between PHSC and child anxiety ranged from .56 to .64 with an alpha of .87 in Laurent et al. (2004). In the present sample, alpha reliabilities were .89 at pre and .90 at post.

Children completed the Cognitive Negative Error Questionnaire (CNEQ; Leitenberg, Yost, & Carroll-Wilson, 1986), a measure consisting of 24 vignettes designed to assess the extent to which children overgeneralize, catastrophize, take personal responsibility, or selectively attend to negative features of events. For each item, respondents indicate how closely a specific response set capturing negative cognition reflects how they might typically respond using a 4-point scale, with anchors of 1 = *not at all like I would think* and 4 = *almost exactly like I would think*. Correlations between CNCEQ and child anxiety ranged from .39 to .42 in Weems, Berman, Silverman, and Saavedra (2001) and an alpha of .89 was reported for the CNCEQ in Leitenberg et al. (1986). In the present sample, alpha reliabilities were .76 at pre and .86 at post.

Children completed the Social Skills Improvement Rating System (SSIS-RS; Gresham & Elliott, 2008), a 46-item measure designed to assess children's social competencies. For each item, respondents indicate how true an item is using a 4-point scale, with anchors of 0 = *not true* and 3 = *very true*. An alpha of .94 was reported for the SSIS-RS in Gresham and Elliott (2008). In the present sample, alpha reliabilities were .92 at pre and .93 at post.

Children completed the Children's Self-efficacy Questionnaire for Handling School Situations (SEQSS, Heyne, King, Tongue, Rollings, Pritchard, Young, & Myerson, 1998), a12-item measure designed to assess children's perceived ability to manage anxiety-provoking situations that typically occur during school. For each item, respondents indicate the extent to which they perceive they can handle anxiety-provoking situations using a 5-point scale, with anchors of 1 = *really sure I couldn't* and 5 = *really sure I could*. A correlation of -.51 between the SEQSS and child anxiety was reported in Maric, Heyne, MacKinnon, van Widenfelt, and Westenberg (2012) and an alpha of .85 was reported for the SEQSS in Heyne et al. (1998). In the present sample, alpha reliabilities were .67 at pre and .80 at post.

Data Analytic Plan

Preliminary analyses. Descriptive statistics and frequencies assessed for out of range variables and normal Q-Q plots were examined to assess the potential influence of outlying cases and whether variables were normally distributed. Skew and kurtosis were inspected. According to recommendations for small to moderate sample sizes, variables that exceed the cutoff values of |2| for skewness and |7| for kurtosis will be transformed (Cohen, Cohen, West, & Aiken, 2003). Descriptive analyses were conducted to explore

sample characteristics and assess the relations among the variables. Given the potential

nested structure of the data, in which sessions are nested within groups, ICCs were

calculated to determine the need for multilevel modeling analyses. SPSS 22 was used to

conduct all preliminary analyses.

Fidelity. Fidelity was evaluated by calculating an adherence score. The adherence

score was based on the percentage of objectives taught divided by the total number of

objectives for each session. Because the adherence measure was administered using a

continuous scale ranging from 0 to 4, with anchors at 0 (Not Covered), 2 (Covered

Adequately), and 4 (Covered Well), each objective was determined as having been met if

rated a 2 or higher. Observations of 15% of sessions were used to validate self-reported

adherence for each session. A reliability score was calculated by comparing the number

of objectives on which the observer and facilitator agree on the level of coverage (i.e.

agreement that the objective was met or not). For instance, if a program session has three

objectives to be covered and both raters agreed that one objective had been covered but

disagreed as to whether the other two had been covered, the level of agreement would be

calculated as 33%. Missing data was not included in the agreement calculations.

Aim 1. Confirmatory factor analysis were conducted using MPlus to determine

whether the items comprising the construct of quality of delivery were best described as a

two-factor model, marked by skillful presentation and positive engagement factors, or a

general one-factor model. Given the nested data, in which each group had quality of

delivery scores for six sessions, a sandwich estimator was used to compute standard

errors that would more accurately account for the nested data of session-level scores (six

sessions) within each group. The most psychometrically robust approach to capturing the

construct of quality of delivery would be used in Aims 2 and 3.

Aims 2 and 3. MPlus was used to analyze Aims 2 and 3. If preliminary analyses (i.e., ICCs) indicated high levels of dependency of session-level implementation ratings within an intervention group, a sandwich estimator would be used to test Aim 2 and multilevel modeling would be used to test Aim 3 in order to account for clustering of scores. Specifically, Aim 2 was tested using a sandwich estimator (Type = Complex), with session-level scores nested within groups. Aim 3 employed multilevel modeling in order to account for individual student pretest and outcome measures and group-level implementation variables (mean scores across six sessions were calculated). All variables included in interaction terms were grand mean centered (Aiken & West, 1991). Given the small sample size, separate analyses were tested for each sub-aim.

Aim 2. Separate regression models were used to test Aim 2: 1) A model predicting participant responsiveness from adherence, skillful presentation, and an adherenceXskillful presentation interaction term to test a) the main effects of adherence and skillful presentation on participant responsiveness and b) the interaction between adherence and skillful presentation on participant responsiveness; 2) A model predicting participant responsiveness from adherence, positive engagement, and an adherenceXpositive engagement presentation interaction term were included to test a) the main effects of adherence and positive engagement on participant responsiveness and b) the interaction between adherence and positive engagement on participant responsiveness; 3) A model predicting participant responsiveness from dedicated time spent, skillful presentation, and a dedicated time spentXskillful presentation of delivery interaction term to test a) the main effect of time spent on participant responsiveness and

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b) the interaction between time spent and skillful presentation on participant responsiveness; 4) A model predicting participant responsiveness from dedicated time spent, positive engagement, and a dedicated timeXpositive engagement interaction term to test a) the main effect of time spent on participant responsiveness and b) the interaction between time spent and positive engagement on participant responsiveness; and 5) A model predicting adherence from perceived usefulness.

Aim 3. Separate path models were used to test Aim 3: 1) A path model testing the indirect effects of adherence on program outcomes through participant responsiveness; 2); A path model testing the indirect effects of skillful presentation on program targets through participant responsiveness; 3) A path model testing the indirect effects of positive engagement on program targets through participant responsiveness; 4) A path model testing the indirect effects of time spent on program targets through participant responsiveness. Indirect effects were tested using the MODEL INDIRECT command.

Covariates. Baseline measures of program targets were included as level-1 (student participant) covariates in Aim 3.

RESULTS

Preliminary Analyses

Descriptive statistics and frequencies were assessed for out of range variables. Visual inspection of normal Q-Q plots were examined to assess the potential influence of outlying cases and whether variables were normally distributed. Skewness and kurtosis also were inspected. All variables were within range and normally distributed (see Table 3). Descriptive analyses were conducted to explore sample characteristics and assess the relations among the focal variables (see Tables 4 and 5 for correlations between implementation variables and program outcomes, and between pretest and posttest variables, respectively). Correlations among implementation variables ranged from small to large (.01 to .66). Given the potential nested structure of the data, in which sessions are nested within groups, ICCs were calculated to determine the need for multilevel modeling analyses. ICCS ranged from .00-.56. Accordingly, a sandwich estimator was used to account for standard errors given nested data for Aims 1 and 2 and Multilevel Modeling was used to examine Aim 3.

Adherence ratings indicated that the group leaders generally covered program material as intended, with group leaders reporting that 100% of program activities and materials were implemented for 13 of 14 groups across the six modules. One of 14 groups reported 67% adherence of intended program activities and materials in the first module and 100% adherence of program activities and materials in the remaining five modules. Specifically, relaxation exercises were not indicated as covered as intended during the first session. However, upon further probing, it was determined that a relaxation exercise was unable to be covered during the initial session due to technical

difficulties and was delivered during the second session. Reliability of 20% of the videos indicated 100% agreement between observer and facilitator-report that session objectives were met across sessions.

Aim 1

A Confirmatory Factor Analysis was used to test whether the Quality of Delivery scale (clarity of explanations, program knowledge, time management, effectively addressing questions, confidence, enthusiasm, and rapport) was more reflective of a single factor or two factor model indicated by two domain specific factors, skillful presentation and positive engagement (see Figures 10 and 11 for factor loadings). Attempts to utilize the Satorra-Bentler Scaled Chi-Square Test were made in order to account for non-normality that occurs in the chi-square distribution with nested data. However, a *p*-value could not be generated, which is likely a function of the small sample size (6 sessions per 14 groups). Instead, alternate indicators of model fit were used, including Akaike's Information Criterion (AIC; Akaike, 1973, 1987), Bayesian information criterion index (BIC; Schwarz, 1978), CFI, TLI, RMSEA, and SRMR. Fit indices for both models are reported in Table 6. As indicated by model fit indices, evidence suggests the Quality of Delivery scale seems to be better captured by a two-factor model (smaller AIC and BIC numbers suggesting better fit; CFI $\geq$ 0.90 and RMSEA $\leq$ 0.08 suggesting adequate fit; and CFI $\geq$ 0.95, RMSEA $\leq$ 0.05, and SRMR $\leq$ 0.08 suggesting good fit; Cheung & Rensvold, 2002; Hu & Bentler, 1998), with the two-factor model demonstrating adequate fit.

Overall, analyses indicated that quality of delivery was better represented by a two-factor model. With regards for the first factor, skillful presentation, factor loadings

were similar in magnitude in the single factor model as compared to the second factor model. However, factor loadings of the items corresponding to second factor, positive engagement, were stronger in the two-factor model compared to the single factor model. The present sample size and nested structure limited the ability to analyze these factors as latent constructs in the models proposed for Aims 2 and 3. Thus, estimated factor scores for each facet were used in separate models to test the subsequent aims in order to examine the unique relations between each facet of quality of delivery and outcomes of interest.

Aim 2

Aim 2 was examined via five separate regression models: 1) A model predicting participant responsiveness from adherence, skillful presentation, and the interaction between adherence and skillful presentation; 2) A model predicting participant responsiveness from adherence, positive engagement, and the interaction between adherence and positive engagement; 3) A model predicting participant responsiveness from dedicated time spent, skillful presentation, and the interaction between dedicated time spent and skillful presentation; 4) A model predicting participant responsiveness from dedicated time spent, positive engagement, and the interaction between dedicated time spent and positive engagement; and 5) A model predicting adherence from perceived usefulness. Models examining interaction terms included centered predictors (Cohen, Cohen, West & Aiken, 2003). Results of regression models are presented in Table 7. A brief summary of findings is provided below.

Quality of implementation and adherence predicted participant

responsiveness. Results partially supported the study's hypotheses that adherence would

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be related to participant responsiveness and that quality of implementation would moderate the effects of adherence on participant responsiveness. Specifically, the skillful presentation and adherence model explained a significant portion of the variance in participant responsiveness ($R^2 = .41$, $p = .01$). In addition, adherence and skillful presentation were each found to have positive main effects on participant responsiveness ($b_{adherence} = .23$, $p = .02$; $b_{skill} = .33$, $p < .001$). However, the interaction between adherence and skillful presentation was not significant ($p = .13$). A second model testing positive engagement, adherence, and their interaction on participant responsiveness indicated similar findings. This model also explained a significant portion of the variance in participant responsiveness ($R^2 = .26$, $p < .01$). Adherence and positive engagement were each found to have positive main effects on participant responsiveness ($b_{adherence} = .33$, $p < .01$; $b_{poseng} = .21$, $p = .01$). The interaction between adherence and positive engagement was marginal ($b_{interaction} = .17$, $p, = .08$). Following Cohen et al. (2003), the marginal interaction was probed by examining simple slopes (see Figure 12). The simple slope of adherence at mean and high levels of positive engagement were each significant in predicting participant responsiveness in the positive direction. That is, when the level of quality of implementation was at the mean, the simple slope of adherence on participant responsiveness was significant ($b = .33$, $p < .01$). At 1 SD above the mean, the simple slope of adherence on participant responsiveness was significant ($b = .48$, $p < .001$). At low levels of quality of implementation, the simple slope of adherence on participant responsiveness was not significant ($p = .11$).

Quality of implementation and dedicated time spent partially predicted participant responsiveness. Results partially confirmed the study's hypothesis that

dedicated time spent would be related to participant responsiveness and that quality of implementation would moderate the effects of adherence on participant responsiveness. Specifically, the skillful presentation and time spent model explained a significant portion of the variance in participant responsiveness ($R^2 = .37$, $p < .001$). Skillful presentation was found to have a positive main effect on participant responsiveness ($b_{skill} = .34$, $p <.001$). The main effect of dedicated time spent on participant responsiveness was not significant ($p = .35$). The interaction between dedicated time spent and skillful presentation was not significant ($p = .71$). A second model testing positive engagement, adherence, and their interaction on participant responsiveness indicated similar findings. The positive engagement and time spent model explained a significant portion of the variance in participant responsiveness ($R^2 = .25$, $p < .001$). Positive engagement was found to have a positive main effect on participant responsiveness ($b_{poseng} = .22$, $p = .01$). The main effect of dedicated time spent on participant responsiveness was not significant ($p = .13$). The interaction between dedicated time spent and positive engagement was not significant ($p = .33$).

Usefulness predicted adherence. Although the overall usefulness model did not explain a significant portion of the variance in participant responsiveness ($R^2 = .03$, $p = .22$), usefulness was found to have a significant positive main effect on adherence ($b_{usefulness} = .41$, $p = .03$).

Aim 3

In order to test specific relations between implementation facets and program targets, an MLM framework in which baseline program control measures were identified as Level 1 variables and implementation variables were identified as Level 2 variables

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was used to conduct a series of path models: 1) A path model testing the indirect effects of adherence on program targets through participant responsiveness;; 2) A path model testing the indirect effects of skillful presentation on program targets through participant responsiveness; 3) A path model testing the indirect effects of positive engagement through participant responsiveness on program targets; 4) A path model testing the indirect effects of dedicated time spent on program targets through participant responsiveness. Results of the regression models are presented in Tables 8 through 11 for models examining effects of adherence, dedicated time spent, skillful presentation, and positive engagement on program targets, respectively.

Adherence. The indirect effect of adherence through participant responsiveness was not significant across any posttest program targets. There was a marginally significant negative direct effect between adherence and (poor) emotional expressivity (b = -5.90, p = .08), suggesting a trend between greater levels of adherence and lower levels of poor emotional expressivity. There was also a significant negative direct effect between participant responsiveness and physiological hyperarousal (b = -.72, p = .05), suggesting greater levels of participant responsiveness are related to lower levels of physiological hyperarousal in youth. Finally, the path from participant responsiveness to social skills was marginally significant (b = 13.05, p = .08), suggesting a trend between greater levels of participant responsiveness and greater levels of (positive) social skills. There were no other significant direct effects between adherence and program targets as well as between participant responsiveness and program targets.

Dedicated time. The indirect effect of adherence on child-reported anxiety through participant responsiveness was not significant across any posttest program

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targets. Negative direct effects were found to be marginally significant between time spent and negative cognitions (b = -15.21, p = .07), indicating greater amount of time spent administering intended program materials and activities was related to reduced problems with negative cognitions. Participant responsiveness was found to have a negative direct effect on physiological arousal (b = -.73, p = .03), suggesting greater levels of participant responsiveness are associated with lower levels of physiological hyperarousal. There were no other significant direct effects between time spent and program targets as well as between participant responsiveness and program targets.

Skillful presentation. An indirect effect of skillful presentation on physiological arousal through participant responsiveness was marginally significant (b = -.21, p = .06), indicating greater levels of skillful presentation are related to greater levels of participant responsiveness (b = .23, p = .03), which in turn is related to lower levels of physiological arousal (b = -.89, p <.01). There was no significant direct effect between skillful presentation and physiological arousal. A direct effect of skillful presentation on parent-reported anxiety symptoms was marginally significant (b = 4.26, p = .06), suggesting a trend in greater levels of skillful presentation related to increases in physiological arousal. There were no other significant direct effects between skillful presentation and program targets as well as between participant responsiveness and program targets.

Positive engagement. An indirect effect of positive engagement on physiological arousal through participant responsiveness was marginally significant (b = .17, p = .10), indicating greater levels of quality of delivery are marginally related to greater levels of participant responsiveness (b = .18, p = .06), which in turn is related to lower levels of physiological arousal (b = -.93, p < .03). There was a marginally significant direct effect

between positive engagement and increased physiological arousal (b = .14, p = .08). Of these models including dedicated time spent, participant responsiveness, and program targets, no other significant indirect effects of quality of delivery on program targets through participant responsiveness were found. A direct effect of positive engagement on parent-reported anxiety symptoms was significant (b = 4.38, p = .04), suggesting a trend in greater levels of positive engagement related to greater perceived levels of child anxiety. There were no other significant direct effects between positive engagement and program targets as well as between participant responsiveness and program targets.

DISCUSSION

This present study examined relations between fidelity of implementation of an indicated prevention and early intervention program for children's anxiety disorders and intervention outcomes. This study contributes to the current field of translational research through the examination of several components of fidelity of implementation (i.e., adherence, delivery effectiveness, child responsiveness), according to a theoretically driven conceptualization of specific links between implementation components and anxiety-related program outcomes. Findings from the present study confirmed that there appear to be distinct dimensions of implementing an intervention with fidelity, and that these dimensions may have different roles in affecting changes at the level of both group (child responsiveness) and individual program outcomes. Findings should be interpreted in light of the fact that: (a) sample size restricted the ability to include covariates of interest (ethnicity and gender) in main analyses; (b), significant results were not consistent across reporters for youth level outcomes; (c) relations between fidelity constructs and program outcomes were mixed; and (d) design was a Hybrid 1 (testing effects of clinical intervention on outcomes of interest while collecting information regarding implementation; not a Hybrid 2 design where dual testing of clinical and implementation interventions would allow for causal relations to be examined; Curran et al., 2012). Thus, findings from this research should be considered with caution and as correlational in nature.

Measurement of Quality of Delivery

Quality of delivery has been operationalized several ways, underscoring the complexity of this construct. Broadly, quality of delivery refers to the process by which

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content is delivered to participants (Dusenbury et al., 2003; 2005). The study's first aim sought to identify whether this process is better characterized as a multifaceted (skillful presentation and positive engagement) or unilateral construct. Results from CFA analyses supported a two-factor model superior to a single-factor alternative. More specifically, items measuring clarity of explanations, program knowledge, time management, ability to effectively addressing questions, and confidence were reflective of group facilitator's skillful presentation of program content. Items measuring facilitator's enthusiasm and rapport were more reflective of a separate facet, group facilitator's positive engagement. Empirical literature has typically assessed quality of delivery in broad terms relating to general "competency" or "effectiveness" (e.g., Knoche et al., 2010; Perepletchikova et al., 2007; Rohrbach et al., 2010). However, current findings were consistent with emerging conceptual and empirical literature outlining distinct dimensions of quality of delivery (Berkel et al., 2011; Sandler et al., 2015). For instance, Berkel and colleagues (2011) are among the first known to propose a model with explicit facets outlined. In this initial model, interactive teaching methods and clinical process skills were identified as separate dimensions. More recently, Sandler and colleagues (2015) provide an in-depth review of their effectiveness trial of an intervention for divorcing and separating parents. In this review they discuss three facets of quality relevant to their intervention: positive engagement, skillful presentation, and skillful feedback. Similarly, present findings support a multidimensional framework of quality of delivery, in which items of the current study were best captured by constructs of skillful delivery and clinical process skills.

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An important consideration in the measurement of this construct is that quality of delivery is a process specific to each intervention. That is, the determinants of competently delivering an intervention is a function of various factors including (but not limited to): the targeted program outcomes (e.g., internalizing vs. externalizing problems), the format (e.g., individual vs. group), the setting (e.g., school vs. home), severity (e.g., universal vs. indicated), and the implementer's background (mental health professional vs. paraprofessional). Thus, there is likely no finite number of dimensions that can be applied universally across interventions. For example, REACH was intended to be implemented in the school setting within a prevention/early intervention framework. In this case, the use of school mental health professionals (e.g., school social workers, school psychologists) to deliver REACH in a group setting appears appropriate. However, if the targeted population was individuals afflicted with severe mental health problems, more intensive services including medication intervention might be more effective. Moreover, the dimensions of quality may be quantitatively and qualitatively different from program to program. For instance, REACH is a group-based intervention targeting anxiety problems and was implemented in the school setting. Positive engagement in this study was operationalized as group leader enthusiasm and rapport. Whereas rapport building within the context of individual therapy may involve 1:1 clinical process skills such as reflective listening and ability to engage the individual participant, rapport building in a group setting infers the ability to foster cohesion among participants. Group cohesion is inapplicable to building rapport in individual therapy yet is important to interventions implemented in group format (Coatsworth et al., 2006; Dillman Carpentier et al., 2007). Thus, although the present study indicated two

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dimensions of quality of delivery (skillful presentation and positive engagement),

findings more generally illustrate the utility in capturing a more nuanced

conceptualization of quality of delivery that is sensitive to the various characteristics of

an intervention.

Relations among Implementation Components

Next, the current study sought to gain some sense about the relations among key

components of implementation outlined in the literature. More specifically, it was

hypothesized that adherence, quality of delivery, and time spent delivering program

content would be related to participant responsiveness. Additionally, it was hypothesized

that quality of delivery would act as a moderator on the relation between adherence and

participant responsiveness as well as between time spent and participant responsiveness.

Because results from Aim 1 indicated quality of delivery was best captured by two facets,

skillful presentation and positive engagement, these constructs were analyzed separately.

Overall, findings were consistent with the literature's multidimensional approach to

conceptualizing program implementation and partially supported Aim 2's hypotheses.

REACH's feasibility as a group-based intervention appears promising and

effective in eliciting engagement or active participation of students with subclinical and

indicated levels of anxiety. Findings supported the present study's hypothesis that the

extent to which a facilitator covered program content as intended (adherence) and greater

levels of the quality of program delivery would be significantly related to participant

responsiveness. In the present sample, the greater the degree of facilitator adherence, the

greater it was perceived that the groups understood and participated in REACH program

activities. According to implementation monitoring literature, the greater an intervention

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is perceived to be implemented as intended, the greater the intervention integrity (Leff et al., 2009). Importantly, integrity serves as an indicator of a program's feasibility (Peterson & McConnell, 1993). Additionally, participant responsiveness is conceptualized as an indicator of engagement to an intervention (Perepletchikova & Kazdin, 2005) and has been found to be important to the effectiveness of an intervention (Smith et al., 2013). Thus, findings suggest REACH may be a feasible intervention to implement and elicit participant engagement.

Similarly, increased levels of facilitator's quality of delivery (i.e., skillful presentation and positive engagement) were significantly related to increased levels of participant responsiveness. Findings are in line with literature's support of associations between general measures of quality of delivery (e.g., relations between clinical competency and client or participant engagement; Berkel et al., 2011; Smith et al., 2013). Present findings suggest both skillful presentation (i.e., the ability to effectively address group members' questions while also managing time and evidencing knowledge of the program content) and positive engagement (i.e., the ability to foster rapport and convey enthusiasm) may be important in increasing group participant responsiveness. It must also be highlighted that REACH facilitators were recruited specifically because they were school mental health professionals that had been identified by their colleagues as popular opinion leaders (POLs), demonstrating helpfulness and knowledge regarding interventions for students with emotional difficulties. As such, present results reflect that greater levels of clinical competency may be associated with greater levels of group participant responsiveness, although this may be in part because of the characteristics associated with REACH facilitators.

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Whereas both facets of quality of delivery were linked to participant responsiveness, results only indicated a marginally significant interaction between positive engagement and adherence on participant responsiveness (at mean and high levels of positive engagement). Interestingly, skillful presentation did not have a significant moderating role in the relation between adherence and participant responsiveness. Qualitatively, it appears that positive engagement is tapping onto an element akin to therapeutic alliance, which has a distinct element of warmth and interpersonal skill that is undeniably linked to program outcomes (Ackerman & Hilsenroth, 2003; Hovarth & Luborsky, 1993; Leach, 2005; Martin, Garske, & Davis, 2000). Findings have consistently demonstrated important and favorable relations between the therapist-patient relationship and intervention outcomes (see Martin et al., 2000 for a meta-analysis). This alliance has been hypothesized as possessing therapeutic properties over and above the actual intervention being implemented. Skillful presentation, on the other hand, appears to capture content-based knowledge and understanding versus an interpersonal dimension. Substantively, the facilitator's enthusiasm and ability to elicit rapport among group members may impact the extent to which program adherence impacts responsiveness because greater positive engagement helps ensure the content is effectively received by the participants. This idea is supported by the fact that the probed marginally significant interaction was only significant at mean and high levels of quality, but was not significant at lower levels. In contrast, skillful presentation may not affect the dynamic between adherence and responsiveness even though it has its own positive relation with participant responsiveness. Overall, findings appear to support distinct relations between provider adherence, positive engagement,

skillful presentation, and participant responsiveness and highlight the potential importance of interpersonal skill in moderating the role between adherence and participant responsiveness.

Contrary to expectations, the extent to which time was spent delivering program materials as prescribed was not significantly related to participant responsiveness, nor did quality of delivery facets moderate this relation. Although time spent delivering key program components has been used to capture adherence (Elliott and Mihalic, 2004; Lillehoj, Griffin, & Spoth, 2004), it may be that actual time is simply not as robust a predictor of participant responsiveness versus other more content-based measures of content delivery. REACH placed a strong emphasis in 'prescribing' core ingredients both in-session and out-of-session activities. For instance, Module 5 engages students through exposure-based exercises during the session and then assigns a game for students to practice exposures throughout the week. Better predictors of participant responsiveness that reflect amount of coverage may include measures of how much time was spent on homework, or how frequently homework was practiced (Berkel et al., under review), which were not measured in the present study. Additionally, time spent was measured as a global proportion score of time spent covering key program activities compared time intended covering key program activities. The mean of the time spent was 1.12 (see Table 3), indicating materials were generally provided as intended. Thus, there may not have been enough qualitative variability in time spent across sessions in order to capture changes in participant responsiveness. A more micro-level measurement of dosage may have provided additional information. Overall, time spent was not predictive of participant responsiveness in the present study.

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The extent to which facilitators perceived program materials to be useful was positively related to greater levels of facilitator adherence. Although implementation research typically examines the links between facilitator adherence and outcomes of interest, factors that may influence facilitator adherence are less established. There is evidence to suggest that various provider characteristics, including attitudes towards evidence-based practice, perceived control for implementing the intervention, and previous experience, have been associated with changes in provider's own behaviors as well as program outcomes (Aarons, 2004; Azjen, 1991; Lillehoj et al., 2004). The theory of planned behavior (Azjen, 1985, 1987, 1991) may be especially helpful in explaining the link between provider attitudes and intervention adherence. This theory is an extension of the theory of reasoned action (Azjen & Fishbein, 1980; Fishbein & Azjen, 1975) and posits that the stronger the intention to carry out a behavior, the more likely the behavior will be actualized. However, behavior can only be manifested when there is motivation *and* behavioral control (ability to carry out the desired behavior). Thus, greater levels of perceived usefulness of REACH program materials may reflect an underlying motivation or investment in the intervention content and also indicate how feasible a program is to implement. Current findings suggest the benefits in assessing facilitator attitudes during stages of adapting interventions to be implemented in real-world settings in order to modify or address facilitator needs.

Findings suggest implementation components may operate as interrelated dimensions, with some dimensions functioning as an interactive process. Adherence, skillful presentation, and positive engagement were each positively related to participant responsiveness whereas time spent was not significantly associated with participant

responsiveness. This may suggest that objective time-based measures are not as meaningfully relevant to group engagement as content-based measures of program delivery.   Moreover, positive engagement served a marginally significant moderating role between the relation between program adherence and group participant responsiveness, whereas skillful presentation did not. This may highlight the importance of a facilitator's warmth and attitude in maximizing the effects of program materials and activities. Overall, the present study underscores the multidimensionality of program implementation. The following section addresses the relations between these components and program targets.

Linking Implementation to Outcomes

The present study sought to identify relations between implementation components and anxiety program targets through participant responsiveness. It was hypothesized that: 1) Adherence would be indirectly related to improved program targets through participant responsiveness, 2) Quality of delivery would be indirectly related to improved program targets through participant responsiveness, and 3) Time spent delivering core intervention components would be related to improved program targets through participant responsiveness. Program targets included child-reported emotional expressivity, physiological arousal, negative cognitions, social skills, self-efficacy, and child and parent-reported levels of anxiety. Findings were mixed, with only two models demonstrating marginally significant indirect effects through participant responsiveness. Overall, some relations were partially consistent with expected a priori predictions, some contrary to expectations, and others not significant. First, findings will be compared to

the program outcome paper (Pina et al., under review). Then, present findings will be discussed as relates to specific program components.

Comparison between present findings and outcome paper. Importantly, findings from the present study generally mapped onto the posttest findings from the outcome paper (Pina et al., under review), despite differences in how fidelity as a construct was analyzed. As described earlier, the outcome paper created a composite fidelity score, and findings demonstrated overall fidelity was related to the program targets or putative mediators (e.g., improved emotional expressivity, negative cognitions, and self-efficacy for managing anxiety). Similarly, the present study demonstrated marginal and significant relations between specific facets of implementation and putative mediators. Greater adherence was marginally related to improved emotional expressivity and the proportion of time spent delivering program content was marginally related to reduced negative cognitions; however, relations between facets of fidelity and self-efficacy were not significant. The present study additionally demonstrated marginal indirect relations between both facets of quality of delivery (skillful presentation and positive engagement) and improved physiological arousal through participant responsiveness. However, the present study also demonstrated marginal positive relations between skillful presentation and parent-reported anxiety levels in children as well as significant relations between positive engagement and parent-reported anxiety levels in children. While results from the present study largely corroborated the outcome paper's findings, lending support to overall links between greater levels of implementation and improved program outcomes, the present findings suggest specific aspects of implementation quality may influence specific program targets.

Linking implementation facets with program targets. REACH was developed

to prevent and reduce anxiety symptoms by targeting key factors empirically associated

with the etiology and symptomatology of anxiety. Program targets included emotional

expressivity, physiological arousal, negative cognitions, social skills, and self-efficacy to

manage stressful situations, each of which has been related to the development and

maintenance of anxiety (Alfano, Beidel, & Turner, 2001; Beidel, Turner, & Dancu, 1985;

Kerns, Comer, & Zemen, 2014; Penza-Clyve & Zemen, 2002). As previously described

and outlined in Table 2, each session incorporated cognitive-behavioral and exposure-

based techniques that directly target these factors. In the context of REACH, findings

between implementation components and program targets in the present study will be

further discussed.

Emotion expressivity: Greater levels of adherence to implementing the

intervention as intended were marginally related to improved levels of child-reported

emotional expressivity. The inability to appropriately regulate one's emotions in times of

distress has been extensively related to the development of psychopathology, including

anxiety (e.g., Bender, Reinholdt-Dunne, Esbjørn, & Pons, 2012; Eisenberg et al., 2000;

Suveg & Zeman, 2004; Suveg et al., 2009; Suveg et al., 2010). Emotion regulation

involves the ability to appropriately monitor, change, or inhibit emotions according to the

demands of one's environment (Eisenbnerg et al., 2000; Southam-Gerow & Kendall,

2002). Literature suggests one must possess emotional understanding and emotional

awareness in order to engage in effective regulatory behaviors during stressful situations

(Eastabrook, Flynn, & Hollenstein, 2014; Southam-Gerow & Kendall, 2002; Zeman,

Shipman, & Suveg, 2002). Emotional expression is one facet of emotion regulation and

is operationalized as emotional awareness and motivation to express emotion (Saarni, 1999; Kerns , Comer, & Zeman, 2014; Penza-Clyve & Zeman, 2002). Deficits in emotion expressivity include poor awareness and reluctance to express emotions and have been linked with child and parent-reported anxiety in samples of clinically and nonclinically anxious children and youth (Kerns, Comer, & Zeman, 2014; Southam-Gerow & Kendall, 2000; Zeman, Shipman, & Suveg, 2002). Some cognitive-based anxiety treatment protocols have more recently emphasized the role of appropriate emotion regulation strategies by increasing emotional understanding and awareness (Ehrenreich et al., 2009; Suveg et al., 2006). Similarly, REACH incorporated activities aimed at increasing emotional understanding and awareness both cognitively and behaviorally. For instance, Session 1 introduced relaxation exercises to target physiological components of emotional dysregulation, Session 2, taught children to cognitively identify discrepancies in anxious thoughts, and Session 5 taught children to experience fearful stimuli instead of succumbing to their preferred avoidant strategies. Thus, the relation between adherence and improved emotional expressivity was likely a function of the specific regulatory skills introduced and discussed throughout REACH sessions. The more facilitators covered REACH content as intended, the more trends in improvements were noted on participant emotional understanding and awareness, suggesting the utility in REACH content to effectively address this program target.

Indirect effects of skillful presentation and positive engagement on physiological arousal were marginally significant through participant responsiveness; Positive engagement was marginally related to increased child-reported physiological arousal. Anxiety is typically conceptualized by deficits or impaired functioning in physiological

arousal, (negative) cognitions, and (avoidant) behavior (Beidel et al., 1985; Gosch, Flannery-Schroeder, Mauro, & Compton, 2006). Concerning physiological arousal, children with anxiety often report somatic symptoms such as increased heart rate, tense muscles, and dizziness when enduring stressful situations. Cognitive-behavioral interventions often teach applied relaxation exercises in order to provide individuals tools to reduce physiological distress (Cuijpers et al., 2014). Relaxation exercises can be used to directly target physiological responses and teach the ability to directly control one's physical reaction (Wenck, Leu, & Amato, 1996). Similarly, REACH introduced relaxation exercises (e.g., deep breathing, guided imagery, progressive muscle relaxation) during the first session and encouraged regular practice of these exercises throughout the sessions. Additionally, exposure-based activities are a key tenet of anxiety interventions as they directly target avoidant behaviors and result in the understanding that anxious symptoms typically reduce after facing the feared stimulus. Facilitators led groups in exposure-based activities while also encouraging the use of relaxation techniques. Findings of the present study suggested marginally significant indirect relations between quality of delivery facets and improved physiological arousal through participant responsiveness. The onus of managing anxiety symptoms is largely on the individual suffering from anxiety because of the personal and internal nature of anxiety. Whereas individual-based interventions teach relaxation exercises directly to one key participant, present findings suggest physiological arousal may also decrease as a function of a leader's skillful ability to engage a group in exposure-based activities and regulatory coping skills.   It may be that group leaders can help foster a supportive environment in which to practice and model relaxation technique, which increases the participants

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engagement in activities that directly reduce individual levels of physiological arousal. For instance, group leaders higher in positive engagement and skillfulness may be more likely to encourage and effectively reinforce the discussion and practice of skills taught, which might then improve symptoms. *Time spent administering the intervention was marginally related to reduced negative cognitions.* Children with anxiety problems are characterized by experiencing negative cognitions, including worried thoughts, distorted thinking, and negative self-evaluations (Chambless & Gillis, 1993; Dalaiden & Vasey, 1997; Kendall & Chansky, 1991). Cognitive-behavioral treatments are the most common and efficacious interventions targeting anxiety (Silverman et al., 2008) and, as is apparent in its name, heavily focus on the identification and active manipulation of negative thinking habits. REACH is modeled after these interventions and teaches the acronym STOP (S = State the fear, T = Thought that accompanies the fear, O = Other thought that is more realistic than the negative thought, and P = Praise yourself for thinking of other thoughts). This acronym is first taught with relevant and concrete examples and then practiced via "Worryheads", a board game in which group members draw cards describing different negative situations and identify "Other" thoughts. Throughout remaining sessions, group leaders encouraged participants to address negative cognitions relevant to social situations, feared tasks, etc. Given the cognitive-behavioral framework of the intervention, it is not surprising that the more time was spent implementing program content, the greater the trends in reductions in negative cognitions.

 Social skills. Participant responsiveness was marginally related to greater levels of appropriate social skills. Children with anxiety problems often face difficulties navigating social situations (Ginsburg, La Greca, & Silverman, 1998; Spence, Donovan,

Brechman-Toussaint, 1999), which is especially challenging given that many children

spend the majority of their time in a social environment (i.e., school). Precisely because

of the various social situations that are difficult for children with anxiety, two sessions

are devoted to increasing social skills. Session 3 taught children to initiate and maintain

conversations and includes a role-play activity in which children must practice starting

and continuing a conversation that could be encountered in the real-world. Session 4

focused on building assertiveness through teaching how to set limits and appropriately

make requests in difficult social situations (e.g., how to say no a peer's request to copy

one's homework). In fact, social elements were embedded throughout the intervention.

For example, all sessions fostered an environment in which participants were encouraged

to share and interact. Thus, social engagement with peers and the group facilitator was a

byproduct of the group format and activities. Present findings suggest that greater levels

of active participation and understanding were associated with greater trends of improved

social skills, and this is likely reflective of the socially salient components of REACH.

Greater levels of skillful presentation (marginally) and positive engagement

(significantly) were related to increased parent reported child anxiety. One explanation

may be that parent reported anxiety is not reflecting actual levels of youth anxiety

symptoms. Parent-child agreement of anxiety symptoms has been lowest in clinic-

referred samples (Edelbrock et al., 1986), with parent-child agreement found to be lower

for internalizing symptoms than externalizing symptoms, indicating parents may be less

reliable in reporting internal symptoms or dysregulation (Rey, Schrader, & Morris-Yates,

1992). Thus, the nonsignificant relations between quality of delivery facets and child

report of anxiety may be more meaningful in elucidating the association between quality

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of delivery and anxious symptoms in youth. Additionally, in prevention research, participants are typically experiencing subclinical symptoms that do not yet meet criteria for a mental health disorder (Coie et al., 1993). Consequently, program outcomes may not always be immediately evident and require longer-term follow-up (e.g., Wolchik et al., 2002). Another explanation is that greater quality of delivery was related to greater parental awareness that youth were engaging in REACH activities during stressful situations, leading to positive associations between quality of facilitator delivery of REACH and parent reported child anxiety. According to the transfer of control model, the therapist possesses the requisite knowledge and skills that lead to changes. This change gradually occurs from the therapist to the child but can also occur from the therapist to the parent to the child (Ginsburg, Silverman, Kurtines, 1995). One method of conveying information to the parent is psychoeducation, which has been linked with improvements in internalizing symptoms (Donker et al., 2009). REACH provided parent psychoeducation each week via informational postcards that were given to each participant to then give to their parent or caregiver(s). For example, the postcard corresponding with Session 2 contained a summary of the activities and skills taught related to cognitive restructuring of worries and included tips that the parent could encourage his or her child to engage in. By providing children with increased ability to explain their anxiety symptoms and content covered during groups, parents may have become more cognizant of the manifestation of their child's anxiety. Thus, the group facilitator's quality of delivery may have subsequently affected parental perception of child anxiety through program content directly provided to parents as well as through the influence of the facilitator's quality of delivery on participant behavior and affect.

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Overall, findings appear consistent with the conceptualization that implementation quality is comprised of various dimensions that may influence change in program targets. While there was only marginal evidence to suggest participant responsiveness' indirect role from skillful presentation to physiological arousal, results supported the distinct roles participant responsiveness and other facets of implementation may play in affecting change in anxiety program targets.

Limitations and Future Directions

Of course, it is recognized that the present study is not without its limitations and that findings must be interpreted accordingly. First, the small sample size restricted the ability to include covariates of interest (ethnicity and gender) in main analyses and may have contributed to some of the null findings. Nonetheless, important and conceptually meaningful relations were extracted and contribute to the empirical support of a multifaceted model of program fidelity. Second, findings were different between quality of implementation facets and parent versus child reported anxiety. Although potential explanations were previously discussed, it is important to recognize these findings as an inconsistency between reporters. Inconsistencies across reporter prohibit the extent to which inferences can be made regarding the quality of program delivery and youth anxiety outcomes. Further, only child report measures of program targets (e.g., social skills, emotional expressivity) were obtained. In light of the present differences between child and parent reported anxiety outcomes, it is possible that similar differences exist between parent and child reported program targets.

Third, the present study was limited by a lack of consistent significant findings between fidelity variables and program outcomes. This may be a function of restricted

range in fidelity variables, not uncommon among program implementation studies (e.g., Lillehoj et al., 2004; Spoth et al., 2002). Statistically, restricted range limits the variance needed to detect significant findings. However, the present study's fidelity variables were normally distributed, with no evidence to suggest limited range, despite generally positive ratings. One compelling interpretation of the present study's limited range is that the implementation variables have already reached optimum levels of effect (Berman & McLaughlin, 1976; Stiles, Honos-Webb & Surko, 1998). As Berman & McLaughlin (1976) outline, "to the extent that a process component is near optimum for most clients, outcome will be roughly constant *insofar as it depends on that component*" (p. 444). If the facets of program implementation meet 'optimal' standards, nonsignificant findings may simply indicate ideal program delivery and not reflect substantive relations with program outcomes. Such an interpretation dilutes the negativity associated with nonsignificant findings. Replication of similar studies is necessary to better differentiate when a lack of significance is a function of optimal delivery versus a potential flaw in methodology.

Fourth, the study's design was characterized as a Hybrid 1 design, which precludes discussion of causality between implementation factors and program outcomes. Curran and colleagues (2012) identified types of hybrid designs that allow for the simultaneous examination of clinical effectiveness and implementation research. Whereas clinical effectiveness trials are typically focused on determining the generalizability of a clinical trial at the level of the individual or participant, implementation research focuses on provider-level characteristics of program delivery. Each hybrid design is associated with benefits and challenges related to cost effectiveness

and feasibility. The present study is a Hybrid 1 design, which allows researchers to identify challenges to delivering effectiveness interventions in "real-world" settings and identify implementation strategies that might need to be adapted in less controlled implementation conditions. Hybrid 1 designs are especially attractive because they can be incorporated into a trial without needing to alter the design of the study. However, Hybrid 1 designs cannot infer causality because there is no direct test or manipulation of the implementation strategies. A Hybrid 2 design simultaneously tests a clinical intervention and implementation intervention or strategy, thus allowing stronger inferences to be made. For instance, a Hybrid 2 design might include different groups of training providers within the treatment condition in order to identify whether previous experience providing anxiety-based interventions affects implementation adherence and program outcomes. However, Hybrid 2 designs are more costly and intensive and thus only recommended in cases where there is need (e.g., if the intervention is provided in a different setting). While the present study helps to elucidate specific relations among implementation facets, direct testing of implementation components could provide causality and make comparative evaluations between implementation strategies.

In addition to incorporating causal design to truly predict program outcomes from implementation strategies, future studies could advance the present efforts to understand how implementation components affect program outcomes by enhancing methodology. For example, in order to determine how multiple components interact or explain program outcomes, sample size must be large enough in order to detect significant relations. With a larger sample size, multiple relations can be simultaneously examined and the influence of potential moderators (e.g., ethnicity, gender) can be included. Additionally, multiple

reporters across measures can provide invaluable information regarding relations between aspects of program delivery and participant outcomes. For instance, the present study indicated significant relations between observer ratings of facilitator's quality of delivery and parent reported anxiety but not child reported anxiety. Consistent administration of multiple reports of each construct can help identify whether relations are stable or if findings are a function of reporter-specific phenomenology.

Perhaps most importantly, careful consideration of the distinctness among implementation facets must be considered. The correlations between quality of delivery and adherence (r_{qa}) as well as quality of delivery and participant responsiveness (r_{qp}) were moderate to large ($r_{qa} = .53$, $r_{qp} = .66$). This has critical conceptual and empirical implications. Conceptually, constructs that are highly correlated may present construct overlap, which can indicate potential flaws in the measurement or inaccurate understanding of constructs. The strong positive correlation between quality of delivery and participant responsiveness may speak to the theoretical bidirectionality that may occur, as quality of delivery is a measurement of provider ability to engage with individuals and elicit active participation. Empirically, when constructs are highly correlated, multicollinearity becomes a concern, because standard errors can be inflated and reduce power to detect significant coefficients in analyses (Baron & Kenny, 1986; Friedman et al., 2006). Although present findings indicate unique relations between implementation components, the lack of significant relations between implementation components and program outcomes may have been due to multicollinearity. On the other hand, time spent and adherence were not significantly correlated ($r = .06$). Although discussed as distinct constructs in the literature, the near absent correlation between the

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amount of time spent implementing a program and the extent to which program materials were covered as intended was surprising. Thus, a clearer understanding of the interrelatedness of implementation components is needed to provide insight into how these facets may affect changes in program mechanisms and outcomes. One potential approach is to be precise in what a measure is capturing. For instance, future studies may better examine time spent as a variable that is more sensitive to identifying trends in relative time spent on specific program activities versus the more global calculation used in the present study.

Implications

Findings from the present study underscore the importance of incorporating implementation research with dissemination of clinical interventions in order to develop and refine strategies for maintaining effective implementation in real-world settings. Taken as a whole, a critical question must be addressed because the answer has important implications. Given findings were generally similar to the outcome paper's results at posttest, is there added benefit to examining implementation facets separately or is a composite sufficient? I argue that a multidimensional approach provides critical information regarding predictors of program outcomes that cannot be captured when measured as a unilateral concept. Until there is an empirical foundation outlining relations between specific implementation components and program outcomes, it is impossible to understand how aspects of program delivery (e.g., adherence, quality) may differentially affect program outcomes. A composite score can provide initial insight into whether an intervention is being affected by program fidelity and may be more practical for administration in real-world settings. However, the identification of important

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dynamics among implementation factors can provide a comprehensive framework for conceptualizing *what* influences an intervention, and *how* it is affected (Carroll et al., 2007; Enett, et al., 2011; Schoenwald et al., 2011) in a way that a single composite cannot. Thus, moving forward, a multimethod, multidimensional approach to program implementation components may be encouraged during early phases of translational research to aid in the conceptualization of how components interact and affect change. As interventions become adopted into real-world settings, a composite score may be a more sustainable approach to evaluating program fidelity. Additionally, a composite score may be ideal for reporting general relations between fidelity and program outcomes.

Findings also support the utility of implementing group-based anxiety interventions in the school setting. Although schools have been identified as optimal avenues for program dissemination, previous efforts have also identified barriers to school-based interventions (Domitrovich et al., 2010, Fagan & Mihalic, 2003; Masia-Warner et al., 2006). Specifically, there are several prerequisites to introducing an intervention into the school setting. For instance, efforts must be made to secure initial buy-in from administrators and staff. Additionally, skilled facilitators must be identified and be willing to provide services within the parameters of the intervention. Moreover, implementation during school-hours may involve disruption of class instruction, which requires teacher approval. However, schools also provide unique opportunities to facilitate the delivery of evidence-based mental health services. As indicated by the high, favorable ratings of program adherence, quality of program delivery, and participant responsiveness, the present study supports the feasibility for an intervention to be

implemented by school mental health professionals as intended. Moreover, high ratings of facilitator's perceived usefulness of the program material indicate provider-level buy-in to evidence-based strategies targeting anxiety symptoms. Relations between implementation components and program targets further highlight the potential maximization of school resources to effectively target and prevent one of the most prevalent mental health disorders among children.

Conclusion

The present study is among the first to analyze relations among multiple facets of implementation and their relation to core anxiety program targets. Findings offer insight into potential predictors of anxiety program outcomes and also underscore the importance of measuring external influences that can be causally linked to the success of an intervention. Consistent with conceptual literature, findings suggest a multifaceted approach to understanding program fidelity may be a powerful way to understand the process through which implementation affects change. Additionally, the current study suggests the potential for group facilitators to implement an evidence-based intervention with favorable ratings of adherence and implementation quality. Given limited resources in real-world settings, continued efforts must be made across stages of translational research to facilitate the use of evidence-based interventions *as intended* in the real-world settings.

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Table 1. REACH Demographics

Characteristic	REACH
Female youth, No. (%)	45 (76)
Child age, M (SD)	9.76 (.77)
Child ethnicity, No. (%)	
Caucasian	22 (37)
Hispanic/Latino	32 (54)
Other	5 (9)
Parent interview in Spanish, No. (%)	18 (31)
Marital status, No. (%)	
Married	28 (48)
Divorced	12 (21)
Single	6 (10)
Other	12 (21)
Mother education, No. (%)	
No diploma/degree	14 (25)
High school diploma/GED	11 (19)
Some college/Trade school	14 (25)
College degree or more	18 (31)
Father education, No. (%)	
No diploma/degree	19 (34)
High school diploma/GED	13 (23)
Some college/Trade school	8 (14)
College degree or more	16 (29)
Self-reported income, M (SD)	10.36 (6.92)

Table 2. Core Program Content

Module	Content Covered	Description
Module 1	Learn about emotions	Identify words used to describe anxiety
	Relaxation	Learn relaxation exercises
Module 2	Learn about worries	Define worry
	STOP	Learn STOP acronym to address cognitive distortions related to worries
	Worryheads game	Practice STOP acronym
Module 3	Learn about conversations	How to initiate and maintain conversations
	Make-Believe game	Practice conversation skills
Module 4	Learn about assertiveness SAFE	Define assertiveness and learn SAFE acronym to build assertiveness
	Stand-up! Activity	Practice SAFE acronym
Module 5	Learn to face situations	Identify difficult situations and rate difficulty according to "yikes thermometer"
	STIC	Learn to face fears
	STIC game	Practice STIC challenges
Module 6	Putting it all together	Review relaxation, STOP, SAFE, and STIC
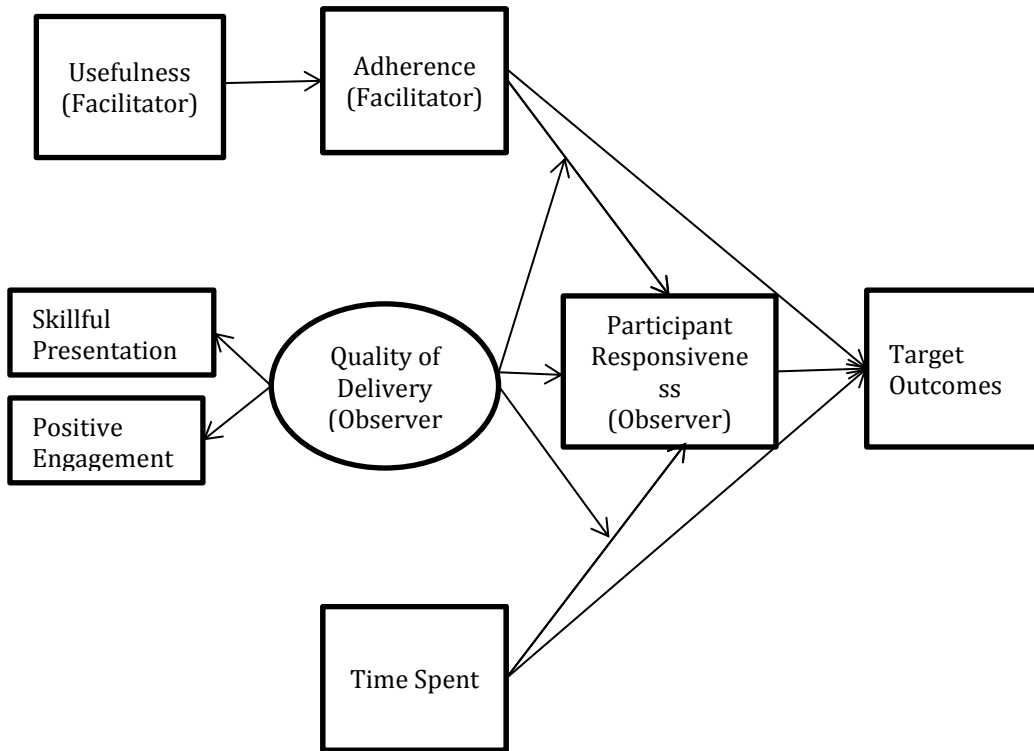
Figure 1. Adapted Conceptual Model from Berkel and colleagues
(2014)
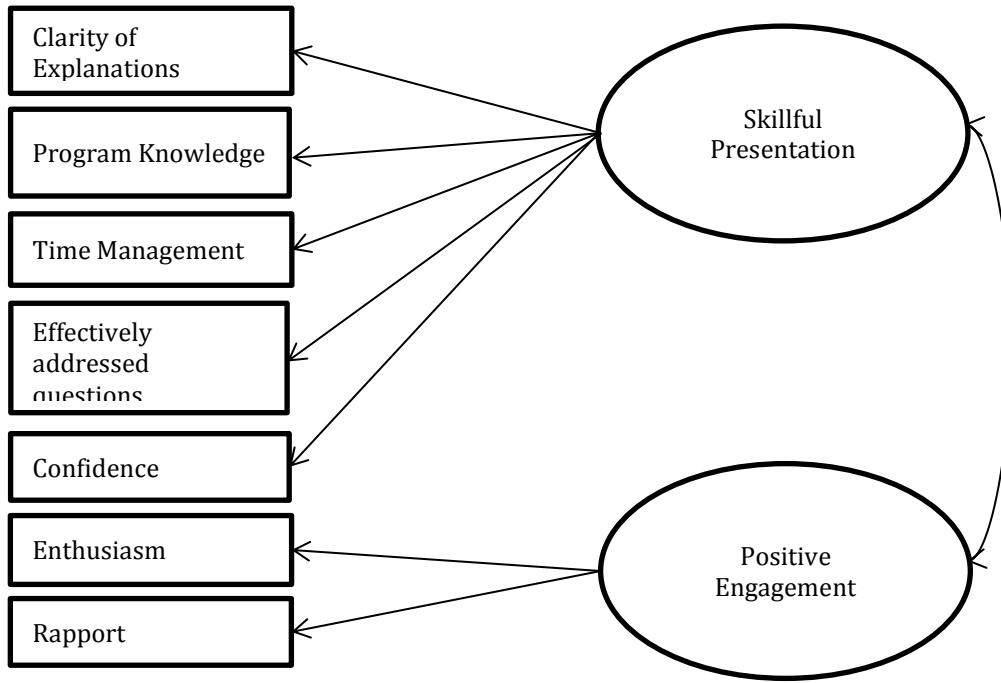
Figure 2. Conceptual Two Factor Model
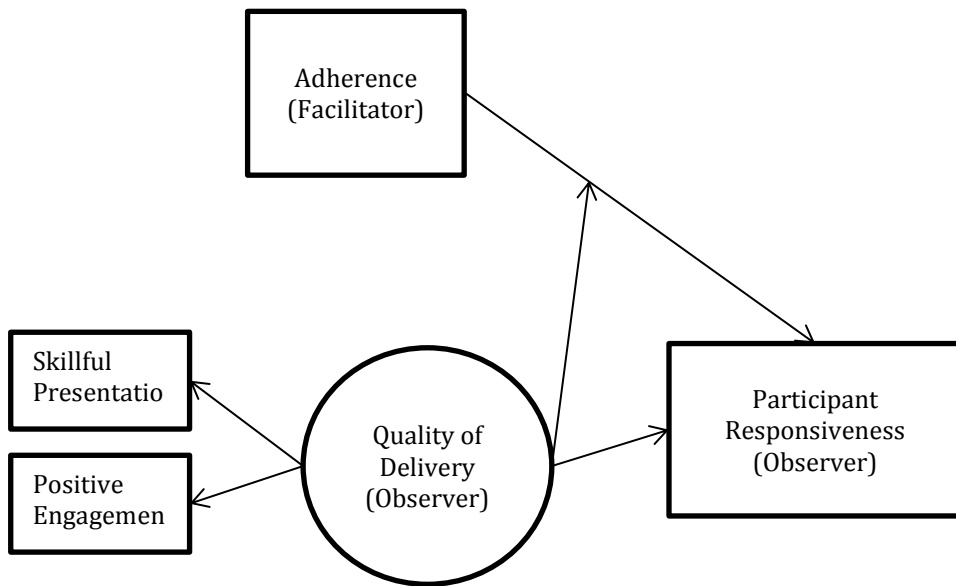
Figure 3. Aim 2a
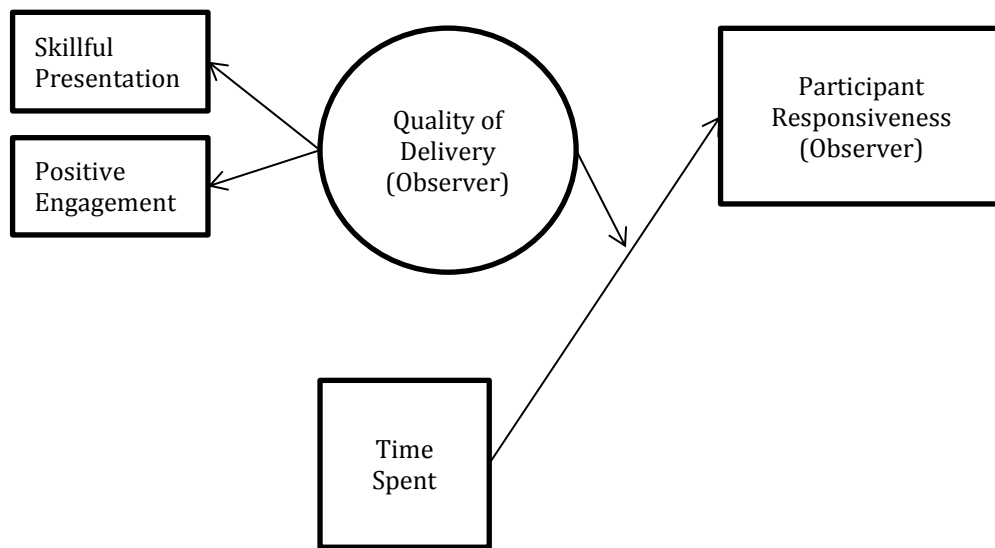
Figure 4. Aim 2b
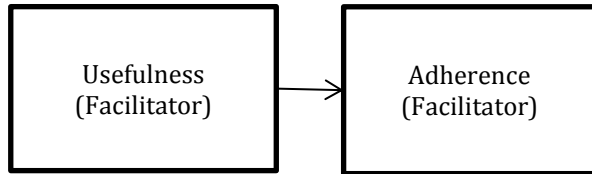
Figure 5. Aim 2c
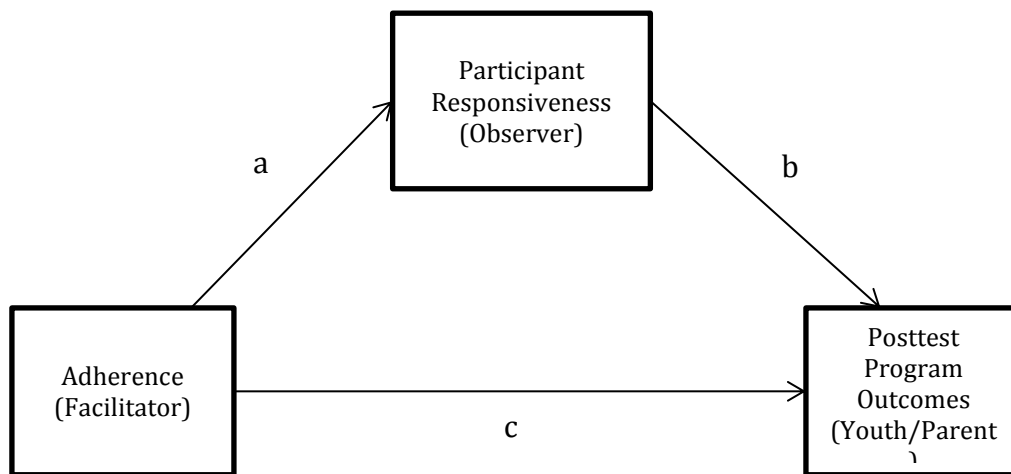
Figure 6. Aim 3a
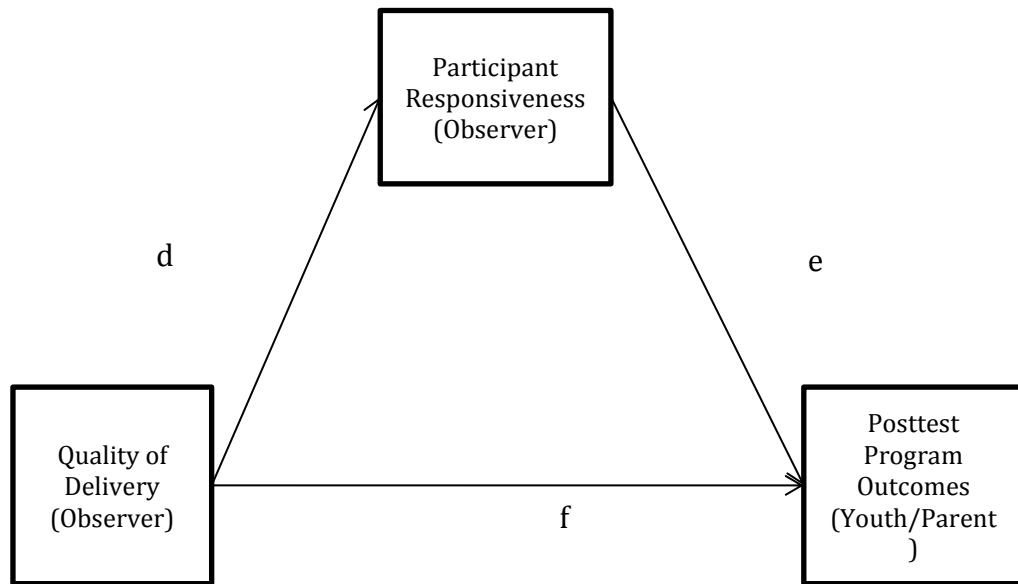
Figure 7. Aim 3b

Figure 8. Aim 3c

Enrollment

Permission Slips Sent (N = 1539)

Did not return signed consent (N = 326)
Did not return consent (N = 338)

Consented via slip (N = 875)

Child was Unable
  Child Moved (N = 9)
  Child Absent (N=5)
  Language Barrier (N=1)
Refused Assent (N =1)

Screened at school (N = 859)

Excluded
Not meeting SCAS inclusion criterion
  (scores<42; N = 678)
Met SCAS inclusion criterion (scores ≥ 42)
  but teacher rated as disruptive (N = 39)
Included by SCAS (scores ≥ 42; N = 142)

Identified (n=142)

Allocation

Excluded
  Based on school's request (N = 1)
  No longer interested (N = 23)
  Lost contact (N =3)
  Relocated (N = 4)
  Could not be pretested (N = 2 spoke
Vietnamese)

Randomized (N = 109)

HOME (N = 50)
Assessed
  Child (N = 50)
  Parent (N = 49)

SCHOOL (N = 59)
Assessed
  Child (N = 59)
  Parent (N = 58)

Unable to locate (N = 3 children and 4
parents)

Postest (1 mo)

Noncompleters (N = 1; dropped out
after session 3)
Unable to locate (N = 3 children and 3
parents)

Assessed
  Child (N =45)
  Parent (N =40)

Assessed
  Child (N = 55)
  Parent (N =53)

Unable to locate (N = 4 children
and 4 parents)

Follow-Up (1 yr)

No longer interested (N = 5 children
and 6 parents)

Assessed
  Child (N =41)
  Parent (N =36)

Assessed
  Child (N =50)
  Parent (N =48)

Figure 9. CONSORT flowchart: Recruitment, randomization, and pre-test
assessment for the pilot preventive intervention trial evaluating the effects of
a school-based anxiety prevention program.

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Table 3. Descriptives of Target Study Variables

Variable	M(SD)	Skewness(SE)	Kurtosis(SE)	ICC
Implementation				
Coverage	3.50(.38)	- 0.90(.31)	0.71(.61)	0.37
Usefulness	3.87(.09)	- 0.10(.31)	-1.32(.61)	0.00
Time Spent	1.12(.16)	.33(.31)	-0.26(.61)	0.19
Quality of Delivery	4.50(.33)	- 1.26(.31)	1.71(.61)	0.56
Participant Responsiveness	4.40(.25)	-0.97(.31)	0.35(.61)	0.07
Pretest				
CR Emotion Expressivity	46.00(9.87)	0.38(.31)	-0.11(0.61)	0.00
CR Physiological Hyperarousal	2.10(0.67)	0.90(.31)	0.23(0.61)	0.00
CR Cognitive Negative Error	36.88(6.74)	0.14(.31)	-0.68(.61)	0.00
CR Social Skills Improvement	104.08(14.45)	-0.69(.31)	0.30(.61)	0.00
CR School Self-Efficacy	39.17(6.92)	-0.33(.31)	1.31(.62)	0.07
CR MASC Anxiety	64.43(11.50)	-0.23(.31)	-0.51(.61)	0.00
PR MASC Anxiety	53.06(18.92)	0.18(.31)	-0.65(.62)	0.17
Posttest				
CR Emotion Expressivity	42.78(11.37)	0.27(.33)	-0.52(.64)	0.00
CR Physiological Hyperarousal	2.01(0.72)	0.60(.33)	-0.51(.64)	0.00
CR Cognitive Negative Error	35.32(8.26)	-0.14(.33)	0.06(.64)	0.08
CR Social Skills Improvement	102.15(14.93)	-0.11(.32)	-0.26(.63)	0.00
CR School Self-Efficacy	40.37(8.30)	0.04(.33)	-0.32(.64)	0.08
CR MASC Anxiety	59.05(13.67)	-0.98(.32)	0.93(.63)	0.16
PR MASC Anxiety	48.35(17.27)	.10(.33)	-0.36(.64)	0.11

Table 4 Correlations between Implementation and Posttest Variables-Individual (n = 14 groups)

	1	2	3	4	5	6	7	8	9	10	11	12	13
1.Gender	--												
2.Ethnicity	-.25†	--											
Implementation													
3.Usefulness	.03	.15	--										
4.Adherence	.01	-.19	.29*	--									
5.Time Spent	.16	-.11	.35**	.06	--								
6. Quality	-.21	.01	.23†	.53**	.28*	--							
7.Responsiveness	.12	-.22†	.09	.41**	.16	.66**	--						
Program Targets													
8.EESC(c)	-.17	.32*	.02	-.44**	-.66**	-.50**	-.44**	--					
9.PHSC(c)	-.11	.29*	.03	-.31*	-.23†	-.30*	-.60**	.69**	--				
10.CNEQ(c)	-.04	.62**	.16	-.28*	-.54**	-.27*	-.22†	.76**	.62**	--			
11. SSIS(c)	.37**	-.52**	-.36**	-.07	.03	-.14	.26*	-.13	-.27*	-.43**	--		
12.SEQS(c)	.42**	-.51**	-.06	.25†	.52**	.22†	.42**	.72**	-.72**	-.78**	.60**	--	
Program Outcomes													
13.MASC(c)	-.15	.26*	-.09	.05	-.60**	-.33*	-.36**	.67**	.68**	.62**	-.04	-.61**	--
14.MASC(p)	.08	.68**	.21	.03	-.20	.15	-.43**	.47**	.59**	.62**	-.53**	-.55**	.51**

Note. All variables are proportion or group mean scores. Gender = Proportion of females in group; Ethnicity = Proportion of Hispanic/Latino students in group; c = Child-Report; p = Parent-Report; EESC = Emotion Expressivity Scale for Children; PHSC = Physiological Hyperarousal Scale for Children; CNEQ = Cognitive Negative Error Questionnaire; SSIS = Social Skills Improvement Rating System; SEQSS = Children's Self-efficacy Questionnaire for Handling School Situations; MASC = Multidimensional Anxiety Scale for Children; *p* < .05, **p* < .01 † *p* < .10.

Table 5. Correlations between Pretest and Posttest Program Targets and Outcomes-Individual (n = 59 students)

	1	2	3	4	5	6	7	8	9	10	11	12	13
Pretest													
1.EESC1	--												
2.PHSC1	.35**	--											
3.CNEQ1	.25†	.31*	--										
4.SSIS1	.08	-.16	-.18	--									
5. SEQS1	-.07	-.12	-.18	.42**	--								
6. Masc1(c)	.24†	.21	.11	.19	-.01	--							
7.Masc1(p)	.00	.04	-.08	-.10	-.29*	.27*	--						
Posttest													
8.EESC2	.40**	.10	.04	.17	-.05	.07	-.09	--					
9.PHSC2	.26†	.50**	.08	-.15	-.30*	-.12	.18	.50**	--				
10.CNEQ2	.17	.22	.15	.06	-.12	.15	.23†	.42**	.32*	--			
11.SSIS2	-.01	-.13	-.12	.59**	.34*	.31*	-.08	-.08	-.26†	-.25†	--		
12.SEQS2	-.06	-.42**	.23†	.32*	.44**	.02	-.20	-.36**	-.53**	-.58**	.51**	--	
13.Masc2(p)	.07	.27*	.12	.21	-.13	.31*	.15	.58**	.44**	.50**	.03	-.42**	--
14.Masc2(c)	-.03	-.02	-.02	-.26†	-.51**	.08	.85**	.16	.39**	.31*	-.22	-.34*	.24†

Note. All variables are individual student scores; c = Child-Report; p = Parent-Report; EESC = Emotion Expressivity Scale for Children; PHSC = Physiological Hyperarousal Scale for Children; CNEQ = Cognitive Negative Error Questionnaire; SSIS = Social Skills Improvement Rating System; SEQSS = Children's Self-efficacy Questionnaire for Handling School Situations; MASC = Multidimensional Anxiety Scale for Children; *p* < .05, **p* < .01 † *p* < .10.
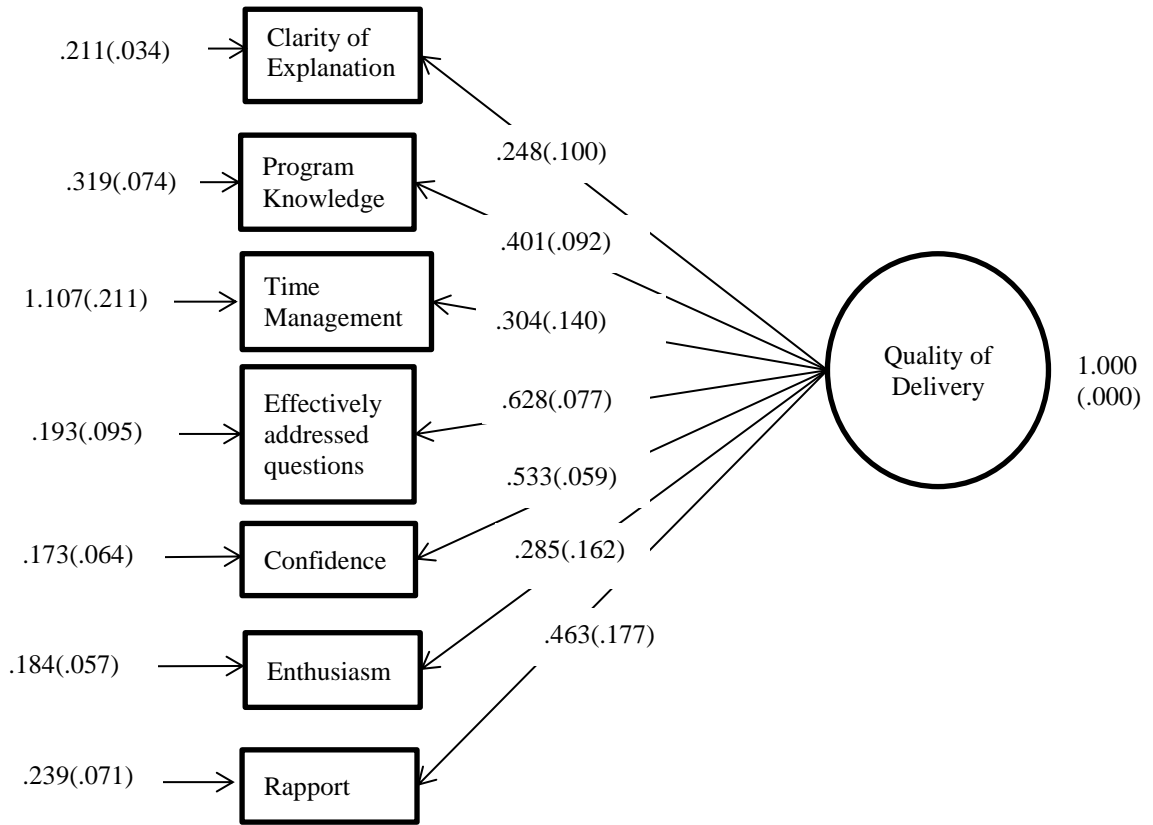
Figure 10. Single Factor Model

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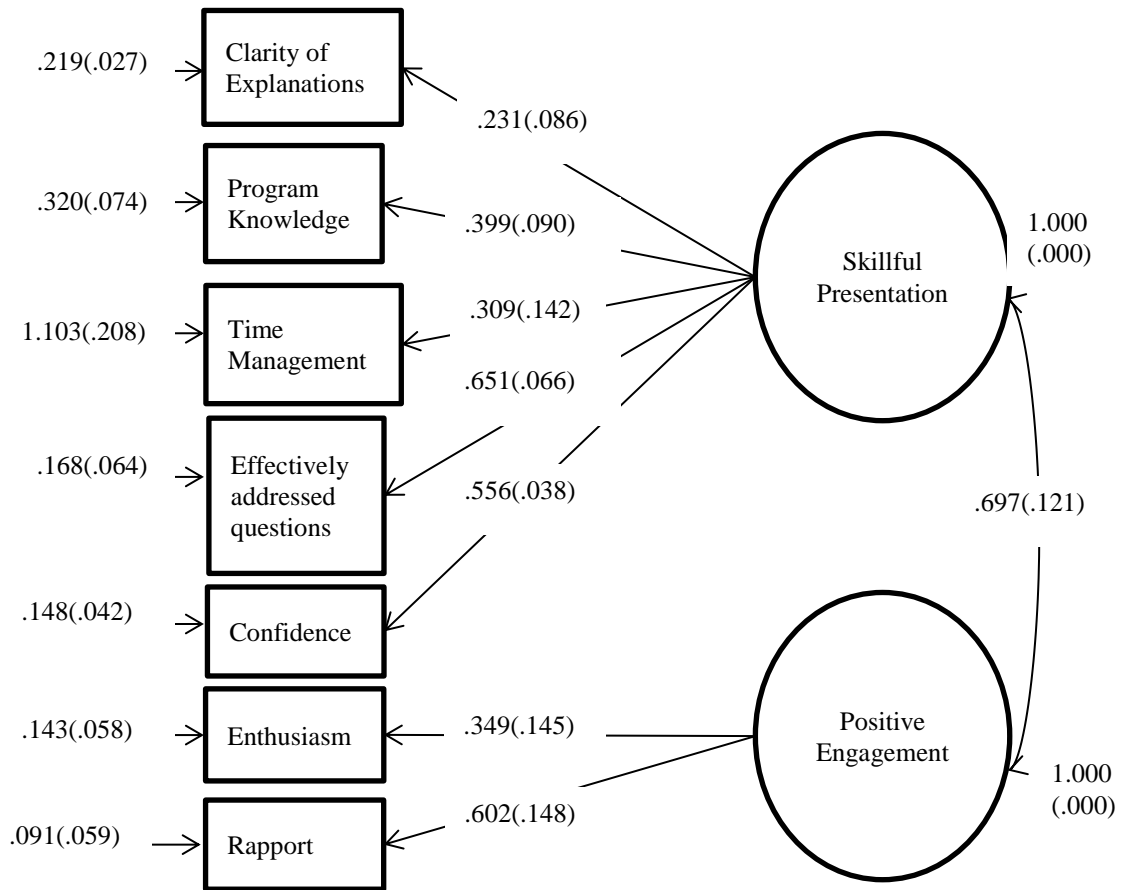
Figure 11. Two Factor Model

Table 6. Model Fit Indices		
	Single Factor	Two Factor
χ^2/df	63.98/14, p <.001; Scaling Correction Factor for MLR = .664	30.956/13, p=.003; Scaling Correction Factor for MLR = .851
RMSEA	.206	.128
CFI	.744	.908
SRMR	.068	.058
TLI	.616	.852
AIC	1102.25	1088.10
BIC	1153.30	1141.58

Table7.Summary of Aim 3 Regression Analyses				
	Participant Responsiveness			
	b (SE)	p	R^2	p
MODEL 1:				
Adherence	.23(.10)	.02		
Skillfulness	.33(.15)	<.001		
Interaction	.15(.10)	.13		
			.41	.01
MODEL 2:				
Adherence	.33(.10)	<.01		
Pos. Engagement	.21(.08)	.01		
Interaction	.17(.09)	.08		
			.26	<.01
MODEL 3:				
Time Spent	.20(.22)	.35		
Skillfulness	.34(.10)	<.001		
Interaction	-.14(.36)	.71		
			.37	<.001
MODEL 4:				
Time Spent	.30(.20)	.13		
Pos. Engagement	.22(.08)	.01		
Interaction	-.24(.25)	.33		
			.25	<.001
	Adherence			
MODEL 5:				
Usefulness	.41(.18)	.03	.03	.22

Low PosEng: b = .18(.11), p = .11
Average PosEng: b = .33(.10), p <.01
High PosEng: b = .48(.13), p <.001
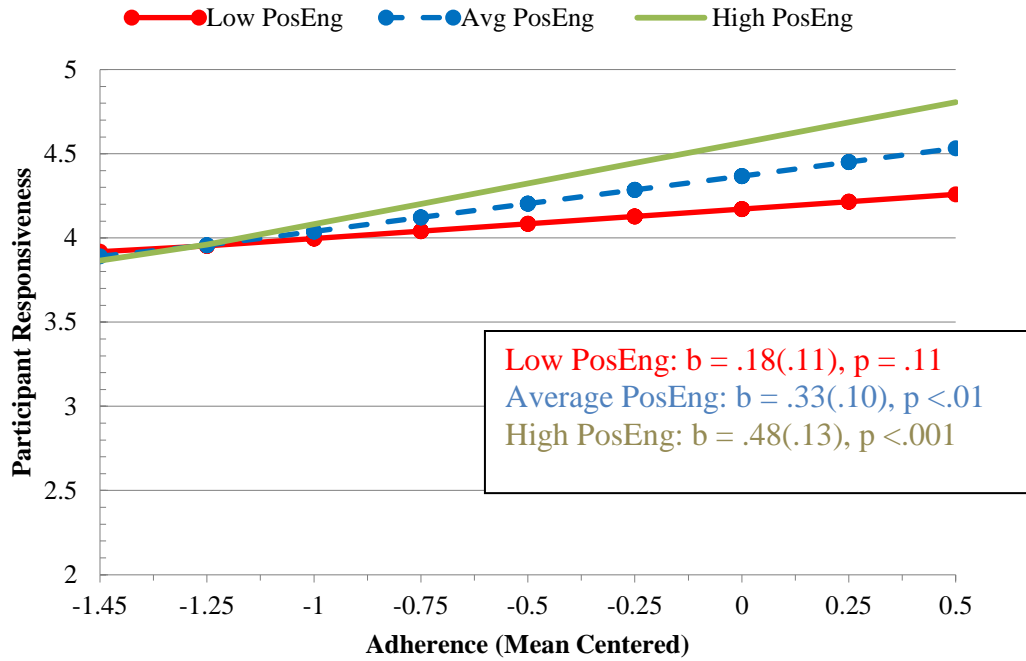
Figure 12. Interaction Plot of Positive Engagement and Adherence on Participant Responsiveness

Table 8. Adherence on Outcomes through Participant Responsiveness

| Model path	b	SE	p	LL	UL
Adherence → Responsiveness → Emotional Expressivity					
W1 Emotional Expressivity → Emotional Expressivity	.32	.17	.06	.04	.59
Adherence → Emotional Expressivity	-5.90	3.39	.08	-11.48	-5.90
Participant Responsiveness → Emotional Expressivity (b)	-5.59	7.24	.44	-17.49	6.32
Adherence → Participant Responsiveness (a)	.25	.21	.24	-.10	.60
Indirect ab	-1.40	2.47	.57	-7.90	2.93
Adherence → Responsiveness → Physio Hyperarousal					
W1 Physiological Hyperarousal→ Physio Hyperarousal	.40	.14	<.01	.17	.62
Adherence → Physio Hyperarousal	-0.03	.17	.85	-.32	.30
Participant Responsiveness → Physio Hyperarousal (b)	-.72	.37	.05	-1.32	-.12
Adherence → Participant Responsiveness (a)	.25	.21	.24	-.10	.60
Indirect ab	-.18	.18	.31	-.64	.12
Adherence → Responsiveness → Negative Cognitions					
W1 Negative Cognitions → Negative Cognitions	.17	.13	.17	-.04	.38
Adherence → Negative Cognitions	-3.98	3.04	.19	-8.97	1.02
Participant Responsiveness → Negative Cognitions (b)	-1.26	6.48	.85	-11.91	9.39
Adherence → Participant Responsiveness (a)	.25	.21	.24	-.10	.60
Indirect ab	-.32	1.68	.85	-5.19	4.02
Adherence → Responsiveness → Social Skills					
W1 Social Skills → Social Skills	.28	.26	.27	-.14	.78
Adherence → Social Skills	-4.51	3.74	.23	-10.66	1.64
Participant Responsiveness → Social Skills (b)	13.05	7.52	.08	.68	25.42
Adherence → Participant Responsiveness (a)	.25	.21	.24	-.10	.60
Indirect ab	3.27	3.25	.31	-2.35	12.11
Adherence → Responsiveness → Self-Efficacy					
W1 Self-Efficacy → Self-Efficacy	.40	.21	.05	.06	.74
Adherence → Self-Efficacy	3.55	3.22	.27	-1.74	8.84
Participant Responsiveness → Self-Efficacy (b)	3.53	6.94	.61	-7.89	14.95
Adherence → Participant Responsiveness (a)	.25	.21	.24	-.10	.60
Indirect ab	.88	1.87	.64	-3.41	6.64
Adherence → Responsiveness → Child-report Masc					
W1 Child-report MASC → Child-report Masc	.34	.20	.09	.01	.66
Adherence → Child-report Masc	4.98	4.16	.23	-1.86	11.82
Participant Responsiveness → Child-report Masc (b)	-12.27	13.63	.37	-34.68	10.15
Adherence → Participant Responsiveness (a)	.25	.21	.24	-.10	.60
Indirect ab	-3.07	4.69	.51	-15.79	5.07
Adherence → Responsiveness → Parent-report Masc					
W1 Parent-report → Parent-report Masc	.80	.07	<.01	.68	.92
Adherence → Parent-report Masc	.88	5.31	.87	-7.86	9.61
Participant Responsiveness → Parent-report Masc (b)	-1.69	9.61	.86	-17.49	14.12
Adherence → Participant Responsiveness (a)	.25	.21	.24	-.10	.60
Indirect ab	-.42	2.43	.86	-7.61	6.04

Table 9. Skillfulness on Outcomes through Participant Responsiveness

Model path	b	SD	p	LL	UL
Skillfulness → Responsiveness → Emotional Expressivity					
W1 Emotional Expressivity → Emotional Expressivity	.45	.16	<.01	.20	.71
Skillfulness → Emotional Expressivity	-1.80	1.99	.37	-5.06	1.48
Participant Responsiveness → Emotional Expressivity (b)	-4.82	6.87	.48	-16.12	6.49
Skillfulness → Participant Responsiveness (a)	.23	.11	.03	.05	.41
Indirect ab	-1.12	1.89	.55	-5.32	2.17
Skillfulness → Responsiveness → Physio Hyperarousal					
W1 Physio Hyperarousal → Physio Hyperarousal	.40	.14	<.01	.17	.64
Skillfulness → Physio Hyperarousal	.08	.08	.31	-.05	.22
Participant Responsiveness → Physio Hyperarousal (b)	-.89	.26	<.01	-1.32	-.46
Skillfulness → Participant Responsiveness (a)	.23	.11	.03	.05	.41
Indirect ab	-.21	.11	.06	-.47	-.01
Skillfulness → Responsiveness → Negative Cognitions					
W1 Negative Cognitions → Negative Cognitions	.15	.12	.23	-.05	.35
Skillfulness → Negative Cognitions	-2.79	1.90	.14	-5.92	.33
Participant Responsiveness → Negative Cognitions (b)	1.87	6.01	.76	-8.02	11.76
Skillfulness → Participant Responsiveness (a)	.23	.11	.03	.05	.41
Indirect ab	.43	1.32	.74	-2.62	3.84
Skillfulness → Responsiveness → Social Skills					
W1 Social Skills → Social Skills	.61	.31	.05	.10	1.12
Skillfulness → Social Skills	-1.66	33.56	.96	-56.86	53.55
Participant Responsiveness → Social Skills (b)	14.94	81.56	.86	-119.23	149.10
Skillfulness → Participant Responsiveness (a)	.23	.30	.43	-.25	.72
Indirect ab	3.47	20.84	.87.	-5.84	15.80
Skillfulness → Responsiveness → Self-Efficacy					
W1 Self-Efficacy → Self-Efficacy	.47	.18	.01	.18	.77
Skillfulness → Self-Efficacy	-.05	1.43	.97	-2.40	2.30
Participant Responsiveness → Self-Efficacy (b)	4.80	4.68	.31	-2.90	12.51
Skillfulness → Participant Responsiveness (a)	.23	.11	.03	.05	.41
Indirect ab	1.12	1.30	.39	-1.05	4.16
Skillfulness → Responsiveness → Child-report Masc					
W1 Child-report Masc → Child-report Masc	.34	.22	.13	-.03	.70
Skillfulness → Child-report Masc	-1.88	3.24	.56	-7.21	3.45
Participant Responsiveness → Child-report Masc (b)	-6.12	17.86	.73	-35.50	23.26
Skillfulness → Participant Responsiveness	.23	.11	.03	.05	.41
Indirect ab	-1.42	4.15	.73	-11.61	7.60
Skillfulness → Responsiveness → Parent-report Masc					
W1 Parent-report Masc → Parent-report Masc	.80	.07	<.01	.69	.92
Skillfulness → Parent-report Masc	4.26	2.29	.06	.50	8.03
Participant Responsiveness → Parent-report Masc (b)	-8.94	7.36	.23	-21.06	3.17
Skillfulness → Participant Responsiveness (a)	.23	.11	.03	.05	.41
Indirect ab	-2.07	1.78	.25	-7.05	1.29

Table 10. Positive Engagement on Outcomes through Participant Responsiveness

Model path	b	*SD*	*p*	LL	UL
PosEng → Responsiveness → Emotional Expressivity					
W1 Emotional Expressivity → Emotional Expressivity	.47	.14	<.01	.24	.70
PosEng → Emotional Expressivity	-.61	2.06	.77	-4.00	2.77
Participant Responsiveness → Emotional Expressivity (b)	-7.42	6.57	.26	-18.22	3.38
PosEng → Participant Responsiveness (a)	.18	.10	.06	.02	.34
Indirect ab	-1.33	1.57	.40	-5.03	1.06
PosEng → Responsiveness → Physio Hyperarousal					
W1 Physio Hyperarousal → Physio Hyperarousal	.39	.15	.01	.15	.64
PosEng → Physio Hyperarousal	.14	.08	.08	.01	.28
Participant Responsiveness → Physio Hyperarousal (b)	-.93	.24	<.01	-1.32	-.54
PosEng → Participant Responsiveness (a)	.18	.10	.06	.02	.34
Indirect ab	-.17	.10	.10	-.40	.01
PosEng → Responsiveness → Negative Cognitions					
W1 Negative Cognitions → Negative Cognitions	.17	.13	.20	-.05	.38
PosEng → Negative Cognitions	-.95	1.97	.63	-4.18	2.28
Participant Responsiveness → Negative Cognitions (b)	-1.99	6.13	.75	-12.07	8.10
PosEng → Participant Responsiveness (a)	.18	.10	.06	.02	.34
Indirect ab	-.36	1.17	.76	-3.24	2.15
PosEng → Responsiveness → Social Skills					
W1 Social Skills → Social Skills	.25	.26	.34	-.18	.68
PosEng → Social Skills	-3.38	2.46	.17	-7.42	.66
Participant Responsiveness → Social Skills (b)	15.19	8.75	.08	.80	29.58
PosEng → Participant Responsiveness (a)	.18	.10	.06	.02	.34
Indirect ab	2.72	2.22	.22	-.68	8.35
PosEng → Responsiveness → Self-Efficacy					
W1 Self-Efficacy → Self-Efficacy	.47	.18	.01	.18	.77
PosEng → Self-Efficacy	-.01	1.20	.99	-1.99	2.00
Participant Responsiveness → Self-Efficacy (b)	4.73	4.42	.29	-2.55	12.01
PosEng → Participant Responsiveness (a)	.18	.10	.06	.02	.34
Indirect ab	.85	.94	.37	-.77	3.30
PosEng → Responsiveness → Child-report Masc					
W1 Child-report Masc → Child-report Masc	.33	.21	.11	-.01	.67
PosEng → Child-report Masc	-1.09	.18	.54	-4.02	1.84
Participant Responsiveness → Child-report Masc (b)	-8.43	12.59	.50	-29.13	12.27
PosEng → Participant Responsiveness (a)	.18	.10	.06	.02	.34
Indirect ab	-1.51	2.38	.53	-7.91	3.31
PosEng → Responsiveness → Parent-report Masc					
W1 Parent-report Masc → Parent-report Masc	.80	.07	<.01	.69	.92
PosEng → Parent-report Masc	4.38	2.13	.04	.89	7.88
Participant Responsiveness → Parent-report Masc (b)	-7.74	6.09	.20	-17.77	2.28
PosEng → Participant Responsiveness (a)	.18	.10	.06	.02	.34
Indirect ab	-1.39	1.35	.30	-4.93	.83

Table 11. Time Spent on Outcomes through Participant Responsiveness

Model path	b	*SD*	*p*	LL	UL
Time Spent → Responsiveness → Emotional Expressivity					
W1 Emotional Expressivity → Emotional Expressivity	.44	.78	.57	.21	.67
Time Spent → Emotional Expressivity	-21.72	63.18	.73	-125.65	82.21
Participant Responsiveness → Emotional Expressivity (b)	-6.86	94.86	.94	-162.91	-6.86
Time Spent → Participant Responsiveness (a)	.35	16.69	.98	-27.10	27.80
Indirect ab	-2.42	84.51	.98	-11.69	2.99
Time Spent → Responsiveness → Physio Hyperarousal					
W1 Physiolo Hyperarousal → Physio Hyperarousal	.41	.14	<.01	.19	.63
Time Spent → Physio Hyperarousal	.04	.45	.93	-.69	.78
Participant Responsiveness → Physio Hyperarousal (b)	-.73	.33	.03	-1.28	-.19
Time Spent → Participant Responsiveness (a)	.35	.29	.22	-.12	.83
Indirect ab	-.26	.25	.30	-.86	.16
Time Spent → Responsiveness → Negative Cognitions					
W1 Negative Cognitions → Negative Cognitions	.16	.12	.19	-.04	.36
Time Spent → Negative Cognitions	-15.21	8.49	.07	-29.18	-1.24
Participant Responsiveness → Negative Cognitions (b)	-2.19	4.83	.65	-10.14	5.76
Time Spent → Participant Responsiveness (a)	.35	.29	.22	-.12	.83
Indirect ab	-.77	1.88	.68	-6.24	3.44
Time Spent → Responsiveness → Social Skills					
W1 Social Skills → Social Skills	.63	.45	.16	-.10	1.37
Time Spent → Social Skills	8.25	71.50	.91	-109..37	125.87
Participant Responsiveness → Social Skills (b)	11.31	39.62	.78	-53.86	76.48
Time Spent → Participant Responsiveness (a)	.35	2.99	.91	-4.57	5.27
Indirect ab	3.99	35.43	.91	-3.7	19.59
Time Spent → Responsiveness → Self-Efficacy					
W1 Self-Efficacy → Self-Efficacy	.46	.58	.42	-.49	1.42
Time Spent → Self-Efficacy	14.19	19.97	.48	-18.65	47.04
Participant Responsiveness → Self-Efficacy (b)	3.84	15.23	.80	-21.22	28.89
Time Spent → Participant Responsiveness (a)	.35	4.18	.93	-6.53	7.23
Indirect ab	1.35	13.89	.92	-2.06	7.67
Time Spent → Responsiveness → Child-report Masc					
W1 Child-report Masc → Child-report Masc	.30	.32	.35	-.23	.83
Time Spent → Child-report Masc	-25.82	19.34	.18	-57.63	5.99
Participant Responsiveness → Child-report Masc (b)	-7.70	23.72	.75	-46.71	31.32
Time Spent → Participant Responsiveness (a)	.35	2.94	.91	-4.49	5.20
Indirect ab	-2.72	24.72	.91	-28.53	18.63
Time Spent → Responsiveness → Parent-report Masc					
W1 Parent-report Masc → Parent-report Masc	.80	.07	<.01	.68	.92
Time Spent → Parent-report Masc	1.46	9.84	.88	-14.72	17.64
Participant Responsiveness → Parent-report Masc (b)	-1.31	7.35	.86	-13.40	10.77
Time Spent → Participant Responsiveness (a)	.35	.29	.22	-.12	.83
Indirect ab	-.46	2.72	.87	-8.11	6.42