A multimodal investigation of distress intolerance and youth anxiety disorders

Elkins, Regina Meredith

http://hdl.handle.net/2144/19585

Boston University
A MULTIMODAL INVESTIGATION OF DISTRESS INTOLERANCE AND
YOUTH ANXIETY DISORDERS

by

R. MEREDITH ELKINS

B.A., Washington and Lee University, 2006
M.A., Boston University, 2010

Submitted in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy
2016
Approved by

First Reader

_________________________________________________________
Donna B. Pincus, Ph.D.
Associate Professor of Psychological and Brain Sciences
Boston University

Second Reader

_________________________________________________________
Jonathan S. Comer, Ph.D.
Associate Professor of Psychology and Psychiatry
Department of Psychology, Florida International University
Special Service Appointment

Third Reader

_________________________________________________________
R. Kathryn McHugh, Ph.D.
Assistant Professor, Department of Psychiatry, Harvard Medical School
Division of Alcohol and Drug Abuse, McLean Hospital
Special Service Appointment
DEDICATION

To my parents, for your wisdom and your love.
ACKNOWLEDGMENTS

I reflect with deep appreciation upon those individuals who have supported me in the completion of this project. To my advisors, Dr. Donna Pincus and Dr. Jonathan Comer, I am profoundly grateful for your extraordinary mentorship throughout my graduate studies. Thank you both for inspiring and nurturing my research interests, and for shaping and encouraging my professional development. Your warmth, understanding, and humor makes learning and collaborating a true pleasure, and I feel so privileged to be your student.

To Dr. Kate McHugh, thank you for sparking my interest in distress intolerance, and for sharing your expertise in the field. From your guidance on my first academic paper as a Master’s student, through your invaluable feedback throughout this project, you have consistently provided me with exceptional mentorship for many years. To Dr. David Langer, thank you for lending your time and expertise to this project, for helping to hone my clinical abilities throughout my training, and for your feedback and guidance throughout my graduate studies. Dr. Lisa Smith, thank you for providing phenomenal clinical training and supervision, for your calm and confident leadership, and for your input on this project. I am grateful to Dr. David Barlow for his guidance, support, and encouragement throughout my graduate school career.

I would like to acknowledge the Clara Mayo Memorial Fellowship, which provided the financial support for this project, and to extend my thanks to the participants and their parents who dedicated their time to participate in this research. I would also like
to thank the Child CARD clinicians and research assistants, and many Boston University faculty members and staff for assisting with recruitment efforts.

I feel uncommonly blessed to have formed friendships with a remarkable group of women throughout my graduate training. To my labmates, past and present, thank you for being terrific collaborators and for preserving the warm and cooperative culture of Child CARD. Thank you also for always being generous with giggles and chocolates. To my work wife, Aubrey Carpenter, a thousand thanks for your friendship, partnership, and encouragement over the past five years. Your intelligence and creativity, your consideration of others, your optimism and poise never cease to amaze me. To my amazing cohort, Kate Bentley, Michelle Bourgeois, Gretchen Reynolds, Lauren Rutter, and Kristin Szuhany, thank you for being great study buddies, trivia partners, and the most entertaining group of women to ever come through BU. I am so grateful to each of you for your friendship, and for making graduate school so enjoyable.

To my godparents, George and Nancy Roche, thank you for your dedication to my education and development. To my fiancé, Jesse, thank you for your love, your constancy, your devotion and encouragement, and for bringing me joy even on the dreariest of days. Last but not least, there is no adequate way to express my gratitude to my incredible parents. Thank you for prioritizing my education above all, for your ardent and unwavering support of my character and my interests, and for loving me so completely.
A MULTIMODAL INVESTIGATION OF DISTRESS INTOLERANCE AND YOUTH ANXIETY DISORDERS

R. MEREDITH ELKINS

Boston University Graduate School of Arts and Sciences, 2016

Major Professor: Donna B. Pincus, Ph.D., Associate Professor of Psychological and Brain Sciences

ABSTRACT

Despite major advances in the development of evidence-based practices (EBPs) for child anxiety, there remains a critical need to improve upon current treatments. Identifying common, transdiagnostic processes underlying child anxiety disorders offers a promising avenue to refine conceptualizations of the etiology and maintenance of child anxiety disorders, to enhance the efficacy of interventions, and to facilitate the dissemination of EBPs. Distress intolerance (DI), defined as the perceived inability to tolerate negative somatic and emotional states or experiential discomfort (Simons & Gaher, 2005), is a transdiagnostic factor contributing to multiple forms of mental illness. Emerging research suggests that DI may be associated with elevated anxiety in community samples of youth; however, associations between DI and child anxiety have yet to be evaluated in a clinical population. The present multimodal investigation \((N = 56)\) examined patterns and correlates of DI in a treatment-seeking sample of anxious youth (ANX, \(n = 28\)) relative to community controls (COM, \(n = 28\)). The aims of the study were to examine differences in DI between ANX and COM youth on self-report
and behavioral measures of DI, and to determine the extent to which DI mediates links between child anxiety and associated behavioral avoidance. Youth ages 10-17 completed self-report measures assessing child anxiety symptoms, behavioral avoidance, and DI. Next, participants completed a behavioral task intended to provoke mild levels of distress that assessed behavioral persistence in the face of that distress. Consistent with hypotheses, ANX participants demonstrated higher levels of self-reported DI than COM participants, and greater anxiety-disorder severity was associated with higher levels of self-reported DI. Contrary to hypotheses, there were no between-group differences in behaviorally assessed DI. Mediation analyses revealed that a composite summary score of three self-report DI measures significantly mediated the link between anxiety status and behavioral avoidance. These findings provide compelling preliminary support that self-perceived DI may underlie the behavioral avoidance that is a cardinal feature across anxiety disorders. Results can inform the optimization of EBPs for child anxiety such that clinicians might directly target DI within treatment to better alleviate symptoms and yield more enduring treatment gains in anxiety-disordered youth.
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<th>Abbreviation</th>
<th>Definition</th>
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<tr>
<td>ADIS-C/P</td>
<td>Anxiety Disorders Interview Schedule – Child and Parent Versions</td>
</tr>
<tr>
<td>AD-NOS</td>
<td>Anxiety disorder not otherwise specified</td>
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<tr>
<td>ANX</td>
<td>Participants in the anxiety-disordered group</td>
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<td>CAMS</td>
<td>Child Avoidance Measure – Self Report</td>
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<td>CARD</td>
<td>Center for Anxiety and Related Disorders</td>
</tr>
<tr>
<td>CASI</td>
<td>Childhood Anxiety Sensitivity Index</td>
</tr>
<tr>
<td>CBT</td>
<td>Cognitive Behavioral Therapy</td>
</tr>
<tr>
<td>CSR</td>
<td>Clinician Severity Ratings</td>
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<tr>
<td>CI</td>
<td>Confidence Interval</td>
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<tr>
<td>COM</td>
<td>Participants in the community control group</td>
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<tr>
<td>DI</td>
<td>Distress Intolerance</td>
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<tr>
<td>DII</td>
<td>Distress Intolerance Index</td>
</tr>
<tr>
<td>DII-Y</td>
<td>Distress Intolerance Index for Youth</td>
</tr>
<tr>
<td>EBP</td>
<td>Evidence-based Practices</td>
</tr>
<tr>
<td>GAD</td>
<td>Generalized anxiety disorder</td>
</tr>
<tr>
<td>IUSC</td>
<td>Intolerance of Uncertainty Scale for Children</td>
</tr>
<tr>
<td>MTPT-C</td>
<td>Computerized Mirror Tracing Persistence Task</td>
</tr>
<tr>
<td>NA</td>
<td>Negative affect</td>
</tr>
<tr>
<td>PA</td>
<td>Positive Affect</td>
</tr>
<tr>
<td>PANAS</td>
<td>Positive and Negative Affect Scale</td>
</tr>
<tr>
<td>PASAT</td>
<td>Paced Auditory Serial Addition Task</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
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<tr>
<td>--------------</td>
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<tr>
<td>PD/PDA</td>
<td>Panic disorder with or without agoraphobia</td>
</tr>
<tr>
<td>PSWQ-C</td>
<td>Penn State Worry Questionnaire for Children</td>
</tr>
<tr>
<td>RCADS</td>
<td>Revised Child Anxiety and Depression Scales</td>
</tr>
<tr>
<td>SAD</td>
<td>Separation anxiety disorder</td>
</tr>
<tr>
<td>SM</td>
<td>Selective mutism</td>
</tr>
<tr>
<td>SOC</td>
<td>Social anxiety disorder</td>
</tr>
<tr>
<td>SPSS</td>
<td>Statistical package for the social sciences</td>
</tr>
<tr>
<td>SP</td>
<td>Specific phobia</td>
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A MULTIMODAL INVESTIGATION OF DISTRESS INTOLERANCE AND YOUTH ANXIETY DISORDERS

Anxiety disorders are among the most prevalent class of mental health problems affecting children and adolescents, impacting 8-12% of youth (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003). Anxiety disorders commonly develop in early life, exhibit a chronic course (Kessler, Berglund, Demler, Jin, & Walters, 2005; Pine, Cohen, Gurley, Brook, & Ma, 1998; Roza, Hofstra, van der Ende, & Verhulst, 2003), and are associated with a variety of academic and social difficulties (e.g., Ginsburg, La Greca, & Silverman, 1998; Kessler, Foster, Saunders, & Stang, 1995), sleep problems (Weiner, Elkins, Pincus, & Comer, 2015), irritability (Cornacchio, Crum, Coxe, Pincus, & Comer, 2016) and the development of comorbid psychopathology in adolescence (e.g. Bittner et al., 2007; Costello et al., 2003). Moreover, untreated anxiety disorders are associated with a host of negative outcomes in adulthood, including comorbid disorders, substance misuse, and reduced quality of life (e.g., Comer et al., 2011; Pine et al., 1998; Roza et al., 2003). The economic costs of anxiety disorders to families and to society are also substantial (Greenberg et al., 1999). The cost of illness in families with an anxious child (i.e., costs of direct care for their children as well as associated indirect costs) is up to 21 times greater than that of families with non-anxiety-disordered children (Bodden, Dirksen, & Bogels, 2008). Not surprisingly, these conditions are also associated with greater family dysfunction and lower parenting satisfaction (Lange et al., 2005). Such findings underscore the importance of developing and disseminating effective treatments for affected youth.
Research efforts over the past 30 years have greatly advanced the treatment of anxiety in childhood and adolescence. Cognitive Behavioral Therapy (CBT) approaches, in particular, have shown considerable efficacy (see Higa-McMillan, Francis, Rith-Najarian, & Chorpita, 2016; Silverman, Pina, & Viswesvaran, 2008), with 60-70% of children receiving CBT for anxiety disorders showing significant improvements (e.g., Albano et al., under review; Kendall, Hudson, Choudhury, Webb, & Pimental, 2005; Ollendick, King, & Chorpita, 2006; Walkup et al., 2008). In addition, CBT dissemination and implementation efforts are working to meaningfully improve the quality of care for anxious youth in practice settings (e.g., Beidas et al., 2012; see Elkins, McHugh, Santucci, & Barlow, 2011, for review).

Despite laudable treatment advances, at least 40% of anxious youth do not show adequate symptom response even after receiving the most well-supported cognitive-behavioral interventions in specialty settings. Accordingly, there is a critical need to improve upon current treatments to address the clinical needs of a greater proportion of treatment-seeking youth. To this effect, focused research examining key mechanisms underlying therapeutic change are critical; as Kazdin (2008) notes, such work “may well be the best long-term investment for improving clinical practice and patient care” (p. 151). Identifying underlying mechanisms of psychological illness clarifies treatment targets that should be emphasized, and is therefore essential to optimizing treatments and improving response rates (e.g., Kazdin, 2007, 2008; Kazdin & Weisz, 1998; Kendall, Settapani, & Cummings, 2012; MacKinnon, Lockhart, Baraldi, & Gelfand, 2013).
Moreover, despite tremendous efforts to disseminate evidence-based practices (EBPs) into community settings, very few affected youth receive evidence-based treatment (Rivard, Ganju, Roberts, & Lane, 2012). Current efforts to facilitate the broad dissemination and implementation of EBPs are hampered in part by the sheer number of single-disorder protocols currently available, rendering it difficult for practicing clinicians to develop proficiency in all supported protocols or to make educated choices about which protocols to use for which cases (Barlow, Allen, & Choate, 2004; Comer & Barlow, 2013; Chu, 2012; McHugh, Murray, & Barlow, 2009). Although it is unlikely that each available treatment protocol produces change through unique mechanisms (Kazdin, 2007), systematic investigations of the change mechanisms underlying supported protocols have been limited. To surmount these barriers, researchers are increasingly considering dissemination feasibility and unifying treatment mechanisms at the early stages of treatment development, leading to a recent proliferation of transdiagnostic treatments (see Barlow et al., 2004; Barlow, Bullis, Comer, & Armetaj, 2013; McHugh et al., 2009).

Taken together, research is needed to inform an advanced understanding of the underlying mechanisms of child anxiety in order to optimize interventions, improve response rates, and facilitate dissemination. Transdiagnostic approaches focusing on common underlying psychopathology dimensions offer a promising avenue to refine our conceptualization of the etiology of child anxiety disorders, as well as to boost the efficacy of interventions and facilitate the dissemination of EBPs (Chu, 2012; Kendall et al., 2012).
The Promise of Transdiagnostic Approaches

Identifying, understanding, and targeting common elements that underlie multiple disorders may enhance the efficacy, efficiency, generalizability, and cost-effectiveness of mental health treatment (Barlow et al., 2013; Chu, 2012; McHugh et al., 2009). Elucidating such transdiagnostic factors can inform treatment development and improve treatment response rates through the parsimonious application of common principles to target core mechanisms underlying multiple disorders. Moreover, emphasizing transdiagnostic factors in treatment development may aid dissemination and implementation efforts by minimizing the number of single-disorder protocols that clinicians are required to learn (Chu, 2012).

A number of transdiagnostic factors have been identified as underlying diverse forms of psychopathology, and a growing body of evidence supports the efficacy of treatments using a transdiagnostic approach to target multiple disorders for adults (e.g., Barlow et al., 2004; Fairburn, Cooper, & Shafran, 2003; Farchione et al., 2012). More recently, transdiagnostic approaches have been developed for the treatment of heterogeneous psychological disorders in youth (e.g., Allen, Tsao, Sideman, Ehrenreich-May, & Zeltzer, 2012; Bilek & Ehrenreich-May, 2012; Loeb, Lock, Greif, & le Grange, 2012). Transdiagnostic approaches to treatment may be particularly relevant for children and adolescents, as these approaches may be more likely to target the pervasive comorbidity seen in youth psychological disorders, as well as the complexity associated with the multiple interpersonal systems at play in the lives of children and adolescents (Chu, 2012).
Transdiagnostic approaches to understanding the development, maintenance, and treatment of youth anxiety disorders may offer much to improve treatment response rates and enhance dissemination efforts for this population. Single-disorder treatments addressing lower-order symptoms of an anxiety disorder may be sufficient to alleviate the suffering of some youth; however, it is likely that neglecting higher-order elements underlying these disorders during treatment may play a role in poor response rates and limited maintenance of gains, and reliance on single-disorder protocols may impede broad dissemination efforts. In contrast, the refinement of EBPs so that they directly target common, transdiagnostic processes underlying heterogeneous child anxiety disorders may lead to treatment optimization and improved response rates, as well as enhanced dissemination efforts as clinicians may be able to focus on learning fewer and more parsimonious EBPs. It follows that the accurate identification of common processes driving the onset and maintenance of anxiety disorders in youth is required in order to develop interventions specifically targeting those processes (Kazdin, 2008; Kazdin & Kendall, 1998).

**Distress Intolerance: A Transdiagnostic Characteristic**

Distress intolerance (DI), defined as the perceived inability to tolerate negative somatic and emotional states or experiential discomfort (Otto, Powers, & Fischmann, 2005; Simons & Gaher, 2005), is a transdiagnostic factor that has been shown to underlie a range of mental health concerns across the lifespan. Current conceptualizations of DI suggest that it is a stable, trait-like characteristic that emerges in childhood or adolescence through repeated avoidance or escape from aversive situations, leading to
deficits in emotion regulation strategies (Cummings et al., 2013; McHugh, Reynolds, Leyro, & Otto, 2013; Zvolensky, Bernstein, & Vujanovic, 2011). Theoretical models of DI propose that this construct encompasses both the perceived capacity to withstand aversive emotional or physical states and the behavioral capacity to tolerate internal aversive states elicited by a stressor (Leyro, Zvolensky, & Bernstein, 2010; McHugh & Otto, 2012; Zvolensky et al., 2011). Models of DI further suggest that it may be comprised of a number of interconnected constructs that are related to difficulties in effective emotion regulation (e.g., intolerance of uncertainty, intolerance of aversive physical sensations, intolerance of negative emotional states; Bardeen, Fergus, & Orcutt, 2013; Bebane, Flowe, & Maltby, 2015; Bernstein, Zvolensky, Vujanovic, & Moos, 2009; McHugh et al., 2013; Zvolensky, Vujanovic, Bernstein, & Leyro, 2010). DI is hypothesized to increase the aversiveness of distress by augmenting its intensity, leading to heightened reactivity to stress and distress. Thus, DI motivates avoidance-based coping strategies to evade aversive emotions, thereby interfering with goal-driven behavior and contributing to negative consequences (Leyro et al., 2010; McHugh et al., 2013; Schmidt, Mitchell, Keough, & Riccardi, 2011). Research has supported associations between DI and maladaptive behaviors in adults, including substance abuse (Brown et al., 2009), self-injury (Nock & Mendes, 2008), disordered eating (Anestis, Fink, Smith, Selby, & Joiner, 2009) and risk taking (MacPherson et al., 2010), among others. Moreover, research increasingly supports the significant contribution of DI to the development, maintenance, prevention, and treatment of multiple adult psychological disorders, including borderline personality disorder (e.g., Linehan, 1993), substance abuse (e.g., Brown et al., 2005), and
anxiety disorders (e.g., Keough, Riccardi, Timpano, Mitchell, & Schmidt, 2010; Kertz, Stevens, McHugh, & Björgvinsson, 2015; Laposa, Collimore, Hawley, & Rector, 2015; Macatee & Cougle, 2013; MacDonald, Pawluk, Koerner, & Goodwill, 2015; Timpano, Buckner, Richey, Murphy, & Schmidt, 2009).

The transdiagnostic scope of DI suggests that a common target in the effective treatment of these heterogeneous disorders may be to improve the patient’s ability to tolerate distressing emotional or somatic experiences. Treatments for adult populations that directly target DI (Bornovalova, Gratz, Daughters, Hunt, & Lejuez, 2012; Linehan, 1993), as well as treatments that indirectly target DI through promoting emotional acceptance and awareness (e.g., Barlow et al., 2004; Hayes, Strosahl & Wilson, 1999; Orsillo & Roemer, 2005) have demonstrated success in alleviating symptoms of multiple forms of psychological disorders. Recent research has also demonstrated that the ability to tolerate distress can improve over the course of CBT-informed treatment, with lower DI at post-treatment associated with improved treatment outcomes (McHugh et al., 2014). Although more research is needed to support the role of DI as a key mechanism of therapeutic change, the growing body of research with adults supports the usefulness of targeting DI within treatment to alleviate symptoms associated with heterogeneous forms of psychological illness.

**Distress Intolerance and Anxiety Disorders**

Although the relationship between DI and anxiety disorders is not fully understood at present, research has established that high DI is associated with greater anxiety symptoms in adults (e.g., Brandt, Zvolensky, & Bonn-Miller, 2013; Keough et
al., 2010; Macatee & Cougle, 2013; MacDonald et al., 2015; Mitchell et al., 2013; Timpano et al., 2009). In addition, DI has been suggested (e.g., Bardeen et al., 2013; Bebane et al., 2015; Bernstein et al., 2009; McHugh and Otto, 2012) to include a number of factors with well-established relevance to the understanding of anxiety disorders, such as anxiety sensitivity – which refers to a fear of anxiety-related sensations (e.g., pounding heart, shortness of breath) and the consequences of those sensations (Reiss & McNally, 1985) – and intolerance of uncertainty – referring to the predisposition to view the possibility of a negative event as threatening, regardless of the probability of occurrence (Ladouceur, Gosselin, & Dugas, 2000). Current conceptualizations of the relationship between DI and anxiety in adults suggest that high DI may increase the risk for the development of anxiety disorders and may also play a role in maintaining fear responses by encouraging maladaptive coping strategies and avoidance behaviors (Schmidt et al., 2011).

Research, however, examining relationships between anxiety symptoms and DI in youth is just emerging. The small literature to date on youth has focused exclusively on community samples, but does suggest that DI may indeed play a key role in the development and maintenance of anxiety disorders in youth. DI is higher in community youth with anxiety symptoms (Cummings et al., 2013), and high DI has been associated with greater internalizing symptoms in female adolescents in the community (Daughters et al., 2009). Relatedly, trauma-exposed girls with high DI show greater post-traumatic stress symptoms than those with low DI (Danielson, Ruggerio, Daughters, & Lejuez, 2010). These data are consistent with theoretical conceptualizations of anxiety, which
suggest that pediatric anxiety develops in part due to elevated anticipation and heightened experience of emotional and somatic distress (see Weersing, Rozenman, Maher-Bridge, & Campo, 2012). Thus, community and analogue research suggests youth with heterogeneous anxiety symptoms may show common DI elevations; however, associations between DI and anxiety have yet to be evaluated in clinical populations of youth with anxiety disorders.

**Relationships between DI, Behavioral Avoidance, and Anxiety**

Evidence strongly supports the key role of behavioral avoidance in the development and maintenance of anxiety disorders (e.g., Barlow, 2002; Chow & Pincus, 2014; Vasey & Ollendick, 2000). It follows that effective treatment of anxiety disorders in children must include efforts to target such avoidance behavior (e.g. Seligman & Ollendick, 2011). CBT protocols employ behavioral strategies of counterconditioning and extinction to target behavioral avoidance during exposure by encouraging children to approach rather than avoid feared stimuli and situations (Gosch, Flannery-Schroeder, Mauro, & Compton, 2006; Kendall et al., 2005). Such approach behavior provokes the emotional experience of fear, the repeated experience of which leads to habituation and demonstrates to the individual that they can indeed tolerate the feared stimuli or situation (see Barlow et al., 2004; Craske & Mystowski, 2006; Kendall et al., 2005).

Exposure therapy is considered an essential ingredient of CBT for child anxiety disorders (Gosch et al., 2006; Kazdin, 2009; Kendall et al., 2005); indeed, prevailing wisdom among intervention scientists is that exposure tasks are necessary to achieve positive treatment outcomes for anxious youth (Kazdin & Weisz, 1998; Kendall et al.,
To this effect, most CBT protocols for child anxiety dedicate at least half of their sessions to practicing exposures (e.g., Barrett, Dadds, & Rapee, 1996; Comer et al., 2012; Kendall, 1994; Kendall et al., 1997; Pincus, Ehrenreich, & Mattis, 2008; Pincus, May, Whitton, Mattis, & Barlow, 2010). Studies in the CBT treatment of youth panic disorder demonstrate that meaningful therapeutic change does not occur until the onset of exposure therapy (Gallo, Cooper-Vince, Hardway, Pincus, & Comer, 2013), and meta-analytic results demonstrate that CBT protocols have their strongest effect on behavioral outcomes, as compared with cognitive change, coping abilities, and physiological outcomes (Chu & Harrison, 2007). Taken together, data strongly suggest that our most effective treatments for child anxiety disorders achieve symptom remission by promoting behavior change through exposure strategies and reducing behavioral avoidance.

Despite consensus that exposures are critical for positive outcomes in the treatment of child anxiety (Kazdin and Weisz, 1998), it remains unclear what mechanisms of action may underlie changes achieved through exposure. The ability to tolerate distressing emotions and somatic symptoms is a likely candidate mediator in this regard. Given associations between DI and maladaptive avoidance behaviors, in concert with the prevailing understanding that exposure-based treatments are responsible for increases in the ability to engage in and tolerate feared situations, it follows that DI may underlie the behavioral avoidance that is a cardinal feature across anxiety disorders. Youth who are able to effectively manage their distress during the course of an exposure may be more likely to engage in repeated exposures, thus contributing to decreases in behavioral avoidance. As a result, treatments that specifically and directly target the
patient’s ability to tolerate distressing situations may be better equipped to improve avoidance symptoms.

Preliminary support for this hypothesis has emerged in the adult literature. Recent research demonstrates that decreases in DI at post-treatment are associated with improvements in anxiety symptoms among adults with heterogeneous psychological conditions – including anxiety disorders – enrolled in CBT modified to directly target DI (McHugh et al., 2014). However, leading child anxiety CBT protocols do not explicitly address DI, although some may address DI indirectly. It may well be that the neglect of DI in the course of well-established child anxiety protocols is related in part to the fact that at least one-third of youth treated with the most well-supported protocols still do not show symptom improvement. If DI in youth mediates the association between anxiety and behavioral avoidance, then augmenting evidence-based treatment protocols with direct DI-related components may improve response rates and avoidance-related outcomes. Moreover, incorporating common DI strategies to improve treatment for child anxiety disorders may foster more parsimonious and improved dissemination of such interventions. In order to achieve such aims, research is needed first to examine patterns and correlates of DI among anxiety-disordered youth, and also to evaluate the extent to which DI may indeed mediate links between anxiety and associated behavioral avoidance.

**Issues in the Definition and Measurement of DI**

Despite accumulating DI research in adult populations over the past decade, theory and empirical study of DI has been hampered by heterogeneity of DI measurement
strategies and diverging DI operationalizations across studies, which in turn has led to a lack of consensus over the construct, as well as a lack of a gold standard of DI measurement (McHugh & Otto, 2012). DI has commonly been evaluated in empirical studies via self-report measures that assess the individual’s perceived capacity to tolerate distress, as well as via real time behavioral performance tasks that examine the individual’s ability to tolerate induced distress or to persist in a task that elicits distress (Leyro et al., 2010). These include self-report measures of specific constructs associated with DI, such as the Discomfort Intolerance Scale (Schmidt, Richey, & Fitzpatrick, 2006), the Anxiety Sensitivity Index (Petersen & Reiss, 1987), and the Intolerance of Uncertainty Scale (Buhr & Dugas, 2002), as well as self-report measures of the inability to tolerate distress more broadly, such as the Distress Intolerance Index (McHugh & Otto, 2012) or the Distress Tolerance Scale (Simons & Gaher, 2005). Behavioral measures include tasks that elicit physical discomfort, such as breath holding tasks or the cold pressor task (for review, see McHugh et al., 2011), as well as tasks that evoke cognitive discomfort, frustration, and risk aversion, such as the Computerized Mirror-Tracing Persistence Task (MTPT-C; Strong et al., 2003), the Paced Auditory Serial Addition Task (PASAT, Lejuez, Kahler, & Brown, 2003), and the Balloon Analogue Risk Task (Lejuez et al., 2002). Thus, available DI assessment measures capture responses to specific types of distress (domain-specific DI) – including distress provoked by uncertainty, frustration, anxiety-related somatic sensations, or physical pain – as well as responses to distress more broadly (domain-general DI). Research with adults indicates that self-report measures of DI share substantial variance, but are often are uncorrelated with behavioral
indices of DI (e.g., Macatee et al., 2015; McHugh et al., 2011; Schloss & Haaga, 2011). Moreover, the literature to date is somewhat equivocal regarding the extent to which available measures using different assessment modalities capture the same latent DI construct.

Recent research with adult samples has attempted to refine the operationalization of DI and to clarify the utility of available DI assessment strategies. McHugh and Otto (2012) analyzed the latent factor structure of four self-report measures of DI and identified support for a single-factor solution, proposing that items demonstrating the strongest concordance to the underlying factor provided the best representation of core DI. The resulting 10-item Distress Intolerance Index (DII; McHugh & Otto, 2012) includes items related to sensitivity and tolerance of distress, thus capturing both the cognitive/emotional and behavioral responses to distress more broadly. Additional research has employed similar factor analytic methods, and proposes that DI is a multidimensional construct comprised of five factors: uncertainty, ambiguity, physical discomfort, frustration, and negative emotion (Bardeen et al., 2013). Most recently, research by Bebane and colleagues (2015) integrated these two approaches and suggest a bifactor model of DI representing both generalized DI as well as specific factors contributing to the construct. Their factor analytic work indicates that a general DI factor accounts for 51% of the total variance, and the five sub-factors proposed by Bardeen and colleagues (2013) together account for 49% of the total variance. Taken together, the literature to date indicates that DI is a multifactorial construct involving both
cognitive/emotional and behavioral responses to tolerating aversive states, and that it includes general and group factors (e.g., uncertainty, physical discomfort, etc.).

Although substantial progress has been made in defining and measuring DI in adults, research on DI in children and adolescents lags considerably behind. To date, studies of DI in community samples of youth have relied primarily on computerized behavioral tasks to evaluate levels of DI (e.g., Cummings et al., 2013; Daughters et al., 2009; Ehrlich, Cassidy, Gorka, Lejuez, & Daughters, 2013). One commonly used behavioral strategy to assess DI in both adults and youth is the Computerized Mirror-Tracing Persistence Task (MTPT-C; Strong et al., 2003), a task designed to provoke cognitive/emotional distress and frustration by asking participants to trace a shape using a computer mouse that is programmed to move in the opposite direction, and which emits a loud aversive sound when an error is made. Individuals who terminate the task early despite being provided a monetary incentive to persist are determined to have high DI. Although behavioral tasks allow for direct and observable measurement of a given construct, relying solely on behavioral tasks to assess DI may not be optimal, as behavioral tasks like the MTPT-C may not capture important aspects of self-perceptions of DI, often take more time to administer than self reports, focus on a specific domain of DI (e.g., frustration tolerance, pain tolerance), and computerized tasks may cumbersome and difficult to broadly administer given technological problems.

To date, very few self-report measures specifically assessing DI in youth have been developed and evaluated. A developmental adaptation of the Distress Intolerance Inventory (DII, McHugh & Otto 2012) was recently developed to assess domain-general
DI in youth ages 10-17 (Distress Intolerance Inventory for Youth, DII-Y; Keller et al., 2015). Given evidence in the adult literature that anxiety sensitivity and intolerance of uncertainty are factors closely related to DI (Allan, Macatee, Norr, Raines, & Schmidt, 2015; Bardeen et al., 2013, Bebane et al., 2015; Bernstein et al., 2009; Kertz et al., 2015; McHugh & Otto, 2012; Mitchell, Riccardi, Keough, Timpano, & Schmidt, 2013; Norr et al., 2013), it follows that developmental adaptations of adult assessment tools with proven utility in the measurement of DI, such as the Childhood Anxiety Sensitivity Index (CASI; Silverman, Fleisig, Rabian & Peterson, 1991) and the Intolerance of Uncertainty Scale for Children (IUSC; Comer et al., 2009), may have similar utility in assessing DI in youth populations. Although the CASI and IUSC have been studied in clinical populations, their relevance to the study of DI in youth has yet to be evaluated. Moreover, to date, neither behavioral measures nor self-report measures of DI have been evaluated specifically to advance our understanding of DI in anxiety-disordered youth.

In light of poor consensus regarding optimal DI measurement, and the need for empirical clarification of relationships between DI and related constructs at this stage of research, multimodal assessment strategies are indicated. This is particularly true with regard to DI in children and adolescents, given that evaluation of DI in this age range lags considerably behind research in adults, and it is unclear the extent to which theoretical models and assessment strategies identified in adult work adequately characterizes DI in youth.

**The Present Study**
Identifying core elements, such as DI, that may underlie multiple forms of youth psychopathology holds enormous promise for improving the understanding and treatment of these disorders, as well as to foster improved dissemination of EBPs. The present study addresses several key gaps in the literature by examining the relationship between DI and youth anxiety disorders using a multimodal assessment strategy comparing a clinical sample of anxiety-disordered youth to community controls \((N = 56)\). Twenty-eight treatment-seeking anxious youth (i.e., ANX youth), and 28 healthy community controls (i.e., COM youth) participated in a one-time laboratory appointment, during which they completed a battery of self-report measures to assess anxiety symptomatology, as well as DI and related constructs. They then completed a behavioral task to additionally assess DI, the MTPT-C (Strong et al., 2003), which is intended to provoke mild levels of distress and assesses behavioral persistence in the face of this distress. The aims of the study were to examine differences in DI between anxious youth and non-anxious controls on both self-report and behavioral measures, and to determine the extent to which DI in anxious youth mediates links between child anxiety and behavioral avoidance.

**Hypotheses.**

*Hypothesis 1.* Child anxiety will be associated with self-report measures of DI and avoidance. Hypothesis 1a: ANX youth, relative to COM youth, will score higher on self-report measures assessing DI, as well as on self-reported behavioral avoidance. Hypothesis 1b: Among ANX youth, greater diagnostic severity (as measured via clinical
severity ratings from a structured diagnostic interview) will be associated with greater levels of DI on all self-report measures.

**Hypothesis 2.** Anxiety will be associated with greater levels of behaviorally assessed DI. Hypothesis 2a. ANX youth will be more likely to pre-emptively terminate the MTPT-C task than COM youth, and ANX youth who terminate this task will have a shorter latency to terminate than COM youth who terminate. Hypothesis 2b. Among ANX youth, greater diagnostic severity (i.e., higher clinical severity ratings from a structured diagnostic interview) will be associated with shorter latency to terminate the MTPT-C task.

**Hypothesis 3.** DI will significantly mediate the relationship between anxiety status and behavioral avoidance. Specifically, after accounting for DI, the association between child anxiety diagnostic status (i.e. ANX vs. COM) and behavioral avoidance will be significantly attenuated.

**Methods**

**Participants**

Participants (N = 56) included a sample of treatment-seeking anxious youth (ANX; n = 28) and non-anxious community controls (COM; n = 28) between the ages of 10 and 17 recruited from a variety of sources (see Procedures below). For the present study, late childhood through adolescence was the focus of assessment, as this period of development is critical to the development of emotion regulation skills and is also accompanied by steepest increases in psychopathology onset (Steinberg, 2007).

Inclusion criteria for the entire sample were: (1) child age between 10 though 17 years (inclusive), (2) no evidence of developmental delay or mental retardation, (3) no
evidence of psychosis or severe mental illness, and (4) availability of at least one parent to attend the laboratory appointment with their child. In addition, as all study procedures were delivered in English, participants and at least one parent had to be fluent in English to be eligible to participate. ANX youth were recruited from the flow of families seeking services for anxiety disorders at the Center for Anxiety and Related Disorders (CARD) at Boston University. COM youth were recruited via flyers posted in public locations (e.g., libraries, gyms, coffee shops) and through word-of-mouth. To be deemed eligible to participate in the study, ANX youth had to meet criteria for a principal diagnosis of a DSM-5 anxiety disorder, including separation anxiety disorder (SAD), generalized anxiety disorder (GAD), social phobia (SOC), specific phobia (SP), selective mutism (SM), panic disorder with or without agoraphobia (PD/PDA), and unspecified anxiety disorder (previously anxiety disorder not otherwise specified, AD-NOS). To optimize the generalizability of study results, ANX participants with comorbid, but less impairing, conditions were allowed to participate in the study. COM youth were excluded from participation if they had ever been diagnosed with or treated for an anxiety or mood disorder.

Amongst the entire sample, participants had a mean age of 12.91 years ($SD = 2.24$). The parent accompanying them to the appointment had a mean age of 47.02 years ($SD = 5.94$). The majority of youth participants were female (58.9%, $n = 33$). Regarding race, 87.5% ($n = 49$) of the participants were identified by their parent as white/Caucasian, 7.1% as biracial ($n = 4$), and 5.4% as African American ($n = 3$). All participants identified as non-Hispanic. The majority of attending parents had completed
college (83.9%). Most of the youth in the study had parents who were married (78.6%, n = 44), with 17.9% of youths’ parents identifying as divorced (n = 10), and 1.8% of youths’ parents separated (n = 1) or never married (n = 1). Total household annual income varied, with 10.7% (n = 6) of parents reporting annual household income of $25-50,000, 12.5% (n = 7) reporting $50,001-100,000, 26.8% (n = 15) reporting $100,001-150,000, 14.3% (n = 8) reporting between $150,001-200,000, 34.5% (n = 19) reporting more than $200,000, and one family electing not to report income. See Table 1 for demographic characteristics of the sample.

All 28 participants in the ANX group met criteria for at least one primary anxiety disorder diagnoses according to the ADIS-C/P. ANX youth were diagnosed with a range of principal disorders: GAD (32.1%, n = 9), PD/PDA (25.0%, n = 7), SOC (17.9%, n = 5), SP (14.3%, n = 4), AD-NOS (7.1%, n = 2), and SAD (3.6%, n = 1). Five participants (17.9%) had co-principal diagnoses, and including GAD (7.1%, n = 2), SAD (3.6%, n = 1), SP (3.6%, n = 1), and oppositional defiant disorder (3.6%, n = 1). Secondary diagnoses among ANX youth included SOC (10.7%, n = 3), SP (10.7%, n = 3), unspecified depressive disorder (10.7%, n = 3), GAD (7.1%, n = 2), excoriation (skin picking) disorder (3.6%, n = 1), and attention-deficit/hyperactivity disorder, combined type, by history (3.6%, n = 1). Clinician-determined clinical severity rating (CSR) scores for participants’ primary anxiety diagnosis ranged from 4 to 6 (M = 5, SD = .72; see Measures section below).

Measures

Demographics.
A brief Demographic Questionnaire, developed for the present study, was administered to the parent who accompanied the participant to the laboratory appointment to assess the participant’s age, gender, race/ethnicity, parent’s marital status, parent age and highest level of education, and annual household income.

Clinician determined child diagnostic status.

The Anxiety Disorders Interview Schedule, Child and Parent Versions (ADIS-C/P; Silverman & Albano, 1997) is a semi-structured diagnostic interview administered to children (ADIS-C) and their parents (ADIS-P) that assesses child mood, anxiety, and disruptive behavior disorders. The ADIS-C/P was administered during the intake appointment to youth in the ANX group presenting to CARD. Based on clinician consensus of parents and child reports, a clinical severity rating (CSR) is assigned on an 8-point scale, with CSRs of 4 and above indicating a diagnosis at a clinical level of severity. The ADIS-C/P has been the most widely used diagnostic interview in research evaluating child anxiety disorders and demonstrates excellent reliability, validity, and sensitivity to change (Silverman & Ollendick, 2005).

Self-reported anxiety symptoms.

Revised Child Anxiety and Depression Scales (RCADS; Chorpita, Yim, Moffitt, Umemoto, & Francis, 2000). As in previous studies investigating DI and child anxiety symptoms (e.g., Cummings et al., 2013), the RCADS was used to assess child self-reported symptoms of anxiety among both ANX and COM youth. The RCADS is a 47-item self-report measure that assesses the frequency of anxious and depressive symptoms in youth ages 6-18. Youth are presented with a number of statements and asked to
indicate the frequency with which they experience each symptom on a scale from 0-3, where 0 = “never” and 3 = “always.” The RCADS Anxiety subscale was used in the present study, and in previous research has shown very strong psychometric properties, including adequate internal consistency and high convergent validity, as well as clinical utility (Chorpita et al., 2000; Chorpita, Moffitt, & Gray, 2005). Internal consistency was high in the present sample (α = 0.94).

**Self-reported distress intolerance.**

*Distress Intolerance Inventory for Youth (DII-Y; Keller et al., 2015):* The DII-Y is a developmental adaptation of the 10-item Distress Intolerance Inventory for adults (DII, McHugh & Otto 2012) that assesses domain-general DI. The DII-Y includes items such as “I can’t handle feeling upset or distressed,” and “When I feel upset or distressed, I can’t stop thinking about how bad I feel.” The DII-Y provides 10 statements and asks respondents to circle how much the statement sounds like them, ranging from “very little” to “very much.” Items are assigned a value on a scale from 1-5, where 1 = “very little” and 5 = “very much,” and a DI Total Score is generated by summing all items. Psychometric analysis of the DII-Y within treatment-seeking anxious youth has demonstrated strong convergent and discriminant validity and acceptable internal consistency (Keller et al., 2015). Internal consistency was high in the present sample (α = 0.90).

*Childhood Anxiety Sensitivity Index (CASI; Silverman et al., 1991):* The CASI is a developmental modification of the Anxiety Sensitivity Index for adults (ASI; Peterson & Reiss, 1987), and is an 18-item self-report questionnaire assessing anxiety sensitivity,
defined as the fear of anxiety-related bodily sensations. The CASI provides number of statements related to anxiety sensitivity (e.g. “It scares me when I feel nervous” and “It is important for me to stay in control of my feelings”) and asks youth to indicate how well the statement describes them on a scale from 1-3, where 1 = “not at all,” 2 = “some,” and 3 = “a lot.” All items are summed to yield a Total Score ranging from 18 to 54. The CASI is considered the gold-standard measure of youth anxiety sensitivity (Beesdo, Knappe, & Pine, 2009; Weems, 2011), and has well-established psychometric properties, including adequate internal consistency, test-retest reliability, and convergent and incremental validity (e.g. Chorpita & Daleidan, 2000; Silverman et al., 1991; Weems, Hammond-Laurence, Silverman, & Ginsburg, 1998; see also Weems, 2011, for review). Internal consistency was high in the present sample ($\alpha = 0.87$).

**Intolerance of Uncertainty Scale for Children** (IUSC; Comer et al., 2009): The IUSC is a 27-item self-report questionnaire that assesses the ability to tolerate uncertainty in children 10 and older. The IUSC lists a number of statements regarding uncertainty (e.g., “Not knowing what will happen in the future makes me uneasy, anxious, or stressed,” “Things that are unclear stress me”), and respondents indicate on a 5-point scale how well each statement describes them, where 1 = “not at all” and 5 = “very much.” The IUSC has demonstrated good internal consistency, convergent validity, and clinical utility (Comer et al., 2009; Read, Comer, & Kendall, 2013). Internal consistency was high in the present sample ($\alpha = 0.95$).

**Behavioral measure of distress intolerance.**
The Computerized Mirror-Tracing Persistence Task (MTPT-C; Strong et al., 2003) is a computer task that has been included in behavioral assessments of DI in studies with both adult (e.g. Macatee & Cougle, 2013) and adolescent samples (e.g. Ehrlich et al., 2013). During the task, the participant is asked to use a computer mouse to guide a dot on the screen along the edges of shapes. The dot on the screen consistently moves in the opposite direction of the mouse, and whenever the participant makes a mistake or stalls for more than 2 seconds, a loud buzzer sounds and the dot returns to the original position. The number of errors per second (i.e., the number of times the participant had to return to the starting position during the task divided by the task time) is recorded to control for the effects of skill on persistence during the final star-tracing level. The task is designed to provoke mild levels of distress and frustration. Participants are instructed to continue engaging in the task for as long as possible, but are told that they may terminate the task at any time they choose. Participants are given incentive to persist in the task by being told that they can earn more money for their participation in the study the longer they persist. The task automatically ends after 7 minutes if the participant does not discontinue earlier. The MTPT-C is structured so that participants engage in three practice rounds of increasing difficulty prior to engaging in the fourth and final “true” task. Specifically, the thickness of the star along which participants must trace becomes gradually thinner across the three practice trials, with the third practice trial presenting a star that is identical in thickness to that in the final “true” task. To assess affect related to this trial, participants completed a computerized 10-item version of the PANAS (see below) prior to completing the practice trials and immediately following the
third practice trial to assess changes in positive and negative affect. Based on the results of pilot trials of the MTPT-C amongst anxiety-disordered youth, which indicated that youth might discontinue the task during the practice trials due without attempting the “true” trial due to excess negative emotion, for the present study the buzzer was disabled during the first and second practice trial, and enabled for the third practice trial and final “true” trial. DI may be assessed continuously and categorically using the MTPT-C (e.g., Ehrlich et al., 2013): time to terminate (in milliseconds) during the final star-tracing level is used as a continuous index of DI, and a categorical index of DI is identified by characterizing participants who quit the task early as having high DI and those who persist through the final level as having low DI. For the present study, behaviorally assessed DI was evaluated both continuously and categorically.

A computerized 10-item version of the Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988) is included in the MTPT-C to assess changes in affect as a function of completing the mirror-tracing task. Participants were asked to identify to what extent they felt each of 10 different types of positive and negative affect at that moment using scale where 0 = not at all and 100 = completely. The PANAS-Positive Affect (PANAS-PA) scale is derived by summing the 5 positively valenced items, which included the following: Excited, Interested, Happy, Energetic, and Proud. Similarly, the PANAS-Negative Affect (PANAS-NA) scale is the summation of the 5 negatively valenced items, comprised of the following: Mad, Frustrated, Upset, Embarrassed, and Nervous. Participants complete this 10-item affect measure prior to completing the practice trials (baseline), and immediately following the third practice
trial (post-practice). Changes in positive and negative affect between baseline and post-practice are used as a manipulation check to determine whether or not participants find that the trials provoke negative affect. The PANAS has demonstrated strong psychometric properties (Watson et al., 1988), and is frequently used to assess state affect and changes in affect in response to mood inductions (e.g., Aldao & Mennin, 2012; Campbell-Sills, Barlow, Brown & Hofmann, 2006). Internal consistency in the current sample was adequate at baseline (PA Cronbach $\alpha = 0.83$; NA Cronbach $\alpha = 0.70$), and at post-practice (PA Cronbach $\alpha = 0.85$; NA Cronbach $\alpha = 0.81$).

**Self-reported behavioral avoidance.**

**Child Avoidance Measure – Self Report** (CAMS; Whiteside, Gryczkowski, Ale, Brown-Jacobsen, & McCarthy, 2013): The CAMS is a brief self-report measure of the tendency to behaviorally avoid stimuli that provoke anxiety, fear or worry. The CAMS presents a stem statement, “When I feel scared or worried about something…” Respondents are provided with several continuations of these question, such as “I try not to go near it,” and “I refuse to do it,” and asked to respond how often the complete statement sounds like them on a scale from 0 to 3, where 0 = “almost never” and 3 = “almost always.” A total avoidance score is generated from the sum of all items. The CAMS has demonstrated adequate internal consistency, good concurrent, criterion, and predictive validity, and total avoidance as measured by the CAMS has shown decreases over a course of CBT for the treatment of anxiety (Whiteside et al., 2013). Internal consistency was high in the present sample ($\alpha = 0.89$).

**Self-reported worry.**
Penn State Worry Questionnaire for Children (PSWQ-C; Chorpita, Tracey, Brown, Collica, & Barlow, 1997): The PSWQ-C is a modification of the adult Penn State Worry Questionnaire (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990) administered to assess worry in youth. Youth are asked to rate the frequency with which they experience each of 16 worry-related statements on a 4-point scale (from 0-3). The PSWQ-C has demonstrated good 1-week test-retest reliability and convergent and discriminant validity (Chorpita et al., 1996); internal consistency was high in the present sample (α = 0.79).

**Procedures**

All study procedures were approved by the Boston University-Charles River Campus Institutional Review Board. ANX youth were recruited from among consecutive treatment-seeking anxious youth seeking services for anxiety-related concerns at CARD. Clinicians conducting the initial diagnostic evaluation informed youth and their families about the study and obtained their permission to be contacted by study staff. Once the clinical team at CARD determined that the child met criteria for a primary anxiety disorder diagnosis, study staff contacted interested families to confirm eligibility and schedule their study appointment. COM youth were recruited through flyers placed throughout Boston-area communities and through word-of-mouth. Efforts were made to achieve demographically matched groups by targeting recruitment efforts in geographic regions with similar demographic characteristics as ANX families presenting for treatment at CARD. As informed consent was required from parents of participating youth, advertisements were directed towards parents of youth ages of 10-17.
Advertisements directed interested families to contact study staff via email to determine eligibility. Participants were told that they could earn between $40 and $50 in Amazon gift cards as compensation for their participation.

Study staff contacted all interested families in both groups. A brief phone screen was conducted with parents of COM youth to confirm study eligibility. Once eligibility was determined, study staff scheduled a one-time laboratory appointment with the child and at least one parent. For ANX participants who completed an intake evaluation and were pursuing CBT at CARD for their anxiety disorder diagnosis, the study appointment was scheduled between the initial intake evaluation and the start of Session 4 of weekly individual treatment. This constraint was applied to control for the effects of treatment on anxiety disorder symptoms and possible treatment-related changes in DI, as standard CBT protocols utilized at CARD do not introduce exposure practice (a psychological intervention hypothesized to increase the ability to tolerate distress) until later in treatment (e.g., Chorpita & Weiss, 2009; Kendall & Hedtke, 2006; Pincus et al., 2008).

On the day of the laboratory appointment, participating youth and their parent(s) were greeted by study staff and were given a brief introduction to study procedures. Written informed consent was obtained from parents, verbal assent was obtained from youth ages 10-11, and written assent from youth ages 12-17. All participants were asked to complete a one-time battery of self-report measures assessing anxiety symptoms, worry symptoms, behavioral avoidance, and DI, which took approximately 20 minutes to complete.
Participants then participated in the Computerized Mirror-Tracing Persistence Task (MTPT-C; Strong et al., 2003), which took 15 minutes at most to complete (see Measures section above). The task is designed to provoke mild levels of distress and frustration. Participants were given incentive to persist in the task by being told that they can earn up to an additional $10 for persisting through the duration of the final shape-tracing task, increasing their payment from the minimum of $40 to a maximum of $50. In truth, all participants received the full $50 gift card, regardless of how long they persisted in the computerized task.

Immediately following the completion of the MTPT-C, participants were verbally debriefed and told that regardless of their performance on the computer task, they would receive compensation in the form of a $50 Amazon gift card. Following the completion of the self-report and behavioral measures, all participants were thanked and given their $50 gift card.

**Data Analytic Plan**

Descriptive means and standard deviations were computed for all study variables, and t-tests (for continuous variables) and chi-square analyses (for categorical variables, or Fisher’s exact tests for tests with cell sizes with <5 observations) were run to examine group differences on demographic variables, including age, gender, and race/ethnicity, parent age and highest level of education, and annual household income (see Table 1). Means and standard deviations of all clinical measures were also calculated, including the DI self-report measures (DII-Y, CASI, and IUSC), self-report anxiety symptomatology measures (RCADS and PSWQ-C), and self-reported behavioral avoidance (CAMS).
Shapiro-Wilk tests of normality indicated that DI raw total scores violated the assumption of normality ($p < .05$) and therefore logarithmic (log) transformations of the DII-Y, CASI, and IUSC total scores were used in all analyses. Independent samples $t$-tests were conducted to examine group differences on these clinical measures (see Table 2). Correlational analyses examined preliminary pairwise associations between self-reported anxiety symptomatology, DI, and behavioral avoidance variables (see Table 3).

Given highly significant correlations between the three self-report measures of child DI (DII-Y, CASI, and IUSC) and conceptual work suggesting the three constructs all assess a broader DI construct (Allan et al., 2015; Bardeen et al., 2013, Bebane et al., 2015; Bernstein et al., 2009; McHugh & Otto, 2012; Mitchell et al., 2013; Norr et al., 2013), a composite measure summing all three total scores was computed and used in further analyses as a pooled index of child self-reported DI. The decision to employ a pooled DI measure was supported by 1) strong, positive correlations between the DII-Y, CASI, and IUSC, 2) evidence that pooling all individual items of the DII-Y, CASI, and IUSC resulted in a higher alpha coefficients ($\alpha = .96$) than was identified for each measure individually, 3) the consistency of these data with previous studies documenting the high degree of shared variance among DI self-report measures (e.g., Laposa et al., 2015; McHugh et al., 2011; McHugh & Otto, 2012), and 4) evidence in adults supporting the utility of synthesizing these measures using factor analytic methods to create parsimonious assessment measures (Bebane et al., 2015; McHugh & Otto, 2012). To facilitate the balance among the measures when pooling the DI scores, standardized $z$-scores were computed from the total scores for the DII-Y, CASI, and IUSC. The three $z$-scores were computed from the total scores for the DII-Y, CASI, and IUSC.
score totals were then summed, and the resulting variable was transformed using logarithmic transformations to adjust for violations of assumptions of normality.

To confirm that participants found the MTPT-C task distressing, a manipulation check was conducted using within-subjects repeated measures ANOVA to assess whether child positive and negative affect scores significantly changed between baseline and post-practice (following the three practice trials, just prior to final “true” trial) on the MTPT-C.

Further analyses examined the extent to which each measure of DI mediated the relationship between condition (ANX vs. COM) and behavioral avoidance as measured by the CAMS. To test the hypothesis that DI mediated the association between child anxiety status (ANX versus COM) and behavioral avoidance, mediation analyses (X→M→Y) investigated DI (M) as an intermediary link between anxiety disorder status (X) and behavioral avoidance (Y) (see Figure A and Figure B). Five DI variables were examined as potential mediators in 5 separate models: 1) DII-Y total scores, 2) CASI total scores, 3) IUSC total scores, 4) the composite score summing the z-scores of the DII-Y, CASI, and IUSC, and 5) total time to terminate the mirror-tracing task on the MTPT-C.

Mediation analyses were conducted using the PROCESS macro for SPSS (Hayes, 2013). In accordance with the recommendations of Hayes and colleagues (2011), for each model bias-corrected bootstrapping methods were applied to determine 95% confidence intervals (CIs) for the total direct effect of anxiety on avoidance, as well as for the indirect effect of anxiety on avoidance via DI. In instances where the CI around the
indirect effect did not overlap with zero, the null hypothesis of no mediation was rejected (Taylor, MacKinnon, & Tein, 2008).

Results

Demographic Characteristics

Table 1 presents means and standard deviations for demographic variables across ANX and COM youth. Regarding child age, independent samples t-tests did not identify significant differences between ANX and COM participants. Similarly, chi-square analyses did not identify differences between groups with regard to race/ethnicity, annual household income, or parent highest level of education. As a result, subsequent analyses were conducted without controlling for demographic factors.

Preliminary Results: Anxiety Symptoms and Severity

Table 2 presents clinical characteristics across ANX and COM youth. Regarding self-reported anxiety symptoms, between-group comparisons demonstrated significant differences on the RCADS Anxiety Scale, \( t(54) = -3.56, p < .01 \), with ANX participants demonstrating, on average, significantly higher scores than COM participants. For ANX participants, the mean RCADS Anxiety Scale score fell within the clinical range compared to age/gender-matched norms, with mean scores for COM participants falling in the normal range (Weiss & Chorpita, 2011). Similarly, between-group comparisons demonstrated significant differences on the PSWQ-C, \( t(54) = -3.03, p < .01 \). PSWQ-C scores ranged considerably for both groups (4-29 for ANX participants, 5-25 for COM participants), and mean scores for both groups fell within the normal range. However, on average ANX participants demonstrated higher PSWQ-C scores than COM participants.
Taken together, these results provide corroborating support for the clinician-determined anxiety-disordered status of ANX youth.

**Self-Reported Behavioral Avoidance**

Table 2 also presents data on self-reported behavioral avoidance across ANX and COM youth. Between-group comparisons demonstrated significant differences between groups on the CAMS, $t(54) = -3.74, p < .001$. As expected, ANX participants demonstrated, on average, significantly higher CAMS scores than COM participants, suggesting more pronounced behavioral avoidance of anxiety-provoking situations. For ANX participants, the average CAMS score ($M = 14.4$) fell above mean scores from a clinical population evaluated in previous research ($M = 12.9$, Whiteside et al., 2013), and the mean CAMS score for COM youth ($M = 9.96$) was slightly lower than mean scores identified in a community sample within the same study ($M = 10.9$).

**Self-Reported Distress Intolerance**

Table 2 also presents means and standard deviations of the self-report measures of DI. Consistent with hypotheses that anxiety-disordered youth would demonstrate greater DI according to self-report measures, between-group comparisons revealed significant differences between groups on all three self-reported measures of DI. More specifically, compared to COM participants, ANX participants endorsed significantly higher levels of general DI according to the DII-Y, $t(54) = -4.51, p < .001$. In addition, ANX participants reported higher levels of anxiety sensitivity than COM controls according to the CASI, $t(54) = -3.41, p < .01$. Mean scores for ANX participants were comparable to those identified in earlier empirical evaluations of anxiety sensitivity in anxious youth.
(Chorpita & Daleiden, 2000; Rabian, Peterson, Richters, & Jensen, 1993). Compared to COM participants, ANX participants demonstrated greater levels of intolerance of uncertainty according to the IUSC, $t(54) = -2.62, p = .01$. Mean scores for both ANX and COM participants were highly consistent with mean scores observed for anxious and control youth in previous studies (Comer et al., 2009). Finally, between-group comparisons indicated that there were significant differences between ANX and COM youth on the composite standardized self-reported DI measure, $t(54) = -3.06, p < .01$, with the ANX group demonstrating more pronounced composite self-reported DI than the COM group.

**MTPT-C Manipulation Check**

Results of a within-subjects repeated measures ANOVA demonstrated a significant increase in reported negative affect, as measured by the PANAS-10 Negative Affect Scale (PANAS-NA) from baseline (PANAS-NA$_{\text{Baseline}}$ $M = 0.77$, $SD = 0.66$) to post practice (PANAS-NA$_{\text{Post}}$ $M = 1.36$, $SD = 0.95$), $F(1) = 131.27, p = .00$. Regarding changes in positive affect (PANAS-PA), results of a repeated measures ANOVA also showed significant changes from baseline (PANAS-PA$_{\text{Baseline}}$ $M = 2.40$, $SD = 0.97$) to post practice (PANAS-PA$_{\text{Post}}$ $M = 2.15$, $SD = 1.02$), $F(1) = 4.65, p = .04$. Taken together, results indicate that participants endorsed a significant increase in negative affect and an accompanying decrease in positive affect following three progressively difficult trials of the mirror-tracing task, suggesting that the task was viewed as mildly distressing.

**Response to Behavioral Distress Intolerance Task**
Despite endorsing changes in subjective negative and positive affect between baseline and post practice trials, contrary to hypotheses, only 2 of the 28 anxiety-disordered participants (7.1%) terminated the final mirror-tracing task early. Similarly, 2 of the 28 control participants also terminated the final task early. Across the entire sample, the average length of time to terminate the final trial of the mirror-tracing task was 402,763 milliseconds (6.7 minutes), with a minimum time to terminate of 110,246 (1.8 minutes) and a maximum time to terminate of 420,017 milliseconds (7 minutes). There were no significant between-group differences in total time to terminate the final task, \( t(54) = 0.17, p = .87 \).

**Pairwise Associations Among Study Variables**

Table 3 presents a pairwise correlation matrix with relations among study variables. Zero-order bivariate correlations are presented between all variables. Consistent with hypotheses, the three proposed DI self-report variables (DII-Y, CASI, and IUSC) showed positive and significant correlations with behavioral avoidance, child anxiety symptoms, and worry symptoms. Consistent with Cohen’s (1988) guidelines for interpreting Pearson correlation coefficients, associations among all study variables were large in magnitude, suggesting that greater DI is highly associated with more severe anxiety symptomatology and behavioral avoidance in youth. In addition, the self-report DI measures showed large, positive associations with one another. Among ANX youth, clinician-determined CSR scores showed significant positive associations with DI as assessed via the DII-Y \( (r = .41, p = .03) \) and the CASI \( (r = .41, p = .03) \), suggesting that youth with anxiety disorders who are more severe experience even greater DI on two
dimensions than youth with anxiety disorder with relatively less severe DI. A similar relationship was not observed for the IUSC ($r = .17, p = .40$).

Contrary to hypotheses, total time to terminate the mirror-tracing task was not significantly correlated with any of the three self-reported DI variables, although as noted previously very few youth terminated the task, resulting in a restricted range of variance on the MTPT-C. Similarly, no significant associations were identified between total time to terminate the task and anxiety symptomatology and worry. Among ANX youth, CSR scores also did not show significant associations with total time to terminate the behavioral task, $r = .00, p = 1.0$.

Measures assessing child anxiety symptomatology and child worry symptoms showed significant positive correlations with one another and with behavioral avoidance. Behavioral avoidance was significantly correlated with all measures, including a significant negative correlation of moderate strength with total time to terminate the mirror-tracing task, suggesting that more rapid termination of the task is associated with higher degrees of avoidance behavior.

**Mediation Models**

To examine the impact of DI as a potential mediator of the link between anxiety disorder status and behavioral avoidance, five separate mediator models were evaluated testing the mediating role of five hypothesized DI variables: Model 1) DII-Y total scores, Model 2) CASI total scores, Model 3) IUSC total scores, Model 4) composite standardized self-reported DI, and Model 5) total time to terminate the mirror-tracing task on the MTPT-C. Details of mediation models can be found in Table 4. The independent
variable for each model was anxiety disorder status (i.e., ANX versus COM participants). The dependent variable was self-reported behavioral avoidance as measured by the CAMS. Each of these models will be examined in turn.

Mediation models 1, 2, and 3 did not identify significant mediation. Specifically, the mediation model examining DII-Y total score as a potential mediator of the association between anxiety disorder status and behavioral avoidance found that the DII-Y total score, by itself, did not mediate the association (total indirect effect = 1.12, 95% bias-corrected bootstrap CI: -0.35, 2.73). Similarly, the mediation model examining CASI total score as a potential mediator of the association between anxiety disorder status and behavioral avoidance found that the CASI score, by itself, did not mediate the association (total indirect effect = 0.90, 95% bias-corrected bootstrap CI: -0.00, 2.23). Also, the mediation model examining IUSC total score as a potential mediator of the association between anxiety disorder status and behavioral avoidance found that the IUSC, by itself, also did not mediate the association (total indirect effect = 0.81, 95% bias-corrected bootstrap CI: -0.04, 2.58).

Mediation model 4 examined the pooled self-report index of DI (simultaneously incorporating scores on the DII-Y, CASI, and IUSC) as a potential mediator between anxiety disorder status and behavioral avoidance. A significant total effect from anxiety disorder status (X) to behavioral avoidance (Y) was observed ($t = 3.74, p < .001$), and the indirect effect of anxiety disorder status on behavioral avoidance through the pooled self-report index of DI (M) was significant (total indirect effect = 1.29; 95% bias-corrected bootstrap CI: 0.31, 2.98), indicating that this pooled index of DI significantly mediated
the link between anxiety disorder status and behavioral avoidance. The remaining direct effect of anxiety disorder status on behavioral avoidance (after accounting for DI) was diminished, but remained statistically significant, $t = 2.59, p = .01$, indicating a partial mediation effect for the pooled self-report index of DI on the association between anxiety and avoidance.

The final mediation model examining the potential mediating effect of total time to terminate on the MTPT-C on the association between anxiety disorder status and behavioral avoidance did not identify a significant indirect effect (total indirect effect = 0.07, 95% bias-corrected bootstrap CI: -0.60, 1.00).

**Discussion**

The present study expands the small but growing literature considering the contributions of an inability to tolerate distress to multiple forms of psychological illness in youth. Although associations between DI and elevated internalizing symptoms have been identified in community samples of youth (Cummings et al., 2013; Daughters et al., 2009), this is the first study to evaluate the role of DI amongst a population of treatment-seeking, anxiety-disordered youth. Using a multimodal assessment strategy to compare patterns and correlates of DI between anxiety-disordered youth to non-anxious youth from the community, the present results strongly suggest that self-perceived DI is a significant part of the clinical portrait of anxiety disorders in children and adolescents. Consistent with recent calls to identify common elements underlying child psychological illness (Chu, 2012; Kazdin, 2000; Kazdin & Kendall, 1998), these results add to the literature documenting core, transdiagnostic factors contributing to child mental health.
concerns. These findings can inform evolving conceptualizations of anxiety disorder pathology and treatment in youth, and may be applied to optimize psychological interventions.

Summary of Findings

Consistent with hypotheses, across the entire sample, self-reported DI demonstrated large, positive correlations with anxiety symptomatology, worry, and behavioral avoidance. Moreover, significant differences were identified between DI among anxious youth compared to community controls, with participants in the ANX group reporting higher levels of DI on all three self-report measures of DI – the DII-Y, the CASI, and the IUSC. Among ANX youth, correlations were also established between the severity of anxiety disorder diagnoses and DI on two of the three self-reported DI measures, with higher levels of clinician-determined anxiety severity associated with greater self-reported DI on the DII-Y and CASI. Taken together, these findings indicate that similar to findings in the adult literature, elevated DI is associated with anxiety disorder status, symptoms, and severity, and that high levels of DI may differentiate anxiety-disordered youth from their non-anxious peers.

In addition to establishing associations between child anxiety and DI, results further clarify the relationship between child anxiety, behavioral avoidance, and DI. Specifically, a standardized, pooled index of self-reported DI was found to mediate the association between child anxiety status and behavioral avoidance, such that anxiety is associated with avoidance via self-perceived DI. These findings provide compelling preliminary support for the hypothesis that DI contributes to heterogeneous anxiety
disorders specifically through its impact on the behavioral avoidance that is a fundamental feature of anxiety pathology. In other words, the avoidance-based coping strategies in which anxiety-disordered youth engage appear to stem in part from the perceived inability to cope with and tolerate anxiety-provoking sensations and situations.

Thus, the present study supports current conceptualizations of the relationship between DI and anxiety disorders in adults, whereby elevated DI is proposed to increase the risk of developing an anxiety disorder, and also to maintain the condition by motivating the use of avoidance-based coping strategies employed by individuals with anxiety who feel incapable of withstanding aversive states (Keough et al., 2010; Schmidt et al., 2011).

The finding that no individual measure of DI independently mediated the association between anxiety disorder status and behavioral avoidance warrants additional consideration. Current models of DI and related constructs in adults indicate that both anxiety sensitivity (presently assessed by the CASI) and intolerance of uncertainty (presently assessed by the IUSC) are theoretically related to – but distinct from – generalized DI (presently assessed by the DII-Y; e.g., Allan et al., 2015; Bardeen et al., 2013; Bebane et al., 2015; Bernstein et al., 2009; Laposa et al., 2015; McHugh & Otto, 2012; Mitchell et al., 2013; Norr et al., 2013), supporting the use of these measures to assess DI in youth samples. However, evidence from the adult literature indicates that these individual measures share substantial variance, and may have improved assessment utility as an index of core DI when synthesized, rather than used individually.

Investigations to refine the measurement of DI in adults have analyzed the contribution of individual items drawn from many self-report measures, identifying latent factor
structures and applying this information to create parsimonious measures of DI (Bebane et al., 2015; McHugh & Otto, 2012). It follows that a pooled index of standardized DI measures may prove a more powerful assessment tool for examining the role of DI in youth than any single component. Furthermore, the strong positive correlations among the DII-Y, CASI, and IUSC, coupled with excellent internal reliability for the pooled index further support the utility of creating a composite DI score. Unfortunately, sample size limitations precluded the use of factor analytic methods to determine the factor structure of pooling the items, or related methods to examine a latent model of DI, in the present study. Such evaluations are needed to investigate the association between these constructs, particularly given their well-documented relevance to the development and maintenance of heterogeneous mental health concerns in youth. The present results provide important preliminary evidence supporting continued examination of the latent factor structure underlying DI measures for youth populations, both to clarify the operationalization of DI in youth, and to inform optimal indices of DI that can be used as strong assessment tools of this important construct in childhood and adolescence.

Contrary to expectations, no significant associations were identified between behaviorally assessed DI and child anxiety. The majority of participants in both groups persisted through the entire MTPT-C without terminating the task early, despite evidence that the task provoked increases in negative affect. In addition, there were no significant differences between the ANX and COM groups with regard to how many participants terminated the task early (7.1% for both groups), nor with the average length of time that participants persisted in the trial. These discrepancies parallel previous research
demonstrating inconsistencies between self-report and behavioral measures of DI (e.g., Macatee et al., 2015; McHugh et al., 2011; Schloss & Haaga, 2011). The reasons for these inconsistencies remain unclear. Perhaps most importantly, very few participants in either group terminated the task early, and so accordingly there was a restricted range of variability in termination of the task as a variable to index DI. Another possible explanation pertains to the issue of domain specificity in the assessment of DI. Although conceptual models of DI differ somewhat, research to date indicates that DI is a multidimensional construct, including domain-specific domains of DI (e.g. uncertainty, frustration, physical discomfort) as well as domain-general DI (Bardeen et al., 2013; Bebane et al., 2015; McHugh & Otto, 2012), and the relationship between these factors requires further clarification, particularly in youth populations where the research lags considerably behind. Available behavioral tasks may be capturing the experience of one of these domains in particular, rather than generalized DI. For example, the cold pressor task – which requires participants to submerge a body part in frigid water for as long as they can tolerate the sensation – assesses behavioral persistence in the face of physical discomfort. It may be that the MTPT-C captures a domain-specific construct related to DI, such as frustration, rather than assessing the domains of DI that are most relevant to child anxiety, or capturing DI more broadly. It may also be that modifications to the MTPT-C for the present study based on pilot data (see Methods) overly-attenuated the aversive nature of the task, thus diminishing its effectiveness in provoking distress. Significant elevations in NA were identified between baseline and post-practice time points of the MTPT-C, providing some support that participants found that the task
aversive. However, increases in NA may not be synonymous with elevated distress, and therefore the extent to which the MTPT-C administered in the present study provoked and captured generalized DI, and/or DI domains most relevant to child anxiety, remains unclear.

Implications for Child Anxiety Interventions and Dissemination

In response to recent calls for further research identifying core, transdiagnostic elements underlying multiple forms of childhood mental illness, the present study contributes to the growing literature identifying common variables that may give rise to multiple psychological concerns in childhood. These findings provide preliminary evidence that DI may in fact be a core element underlying heterogeneous child anxiety disorders. Results indicate that self-perceived DI is significantly elevated amongst youth with anxiety disorders and mediates the established association between child anxiety and the behavioral avoidance that is a fundamental feature of anxiety disorder pathology. Taken together, these results strongly suggest that the inability to tolerate distress may play a vital role in the development and maintenance of anxiety disorders by motivating the avoidance behavior that perpetuates anxiety disorders (e.g., Barlow, 2002; Vasey & Ollendick, 2000). The present findings therefore have important implications for psychological interventions addressing child anxiety disorders.

Current treatments for child anxiety employ exposure strategies to encourage youth to approach rather than avoid feared situations (e.g., Gosch et al., 2006; Kendall et al., 2005), and exposure therapy is considered an elemental treatment component necessary to achieve symptom remission by reducing maladaptive avoidance (Kazdin &
Weisz, 1998; Kendall et al., 2005). Despite the reliance on exposure practice to achieve positive treatment outcome, the mechanisms driving the effectiveness of exposure therapy remain unclear. The present findings regarding the mediating role of DI in child anxiety disorders provide compelling preliminary support for the hypothesis that learning to tolerate distress may be the mechanism through which changes are achieved during exposure exercises. Conversely, the inability to tolerate distress may significantly hamper the ability of a child to engage in repeated exposure practice, thereby diminishing the effectiveness of treatment. As a result, it is possible that neglecting to target DI in the treatment of anxious youth contributes at least in part to the fact that 40% of youth receiving evidence-based treatment for anxiety disorders still do not experience adequate symptom response. Addressing DI directly in child anxiety treatments may therefore yield improved response rates to EBPs.

Integrating DI strategies into evidence-based child anxiety treatments may also help to improve the dissemination of such interventions. Results from the present study support the unifying contribution of the inability to tolerate distress across heterogeneous anxiety disorders. Thus, augmenting evidence-based treatments for a given anxiety disorder with common strategies to promote distress tolerance may provide a parsimonious solution to addressing DI across a range of anxiety disorders in childhood and adolescence, although further research is needed to examine whether relationships between DI and behavioral avoidance are more concentrated among particular youth anxiety disorders versus others. Furthermore, in light of the widespread comorbidity of child anxiety disorders with additional mental health concerns (e.g., Costello et al., 2003;
Kessler, Chiu, Demler, Merikangas, & Walters, 2005; Weersing et al., 2012) in concert with evidence supporting the transdiagnostic contribution of DI to multiple forms of mental health concerns in youth (Cummings et al., 2013; Danielson et al., 2010; Daughters et al., 2009; Wolitzky-Taylor et al., 2015), directly targeting DI in treatment may contribute to symptom improvement across the spectrum of psychological illness.

Promising support for the efficacy of modifying DI within psychosocial treatment has emerged in the adult literature, where interventions addressing DI by encouraging the patient’s ability to tolerate aversive emotional or physical experiences have demonstrated success in ameliorating symptoms transdiagnostically (Barlow et al., 2004; Bornovalova et al., 2012; Hayes et al., 1999; Linehan, 1993; Orsillo & Roemer, 2005). Attentional control has recently been identified as a moderator of DI, such that individuals who are more skilled at regulating their attention showed lower DI (Bardeen, Tull, Dixon-Gordon, Stevens, & Gratz, 2015), and authors suggest that interventions improving volitional attention control may reduce the risk for psychopathology. It may well be that similar interventions, modified for developmental appropriateness, could be employed to alleviate symptoms associated with heterogeneous forms of child psychological illness, including anxiety disorders. In addition, Dialectical Behavior Therapy for adolescents (Rathus & Miller, 2015) is an EBP that incorporates strategies to assist youth in coping with elevated emotional distress. Although the extent to which these strategies may promote – rather than discourage – avoidance during exposure would need to be evaluated, such strategies may inform the development of distress tolerance strategies that could be incorporated into CBT for child anxiety. Modular approaches may provide
an optimal model for incorporating this content into child anxiety treatments, and could allow clinicians to tailor treatments to individual patient presentations. The development of a research-informed DI module that could be applied to augment existing anxiety disorder protocols may provide youth with a range of presenting concerns with a common skillset to manage their distress, equipping them with tools to cope with – rather than avoid – distressing situations and sensations. These skills may in turn help to alleviate symptoms of presenting concerns, and may also prevent the development of additional maladaptive avoidance behaviors and associated psychological illnesses.

**Limitations and Future Directions**

This study used a well-defined sample drawn from a population of treatment-seeking anxious youth and community controls, and incorporated data derived from self-report questionnaires, behavioral measures, and clinician-administered diagnostic interviews to provide the first empirical examination of the contribution of the inability to tolerate distress to child anxiety disorders and related behavioral avoidance. However, several limitations merit comment. First, the study was cross-sectional in nature, and therefore issues of temporal precedence and causality could not be evaluated. Although current conceptualizations suggest that DI is stable trait that develops in childhood (Cummings et al., 2013; Zvolensky et al., 2011), it is unclear at present whether the development of DI precedes or follows anxiety disorder pathology and associated behavioral avoidance. Given the dynamic nature of these variables, future longitudinal research is critical to clarify their emergence over time and to more fully understand their relationship to the development of anxiety disorder pathology in youth. In addition, future
studies examining fluctuations in DI over the course of CBT for child anxiety may shed light on the role of DI as a key mechanism of therapeutic change.

Second, anxious youth participated in lengthy semi-structured interviews to determine anxiety disorder diagnostic status. Although the parents of community youth completed a phone screen assessment to rule out parent-reported anxiety and mood disorder pathology, they did not complete diagnostic interviews to provide additional confidence that community samples were diagnosis-free. As such, it is possible that some COM youth in fact suffered from anxiety disorders. However, results demonstrating significant differences between ANX and COM youth across all clinical self-report measures support the conclusion that these samples represented distinct groups of youth. In addition, outside of the diagnostic interview and the MTPT-C, all remaining measures were youth self-report. Research indicates that older children and adolescents can provide reliable self-reports (e.g., Arbuckle & Abetz-Webb, 2013; Ebesutani, Bernstein, Martinez, Chorpita, & Weisz, 2011), however it is possible that parent assessments of their child’s ability to tolerate distress may have yielded different results. That said, the present study had a particular focus on children’s self-perceived DI, and so child self-reports, while perhaps flawed for some youth, offer a necessary window into child self-perceptions.

The present study employed a multimodal assessment strategy to explore patterns and correlates of DI and child anxiety. However, the study relied on a single task as the behavioral index of DI. The MTPT-C failed to distinguish between youth with and without anxiety disorder diagnoses, limiting conclusions that can be drawn regarding the
utility of behavioral measures to assess DI in youth with anxiety disorders. Future research could consider the inclusion of additional behavioral tasks that may tap into other DI domains. It should be noted, however, that some behavioral tasks employed in adult DI research may require additional considerations for research with clinical populations of children. For example, tasks that induce physical distress may be difficult to justify in the assessment of treatment-seeking anxious children, as participating in research that applies the deliberate provocation of pain may be objectionable to these children or to their parents. It may be that the inclusion of additional cognitive tasks, such as the PASAT (Lejuez et al., 2003), would have yielded different results. However, as previously discussed, given the lack of consensus regarding the gold standard approach to assessing DI, it is likely that available behavioral tasks are each capturing just a single, domain-specific facet of DI (e.g., pain, frustration, risk-aversion) as a proxy of DI rather than DI more broadly. These considerations underscore the need to develop and validate developmentally appropriate behavioral measures assessing broad-based DI in youth.

Findings may have been influenced by the modest sample size of the present study, which may have lacked the power to detect significant effects, particularly in mediation analyses. As previously discussed, the present findings provide important pilot data supporting future factor analytic work with larger samples of youth to better clarify relationships between available DI assessment measures for this population. Finally, the present study took place in a university-based outpatient clinic specializing in the treatment of anxiety disorders in a major city in New England. As a result, the findings may not be representative of youth presenting for treatment in other settings, or in the
general population. Study selection procedures may also limit the generalizability of the present results, as non-English-speaking participants were not eligible to participate in the study, given that all measures were administered in English. Moreover, the sample was predominantly Caucasian and of relatively high economic means, which regrettably is consistent with findings that minority and lower-income participants are consistently underrepresented in clinical research (e.g., Cauce, Ryan, & Grove, 1998; Yancey, Ortega, & Kumanyika, 2006). Given these limitations, future research would do well to replicate current results using larger samples comprised of participants representing greater sociodemographic diversity.

Conclusions

DI is a factor with demonstrated relevance to a range of psychological illness and maladaptive behaviors across the lifespan. The present study contributes to the growing DI literature by investigating the relationship between DI and youth anxiety disorders using a multimodal assessment strategy. Results provide strong preliminary evidence that self-perceived DI is significantly elevated amongst anxiety-disordered youth, and even mediates the relationship between child anxiety and associated behavioral avoidance. These findings suggest that DI may be a key contributor to anxiety disorder pathology in youth, and that augmenting evidence-based treatment protocols with direct DI-related components may therefore increase the efficacy of child anxiety treatments. Future factor analytic work with larger samples is a crucial next step to further refine the measurement of DI in youth. Improved assessment can meaningfully impact future research examining the development of DI in anxiety-disordered youth, which in turn can inform
recommendations for integrating DI-related interventions into evidence-based treatments for this population.
Table 1. Demographic characteristics across anxious and non-anxious youth (N=56)

<table>
<thead>
<tr>
<th></th>
<th>Total Sample (N = 56)</th>
<th>ANX (n = 28)</th>
<th>COM (n=28)</th>
<th>Significance Tests comparing ANX and COM</th>
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<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
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<tr>
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<td>151,001-200,000</td>
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Table 2. Clinical characteristics across anxious and non-anxious youth (N=56)

<table>
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<tr>
<th></th>
<th>Total Sample</th>
<th>ANX</th>
<th>COM</th>
<th>Significance Test (2-tailed)</th>
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<td>14.4</td>
<td>3.9</td>
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<tr>
<td>Total Scale</td>
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<td>17.4</td>
<td>38.6</td>
<td>18.9</td>
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<tr>
<td>Total Time on Final</td>
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<td>64,227</td>
<td>401,297</td>
<td>69,907</td>
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<tr>
<td>MTPT-C Trial ( b )</td>
<td></td>
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</table>

\(^a\) Comparisons conducted on log transformed data (see data analysis). All other comparisons conducted using raw scores.

\(^b\) In milliseconds.

\(^{*}p \leq .01, **p \leq .001\)
Table 3. Pairwise associations among study variables

<table>
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<th>3</th>
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<td>1. DII-Y Total&lt;sup&gt;a&lt;/sup&gt;</td>
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<td></td>
<td></td>
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<tr>
<td>2. CASI Total&lt;sup&gt;a&lt;/sup&gt;</td>
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<td>3. IUSC Total&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.66***</td>
<td>.65***</td>
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</tr>
<tr>
<td>4. CAMS Total</td>
<td>.40**</td>
<td>.37**</td>
<td>.38**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. RCADS Anxiety Scale Total</td>
<td>.65***</td>
<td>.66***</td>
<td>.69***</td>
<td>.53***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. PSWQ-C Total</td>
<td>.67***</td>
<td>.61***</td>
<td>.73**</td>
<td>.40**</td>
<td>.77***</td>
<td></td>
</tr>
<tr>
<td>7. Total Time on Final MTPT-C Trial</td>
<td>-.08</td>
<td>-.09</td>
<td>-.06</td>
<td>-.31*</td>
<td>-.18</td>
<td>-.02</td>
</tr>
</tbody>
</table>

<sup>a</sup>Correlations conducted on log transformed data (see data analysis). All other correlations conducted using raw scores.

* p < .05, **p < .01, ***p < .001
Table 4. Details of mediation models predicting relationship between child anxiety disorder status and behavioral avoidance through distress intolerance

<table>
<thead>
<tr>
<th>Mediator (M) variable</th>
<th>$a$</th>
<th>$b$</th>
<th>(a,b)</th>
<th>$c'$</th>
</tr>
</thead>
<tbody>
<tr>
<td>DII-Y $^a$</td>
<td>0.16</td>
<td>7.11</td>
<td>1.11</td>
<td>3.29</td>
</tr>
<tr>
<td>CASI $^a$</td>
<td>0.08</td>
<td>11.90</td>
<td>0.90</td>
<td>3.49</td>
</tr>
<tr>
<td>IUSC $^a$</td>
<td>0.10</td>
<td>8.26</td>
<td>0.81</td>
<td>3.58</td>
</tr>
<tr>
<td>Pooled Standardized DI Measure $^{a,b}$</td>
<td>0.34</td>
<td>3.74</td>
<td>1.29***</td>
<td>3.10</td>
</tr>
<tr>
<td>Total Time to Terminate MTPT-C $^c$</td>
<td>-2933.82</td>
<td>0.00</td>
<td>0.07</td>
<td>4.33</td>
</tr>
</tbody>
</table>

$^a$ Conducted on log transformed data (see data analysis).

$^b$ Z-scores (see Methods).

$^c$ In milliseconds.

***Null hypothesis rejected; 95% bias-corrected bootstrap confidence interval around effect does not overlap with 0, based on 10,000 bootstrap samples.
Figure A. Hypothesized model of the role of distress intolerance as mediating the link between child anxiety and behavioral avoidance.
Figure B. Diagram of proposed mediation model

M Variables:  
(1) DII-Y  
(2) CASI  
(3) IUSC  
(4) Composite Standardized Self-Reported DI  
(5) Total Time on Final MTPT-C Trial
Appendix A

Parent Demographic Questionnaire
We have a few questions for parents of children participating in our study:

Today’s Date:
Child’s Age:

Child’s Race (please circle all that apply)
- African-American/Black
- Asian
- Caucasian/White
- Native American/Alaskan Native
- Native Hawaiian or Pacific Islander
- Other:

Child’s Ethnicity (Please Circle)
- Hispanic or Latino
- Not Hispanic or Latino

Family Background
Parent 1 Age:
Parent 1 Occupation:
Parent 1 Highest Level of Education:
Parent 2 Age:
Parent 2 Occupation:
Parent 2 Highest Level of Education:
Current Status of Parents’ Marriage (please circle one)
- Never Married
- Married
- Separated
- Divorced
- Widowed

Approximate Family Income (please circle one)
- Less than $25,000
- $25,001-$50,000
- $50,001-$100,000
- $100,001-$150,000
- $150,001-$200,000
- Over $200,000
- $200,000
- $200,000


Appendix B

Revised Child Anxiety and Depression Scales (RCADS)

*Please put a circle around the word that shows how often each of these things happen to you. There are no right or wrong answers.*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Never</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I worry about things.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>I feel sad or empty.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>When I have a problem, I get a funny feeling in my stomach.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>I worry when I think I have done poorly at something.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>I would feel afraid of being on my own at home.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>I feel scared when I have to take a test.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>I feel worried when I think someone in angry with me.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>I worry about being away from my parents.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>I get bothered by bad or silly thoughts or pictures in my mind.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>I have trouble sleeping.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>I worry that I will do badly at my schoolwork.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>I worry that something awful will happen to my family.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>I suddenly feel as if I can’t breathe when there is no reason</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>I have problems with my appetite.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>I have to keep checking that I have done things right (like</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>the switch is off, or the door is locked).</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>I feel scared if I have to sleep on my own.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>I have trouble going to school in the morning because I feel</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>nervous or afraid.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19.</td>
<td>I have no energy for things.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td>I worry that I might look foolish.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21.</td>
<td>I am tired a lot.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22.</td>
<td>I worry that bad things will happen to me.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23.</td>
<td>I can’t seem to get bad or silly thoughts out of my head.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24.</td>
<td>When I have a problem, my heart beats really fast.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
25. I cannot think clearly.  
26. I suddenly start to tremble or shake when there is no reason for this.  
27. I worry that something bad will happen to me.  
28. When I have a problem, I feel shabby.  
29. I feel worthless.  
30. I worry about making mistakes.  
31. I have to think special thoughts (like numbers or words) to stop bad things from happening.  
32. I worry what other people will think of me.  
33. I am afraid of being in crowded places (like shopping centers, the movies, buses, busy playgrounds).  
34. All of a sudden I feel really scared for no reason at all.  
35. I worry about what is going to happen.  
36. I suddenly become dizzy or faint when there is no reason for this.  
37. I think about death.  
38. I feel afraid if I have to talk in front of my class.  
39. My hear suddenly starts to beat too quickly for no reason.  
40. I feel like I don’t want to move.  
41. I worry that I will suddenly get a scared feeling when there is nothing to be afraid of.  
42. I have to do some things over and over again (like washing my hands, cleaning or putting things in certain order).  
43. I feel afraid that I will make a fool of myself in front of other people.  
44. I have to do some things in just the right way to stop bad things from happening.  
45. I worry when I go to bed at night.  
46. I would feel scared if I had to stay away from home overnight.  
47. I feel restless.
Appendix C

Distress Intolerance Index for Youth (DII-Y)

Directions: We all get upset sometimes. By upset, we mean that we might feel mad, or sad, or distressed, or angry, or in pain. We want to know some things about how you handle feeling upset. Please read each question below. Circle the word that best describes how each question fits you. There are no right or wrong answers.

1. I can’t handle feeling upset or distressed.
   - Very Little
   - A Little
   - Some
   - Much
   - Very Much

2. Other people seem to be able to handle feeling upset or distressed better than I can.
   - Very Little
   - A Little
   - Some
   - Much
   - Very Much

3. Being upset or distressed is always a really big deal for me.
   - Very Little
   - A Little
   - Some
   - Much
   - Very Much

4. Feeling upset or distressed scares me.
   - Very Little
   - A Little
   - Some
   - Much
   - Very Much

5. I’ll do anything to stop feeling upset or distressed.
   - Very Little
   - A Little
   - Some
   - Much
   - Very Much

6. When I feel upset or distressed, I can’t stop thinking about how bad I feel.
   - Very Little
   - A Little
   - Some
   - Much
   - Very Much

7. I need upsetting feelings to go away as fast as possible; I can’t handle if they keep going.
   - Very Little
   - A Little
   - Some
   - Much
   - Very Much

8. I can’t stand situations where I might feel upset.
   - Very Little
   - A Little
   - Some
   - Much
   - Very Much

9. I can’t handle upsetting feelings.
   - Very Little
   - A Little
   - Some
   - Much
   - Very Much

10. It scares me when I feel nervous.
    - Very Little
    - A Little
    - Some
    - Much
    - Very Much
**Appendix D**

**Childhood Anxiety Sensitivity Index (CASI)**

*Directions: A number of statements which boys and girls use to describe themselves are given below. Read each statement carefully and circle the words that describe you. There are no right or wrong answers.*

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I don’t want other people to know when I feel afraid.</td>
<td>None</td>
<td>Some</td>
</tr>
<tr>
<td>2.</td>
<td>When I cannot keep my mind on my schoolwork I worry that I might be going crazy.</td>
<td>None</td>
<td>Some</td>
</tr>
<tr>
<td>3.</td>
<td>It scares me when I feel shaky.</td>
<td>None</td>
<td>Some</td>
</tr>
<tr>
<td>4.</td>
<td>It scares me when I feel like I am going to faint.</td>
<td>None</td>
<td>Some</td>
</tr>
<tr>
<td>5.</td>
<td>It is important for me to stay in control of my feelings.</td>
<td>None</td>
<td>Some</td>
</tr>
<tr>
<td>6.</td>
<td>It scares me when my heart beats fast.</td>
<td>None</td>
<td>Some</td>
</tr>
<tr>
<td>7.</td>
<td>It embarrasses me when my stomach growls (makes noise).</td>
<td>None</td>
<td>Some</td>
</tr>
<tr>
<td>8.</td>
<td>It scares me when I feel like I am going to throw up.</td>
<td>None</td>
<td>Some</td>
</tr>
<tr>
<td>9.</td>
<td>When I notice that my heart is beating fast, I worry that there might be something wrong with me.</td>
<td>None</td>
<td>Some</td>
</tr>
<tr>
<td>10.</td>
<td>It scares me when I have trouble getting my breath.</td>
<td>None</td>
<td>Some</td>
</tr>
<tr>
<td>11.</td>
<td>When my stomach hurts, I worry that I might be really sick.</td>
<td>None</td>
<td>Some</td>
</tr>
<tr>
<td>12.</td>
<td>It scares me when I can’t keep my mind on my schoolwork.</td>
<td>None</td>
<td>Some</td>
</tr>
<tr>
<td>13.</td>
<td>Other kids can tell when I feel shaky.</td>
<td>None</td>
<td>Some</td>
</tr>
<tr>
<td>14.</td>
<td>Unusual feelings in my body scare me.</td>
<td>None</td>
<td>Some</td>
</tr>
<tr>
<td>15.</td>
<td>When I am afraid, I worry that I might be crazy.</td>
<td>None</td>
<td>Some</td>
</tr>
<tr>
<td>16.</td>
<td>It scares me when I feel nervous.</td>
<td>None</td>
<td>Some</td>
</tr>
<tr>
<td>17.</td>
<td>I don’t like to let me feelings show.</td>
<td>None</td>
<td>Some</td>
</tr>
<tr>
<td>18.</td>
<td>Funny feelings in my body scare me.</td>
<td>None</td>
<td>Some</td>
</tr>
</tbody>
</table>
Appendix E

Intolerance of Uncertainty Scale Child Report Form (IUSC)

*How well do these statements describe you?*

1. Doubts stop me from having strong opinions.
   1. Not at all
   2. Somewhat
   3. Very much
   4. Very much

2. Being unsure means that a person is mixed-up.
   1. Not at all
   2. Somewhat
   3. Very much
   4. Very much

3. Not knowing what will happen in the future makes life hard.
   1. Not at all
   2. Somewhat
   3. Very much
   4. Very much

4. It’s not fair that we can’t predict the future.
   1. Not at all
   2. Somewhat
   3. Very much
   4. Very much

5. I can’t relax if I don’t know what will happen tomorrow.
   1. Not at all
   2. Somewhat
   3. Very much
   4. Very much

6. Not knowing what will happen in the future makes me uneasy, anxious, or stressed.
   1. Not at all
   2. Somewhat
   3. Very much
   4. Very much

7. Surprise events upset me greatly.
   1. Not at all
   2. Somewhat
   3. Very much
   4. Very much

8. It frustrates me to not have all the information I need.
   1. Not at all
   2. Somewhat
   3. Very much
   4. Very much

9. Not knowing what could happen keeps me from enjoying life.
   1. Not at all
   2. Somewhat
   3. Very much
   4. Very much

10. One should always think ahead to avoid surprises.
    1. Not at all
    2. Somewhat
    3. Very much
    4. Very much

11. Plans can be ruined by things you didn’t think would happen.
12. When it is time to do things, not knowing what could happen keeps me from acting.

13. Being unsure of things means that I am not great.

14. When I am not sure of something, I can’t go forward.

15. When I am not sure of something I can’t work very well.

16. Other kids have less doubts than I do.

17. Not knowing what will happen makes me unhappy or sad.

18. I always want to know what will happen to me in the future.

19. I don’t like being taken by surprise.

20. The smallest doubt can stop me from doing things.

21. I should be able to prepare for everything in advance.

22. Being unclear about things mean that I am not confident.
23. It’s not fair that other kids are more sure of things.
   Not at all  Somewhat  Very much
   1  2  3  4  5

24. Not knowing what can happen keeps me from sleeping well.
   Not at all  Somewhat  Very much
   1  2  3  4  5

25. I must get away from all situations where I don’t know what will happen.
   Not at all  Somewhat  Very much
   1  2  3  4  5

26. Things that are unclear stress me.
   Not at all  Somewhat  Very much
   1  2  3  4  5

27. I don’t like being undecided about the future.
   Not at all  Somewhat  Very much
   1  2  3  4  5
## Appendix F

### Positive and Negative Affect Scale – 10 (PANAS-10)

For the questions the will be presented, use the mouse to click on the line with the left mouse button to provide ratings from “none” to “extreme.” Your ratings should reflect how you feel right now.

**To what extent do you feel:**

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Excited</td>
<td>0-----------------------------50-----------------------------100</td>
<td>None</td>
<td>Extreme</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Mad</td>
<td>0-----------------------------50-----------------------------100</td>
<td>None</td>
<td>Extreme</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Interested</td>
<td>0-----------------------------50-----------------------------100</td>
<td>None</td>
<td>Extreme</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Frustrated</td>
<td>0-----------------------------50-----------------------------100</td>
<td>None</td>
<td>Extreme</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Happy</td>
<td>0-----------------------------50-----------------------------100</td>
<td>None</td>
<td>Extreme</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Upset</td>
<td>0-----------------------------50-----------------------------100</td>
<td>None</td>
<td>Extreme</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Energetic</td>
<td>0-----------------------------50-----------------------------100</td>
<td>None</td>
<td>Extreme</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Embarrassed</td>
<td>0-----------------------------50-----------------------------100</td>
<td>None</td>
<td>Extreme</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Proud</td>
<td>0-----------------------------50-----------------------------100</td>
<td>None</td>
<td>Extreme</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Nervous</td>
<td>0-----------------------------50-----------------------------100</td>
<td>None</td>
<td>Extreme</td>
<td></td>
</tr>
</tbody>
</table>
Appendix G

Child Avoidance Measure Self-Report (CAMS)

We want to know more about your fears and worries. Some examples of things that make kids feel scared and worried are: meeting new people, taking tests, being away from parents, and going near dogs, snakes, spiders, bugs, or germs.

Now we want to know what you do when you are afraid. Please circle the number that shows how often you do these things when you are afraid. Use this scale:

<table>
<thead>
<tr>
<th>Almost Always = 3</th>
<th>Sometimes = 2</th>
<th>Often = 1</th>
<th>Almost Never = 0</th>
</tr>
</thead>
</table>

When I feel scared or worried about something…

1. I try not to go near it… 0 1 2 3
2. I try not to think about it… 0 1 2 3
3. I feel scared until I get away from it… 0 1 2 3
4. I ask if I can do something else… 0 1 2 3
5. I try to avoid it… 0 1 2 3
6. I refuse to do it… 0 1 2 3
7. I think it is best to stay away from it… 0 1 2 3
8. I try to stay away from it… 0 1 2 3
Appendix H

Penn State Worry Questionnaire for Children (PSWQ-C)

Directions. This form is about worrying. Worrying happens when you are scared about something and you think about it a lot. People sometimes worry about school, their family, their health, things coming up future or other kinds of things. For each sentence that you read, circle the answer that best tells how true that sentence is about you.

<table>
<thead>
<tr>
<th>Number</th>
<th>Sentence</th>
<th>Never true</th>
<th>Sometimes true</th>
<th>Most times true</th>
<th>Always true</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>My worries really bother me.</td>
<td>Never true</td>
<td>Sometimes true</td>
<td>Most times true</td>
<td>Always true</td>
</tr>
<tr>
<td>2.</td>
<td>I don't really worry about things.</td>
<td>Never true</td>
<td>Sometimes true</td>
<td>Most times true</td>
<td>Always true</td>
</tr>
<tr>
<td>3.</td>
<td>Many things make me worry.</td>
<td>Never true</td>
<td>Sometimes true</td>
<td>Most times true</td>
<td>Always true</td>
</tr>
<tr>
<td>4.</td>
<td>I know I shouldn't worry about things, but I just can't help it.</td>
<td>Never true</td>
<td>Sometimes true</td>
<td>Most times true</td>
<td>Always true</td>
</tr>
<tr>
<td>5.</td>
<td>When I'm under pressure, I worry a lot.</td>
<td>Never true</td>
<td>Sometimes true</td>
<td>Most times true</td>
<td>Always true</td>
</tr>
<tr>
<td>6.</td>
<td>I am always worrying about something.</td>
<td>Never true</td>
<td>Sometimes true</td>
<td>Most times true</td>
<td>Always true</td>
</tr>
<tr>
<td>7.</td>
<td>I find it easy to stop worrying when I want.</td>
<td>Never true</td>
<td>Sometimes true</td>
<td>Most times true</td>
<td>Always true</td>
</tr>
<tr>
<td>8.</td>
<td>When I finish one thing, I start to worry, about everything else.</td>
<td>Never true</td>
<td>Sometimes true</td>
<td>Most times true</td>
<td>Always true</td>
</tr>
<tr>
<td>9.</td>
<td>I never worry about anything.</td>
<td>Never true</td>
<td>Sometimes true</td>
<td>Most times true</td>
<td>Always true</td>
</tr>
<tr>
<td>10.</td>
<td>I've been a worrier all my life.</td>
<td>Never true</td>
<td>Sometimes true</td>
<td>Most times true</td>
<td>Always true</td>
</tr>
<tr>
<td>11.</td>
<td>I notice that I have been worrying about things.</td>
<td>Never true</td>
<td>Sometimes true</td>
<td>Most times true</td>
<td>Always true</td>
</tr>
<tr>
<td>12.</td>
<td>Once I start worrying, I can't stop.</td>
<td>Never true</td>
<td>Sometimes true</td>
<td>Most times true</td>
<td>Always true</td>
</tr>
<tr>
<td>13.</td>
<td>I worry all the time.</td>
<td>Never true</td>
<td>Sometimes true</td>
<td>Most times true</td>
<td>Always true</td>
</tr>
</tbody>
</table>
14. I worry about things until they are all done. | Never true | Sometimes true | Most times true | Always true
References


Psychotherapy Research, 19(4-5), 418-428. doi: 10.1080/10503300802448899


Kendall, P. C., Flannery-Schroeder, E., Panichelli-Mindel, S. M., Southam-Gerow, M.,
second randomized clinical trial. *Journal of Consulting and Clinical Psychology,*


behavioral treatment for childhood anxiety disorders. In E. D. Hibbs & P. S.

Kendall, P. C., Robin, J. A., Hedtke, K. A., Suveg, C., Flannery-Schroeder, E., & Gosch,
Behavioral Practice, 12,* 136-150. doi: 10.1016/S1077-7229(05)80048-3

Kendall, P. C., Settipani, C. A., & Cummings, C. M. (2012). No need to worry: The
promising future of child anxiety research. *Journal of Clinical Child and
Adolescent Psychology, 41*(1), 103-115. doi: 10.1080/15374416.2012.632352

10.1080/10615806.2014.974571


Lange, G., Sheerin, D., Carr, A., Dooley, B., Barton, V., Marshall, D., ... Doyle, M. (2005). Family factors associated with attention deficit hyperactivity disorder and


Revised: August 24, 2011


R. Meredith Elkins, M.A.
Curriculum Vitae

New York Presbyterian Hospital - Weill Cornell Medical Center
Department of Psychiatry
425 E. 61st Street, PH Floor
New York, NY 10065
Office: 212.821.0790.
meredith.elkins@gmail.com
Mobile: 443.798.0271

EDUCATION

New York Presbyterian Hospital – Weill Cornell Medical Center 2015-
APA-accredited Predoctoral Internship in Clinical Psychology expected 2016
Training Director: Susan Evans, Ph.D.

Boston University, Boston, MA 2011-
Doctor of Philosophy in Clinical Psychology expected 2016
Mentors: Jonathan S. Comer, Ph.D., & Donna B. Pincus, Ph.D.
Dissertation Title: A Multimodal Investigation of Distress Intolerance and Youth Anxiety Disorders

Boston University, Boston, MA 2010
Master of Arts in Psychology

Washington and Lee University, Lexington, VA 2006
Bachelor of Arts in Psychology
Magna Cum Laude

PUBLICATIONS AND PRESENTATIONS

Peer Reviewed Publications


**Book Chapters**


**Manuscripts under Review**


Manuscripts in Preparation


Presentations


presented at the 47th annual conference of the Association for Behavioral and Cognitive Therapies, Nashville, TN.


presented at the annual conference of the World Congress of Behavioral and Cognitive Therapies, Boston, MA.


**Community Trainings/Invited Lectures**

2014  
*Diagnosis, interviewing, behavioral assessment and clinical observation with children.* Guest lecture presented to honors undergraduate psychology students. Department of Psychology, Boston University, Boston, MA.

2014  
*Parent-Child Interaction Therapy for early childhood disruptive behavior disorders.* Guest lecture presented to social work masters students and honors undergraduate psychology students. School of Education, Boston University, Boston, MA.

2013  
*Developmental disorders.* Guest lecture presented to undergraduate psychology students. Department of Psychology, Boston University, Boston, MA.
2012  *School refusal behavior in youth: Distinguishing anxiety from truancy.* Workshop presented at the Department of Children and Families, Weymouth, MA.

**ACADEMIC HONORS AND AWARDS**

<table>
<thead>
<tr>
<th>Year</th>
<th>Honor or Award</th>
</tr>
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<tbody>
<tr>
<td>2013</td>
<td>Claro Mayo Fellowship Award, Boston University</td>
</tr>
<tr>
<td>2006</td>
<td>Graduated <em>Magna Cum Laude</em> from Washington and Lee University</td>
</tr>
<tr>
<td>2006</td>
<td>Membership in Psi Chi, National Honor Society in Psychology</td>
</tr>
<tr>
<td>2004</td>
<td>Robert E. Lee Research Scholar Award, Washington and Lee University</td>
</tr>
<tr>
<td>2002-2006</td>
<td>Dean’s List at Washington and Lee University, all semesters</td>
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**GRANTS AND FELLOWSHIP SUPPORT**

<table>
<thead>
<tr>
<th>Year</th>
<th>Fellowship/Award</th>
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<tr>
<td>2013</td>
<td>Claro Mayo Fellowship Award, Boston University</td>
</tr>
<tr>
<td></td>
<td>Grant funding awarded to support dissertation project. Amount of award: $6,075.00</td>
</tr>
<tr>
<td>2004</td>
<td>Robert E. Lee Research Scholar, Washington and Lee University</td>
</tr>
<tr>
<td></td>
<td>Merit-based funding awarded in the form of a stipend to support undergraduate summer research in psychology.</td>
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</table>

**PROFESSIONAL AFFILIATIONS**

<table>
<thead>
<tr>
<th>Year</th>
<th>Organization</th>
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<tbody>
<tr>
<td>2006</td>
<td>Psi Chi, National Honor Society in Psychology</td>
</tr>
<tr>
<td>2008-2009</td>
<td>Maryland Association for Behavior Analysis</td>
</tr>
<tr>
<td>2009</td>
<td>Association for Behavior Analysis</td>
</tr>
<tr>
<td>2011-present</td>
<td>Association for Behavioral and Cognitive Therapies (ABCT)</td>
</tr>
<tr>
<td>2011-present</td>
<td>Child and Adolescent Anxiety Special Interest Group, ABCT</td>
</tr>
<tr>
<td>2012-present</td>
<td>APA Division 53, Society of Clinical Child and Adolescent Psychology</td>
</tr>
<tr>
<td>2016-present</td>
<td>Women’s Issues in Behavior Therapy Special Interest Group, ABCT</td>
</tr>
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**AD HOC REVIEW EXPERIENCE**

Clinical Psychology Review  
Cognitive and Behavioral Practice  
Journal of Abnormal Psychology

**PROFESSIONAL COMMITTEES AND LEADERSHIP POSITIONS**

<table>
<thead>
<tr>
<th>Year</th>
<th>Position</th>
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</thead>
<tbody>
<tr>
<td>2013</td>
<td>Program Committee, 2013 PCIT International Convention, Boston, MA</td>
</tr>
</tbody>
</table>
2013-2014 Student Representative to Clinical Faculty, Doctoral Program in Clinical Psychology, Boston University

SUPERVISED CLINICAL EXPERIENCE

Department of Psychiatry
New York Presbyterian Hospital, Weill Cornell Medical Center
New York, NY
Supervisors: Susan Evans, Ph.D., Alex Levi, Ph.D., Grace Lee, Ph.D., Jaime Shumpf, Psy.D., Clinician, 2015-present

- Conduct outpatient cognitive behavioral therapy for adults at the Cognitive Therapy Clinic; attend weekly case conference, weekly individual supervision, and monthly video supervision.
- Conduct weekly psychological evaluations for the Cognitive Therapy Clinic; compile written reports; participate in case presentation in weekly disposition meeting
- Conduct outpatient psychodynamic therapy for adults; attend weekly individual supervision.
- Attend weekly Psychiatry Grand Rounds and monthly Psychology Grand Rounds.

Child and Adolescent Outpatient Psychiatry Clinic
New York Presbyterian Hospital, Weill Cornell Medical Center
New York, NY
Supervisor: Shannon Bennett, Ph.D.
Clinician, 2015-present

- Conduct outpatient cognitive behavioral therapy for children and adolescents with a range of presenting concerns; participate in weekly case conferences, didactic trainings, and individual supervision.
- Receive training and supervision in Comprehensive Behavioral Intervention for Tics (CBIT).
- Present at interdisciplinary case conferences.

Pediatric Psychology Service
New York Presbyterian Hospital, Weill Cornell Medical Center
New York, NY
Supervisor: Tara Mathews, Ph.D.
Clinician, 2015-present

- Provide assessment, consultation, and behavioral and psychological interventions for children with a co-occurring medical and psychological conditions presenting to outpatient pediatric endocrinology, neurology, gastroenterology, and pulmonology clinics within a hospital setting.
• Conduct weekly outpatient follow-up treatment for patients referred from these clinics.
• Receive weekly individual supervision.

**Psychiatric Emergency Room**  
**New York Presbyterian Hospital, Weill Cornell Medical Center**  
New York, NY  
*Clinician, Spring 2016*

• Work as part of a multidisciplinary team conducting evaluations of patients presenting to the Psychiatric Emergency Room; assist in coordinating patient care.

**Child and Adolescent Fear and Anxiety Treatment Program**  
**Early Childhood Interventions Program**  
**Center for Anxiety and Related Disorders**  
**Boston University, Boston, MA**  
*Co-Directors: Donna B. Pincus, Ph.D., Jonathan S. Comer, Ph.D., David Langer, Ph.D.*  
*Supervisors: Jonathan S. Comer, Ph.D., Jami M. Furr, Ph.D., David Langer, Ph.D., Ryan J. Madigan, Psy.D.*  
*Graduate Student Clinician, 2011-2015*

• Provide individual and group cognitive-behavioral therapy to children, adolescents, and their families with a range of psychological disorders.
• Deliver treatments in individual and family formats, in the clinic, and over the Internet.
• Administer semi-structured diagnostic interviews to children and families using the Anxiety Disorders Interview Schedule for DSM-IV, Child and Parents Versions (ADIS-IV-C/P); administer and score a battery of self-report measures for children and parents.
• Generate case formulation and engage in treatment planning; present case conceptualization during weekly clinical meetings and compose diagnostic report.
• Treatment strategies include: exposure therapy, cognitive restructuring, Parent-Child Interaction Therapy (PCIT), exposure and response prevention (EX/RP), relaxation training, mindfulness, behavior modification, intensive treatments, and behavioral parent coaching.

**Boston Child Study Center**  
**Boston, MA**  
*Supervisor: Nathan Lambright, Psy.D., BCBA-D*  
*Neuropsychology Extern, Summer 2014*

• Provide neuropsychological testing services to children and young adults; administer and interpret various tests of intelligence, achievement, memory, attention, and executive functioning; score test batteries and prepare integrative neuropsychological summary reports.
• Receive comprehensive didactic instruction, observation experience, and supervision in test administration, scoring procedures, testing theory, and interpretation.

3East Adolescent Intensive DBT Partial Program
McLean Hospital, Harvard Medical School
Belmont, MA
Supervisor: Michael R. Hollander, Ph.D.
Psychology Extern, 2013-2014
• Implement Dialectical Behavior Therapy in a group format for adolescents and young adults ages 13 to 22 with self-injurious behaviors and co-morbid borderline personality traits, PTSD, substance abuse, anxiety and mood disorders in an intensive day-treatment program.
• Lead group therapy sessions, provide co-therapy for individual patients, conduct psychological assessments and individual sessions with patients as needed, observe intake interviews with patients and their families, and participate in weekly case conferences; attend weekly supervision and didactic trainings.

Psychological Services Clinic
Boston University, Boston, MA
Supervisor: Lisa C. Smith, Ph.D.
Psychology Extern, 2012-2013
• Provide individual cognitive-behavioral therapy to adults with a range of psychological disorders.
• Administer semi-structured intake assessments to adults seeking psychological services using the Anxiety Disorders Interview Schedule for DSM-IV (ADIS).
• Receive weekly live observation as well as individual and group supervision.
• Treatment strategies include: in vivo exposures, relaxation training, cognitive restructuring, sleep hygiene training, behavioral modification, and motivational interviewing.

Neuropsychological Testing at the Psychological Services Clinic
Boston University, Boston, MA
Supervisors: Mark A. Richardson, Ph. D., & Rosemary Toomey, Ph.D.
Psychology Extern, 2012-2013
• Provide neuropsychological testing services to adults and children.
• Administer and interpret various tests of intelligence, achievement, memory, attention, and executive functioning; score test batteries and prepare integrative neuropsychological summary reports.
• Receive comprehensive didactic instruction, observation experience, and weekly supervision in test administration, scoring procedures, testing theory, and interpretation.
Summer Treatment Program for Selective Mutism
Child and Adolescent Fear and Anxiety Program
Center for Anxiety and Related Disorders
Boston University, Boston, MA
*Supervisors: Jami M. Furr, Ph.D., David Langer, Ph.D.*
*Graduate Clinician, Summer 2012; Summer 2013*

- Administered behavioral treatment in a one-week intensive group format to children ages 3-7 with selective mutism.
- The camp simulates a classroom environment, which provided guided opportunities for these children to interact with a number of new children and adults, participate in classroom-like activities, engage in field trips, and play socializing games that promote verbal participation and spontaneous speaking.
- Co-lead group sessions, assist with camp activities, and facilitate exposure tasks.

Summer Treatment Program for Separation Anxiety Disorder
Child and Adolescent Fear and Anxiety Program
Center for Anxiety and Related Disorders
Boston University, Boston, MA
*Supervisor: Lauren C. Santucci, Ph.D.*
*Graduate Clinician, Summer 2010*

- Assisted in the administration of cognitive-behavioral treatment in a one-week intensive cognitive behavioral therapy delivered in summer camp format to girls aged 7 to 12 diagnosed with separation anxiety disorder as part of NIMH-funded research.

Pediatric Feeding Disorders Program
Kennedy Krieger Institute, Johns Hopkins Hospital
Baltimore, MD
*Supervisor: Charles Gulotta, Ph.D.*
*Clinical Specialist, 2008-2009*

- Conduct treatment sessions using behavioral interventions for children with a variety of medical, behavioral, and comorbid emotional issues.
- Conduct comprehensive assessment with families who have children with behavioral and medically-related feeding issues.
- Develop and implement child-specific behavioral treatment protocols.
- Collaborate within a multidisciplinary team; write progress notes and discharge summaries based on measurable outcomes; collect and record patient behavioral data; create and maintain treatment graphs; lead caregiver training; present case summaries at interdisciplinary meetings.
Kennedy Krieger Institute, Johns Hopkins Hospital
Baltimore, MD
Supervisor: Charles Gulotta, Ph.D.
Behavior Data Specialist, 2006-2008
- Behavior data specialist conducting treatment sessions using behavioral interventions for children with a variety of medical, behavioral, and comorbid emotional issues.

Project Horizon
Lexington, VA
Supervisor: Elyse Barnard, B.A.
Shelter Volunteer, 2006
- Hotline and shelter volunteer for a non-profit organization, serving victims of domestic violence, sexual assault, and child abuse. Provided client support within a shelter setting and via a 24-hour hotline.

Early Intervention Therapist
Owings Mills, MD, 2004
Supervisor: Christine Accardo, Ph.D., BCBA
- Implement discrete trial training as a home-based intervention for a child with a diagnosis of autism. Serve as a paraprofessional aide within a classroom setting, facilitating the child’s generalization of skills and peer socialization.

RESEARCH EXPERIENCE

Doctoral Dissertation
(Funding: Clara Mayo Foundation, Boston University; PI: Elkins)

Boston University, Boston, MA
Readers: Donna B. Pincus, Ph.D., Boston University; Jonathan S. Comer, Ph.D., Florida International University; R. Kathryn McHugh, Ph.D., McLean Hospital, Harvard Medical School
- Proposed and received approval to conduct a dissertation project entitled “A multimodal investigation of distress intolerance and youth anxiety disorders.”
- Subject recruitment, data collection and analysis completed in 2015.
- Defense anticipated in Spring, 2016.

Child and Adolescent Fear and Anxiety Treatment Laboratory
Early Child Interventions Program
Center for Anxiety and Related Disorders
Boston University, Boston, MA
Supervisors: Jonathan S. Comer, Ph.D., & Donna B. Pincus, Ph.D.
Graduate Student Researcher, 2011-2015
- Participate in ongoing research activities in the laboratory, including data tracking, preparation of IRB and grant materials, data collection and analysis, coding behavioral data, conducting literature reviews, conducting IE assessments for graduate student projects, and manuscript preparation.

**The Effects of Cognitive-Behavioral Therapy on the Sleep Problems of Anxious Youth**

**Center for Anxiety and Related Disorders**

**Boston University/Temple University**

*Supervisors: Jonathan S. Comer, Ph.D.; Donna B. Pincus, Ph.D.; Philip Kendall, Ph.D.*

*Co-Principal Investigator/Site Coordinator, 2012-2015*

- Co-principal investigator in a multi-site study conducted at Boston University and Temple University, investigating changes in sleep problems following cognitive-behavioral treatment in a clinical sample of anxious children presenting for treatment at the Center for Anxiety and Related Disorders (CARD) and the Child and Adolescent Anxiety Disorders Clinic (CAADC).

**Evaluating the Feasibility of Internet-delivered Parent-Child Interaction Therapy**

*(Funding: NIMH KMH909247A; PI: Comer)*

**Center for Anxiety and Related Disorders**

**Boston University, Boston, MA**

*Principal Investigator/Supervisor: Jonathan S. Comer, Ph.D.*

*Protocol Therapist, Independent Evaluator, & Research Coordinator, 2011-2015*

- Deliver PCIT in-clinic and over the Internet with families from both sites. Engage in in-session coding of behavioral data using the DPICS.
- Conduct pre-treatment and post-treatment diagnostic assessments with study participants using the KDBDS and the DPICS.
- Organize data tracking and preparation of IRB materials.

**Internet-delivered Exposure and Response Prevention for Early Onset Obsessive-Compulsive Disorder: A Pilot Feasibility Trial**

*(Funding: International OCD Foundation; PI: Comer)*

**Center for Anxiety and Related Disorders**

**Boston University, Boston, MA**

*Principal Investigator/Supervisor: Jonathan S. Comer, Ph.D.*

*Protocol Therapist and Independent Evaluator, 2011-2015*

- A study evaluating internet-delivered family-based exposure and response prevention (EX/RP) over the internet and in clinic.
• Implement EX/RP with families in the clinic and over the Internet. Conduct pre- and post-treatment diagnostic assessments using the ADIS-C/P and the Children’s Yale-Brown Obsessive-Compulsive Scale (CY-BOCS).

Center for Anxiety and Related Disorders
Boston University, Boston, MA
Supervisor: David H. Barlow, Ph.D., ABPP
Research and Administrative Assistant to David H. Barlow, 2010-2011
• Served as research and administrative assistant to Dr. David Barlow. Responsibilities include participating in research for several NIMH-funded projects, including ongoing evaluations of the efficacy and dissemination of the Unified Protocol for the Transdiagnostic Treatment of Emotional Disorders, as well as the development and evaluation of the efficacy and dissemination of online programs that train clinicians in Panic Control Treatment for adults (PCT) and adolescents (PCT-A); assisting in research and editorial tasks; administrative tasks as needed.

Child and Adolescent Fear and Anxiety Laboratory
Center for Anxiety and Related Disorders
Boston University, Boston, MA
Director: Donna B. Pincus, Ph.D.
Supervisor: Courtney Weiner, Ph.D.
Research Assistant, 2010-2011
• Research assistant for a project exploring the predictors and correlates of sleep-related problems in anxious youth. Responsibilities include database development and management, data collection and scoring, statistical analysis, and manuscript preparation.

An Evaluation of the Dissemination and Effectiveness of a Novel Intervention for Anxiety and Depression
(Funding: Boston University BRIDGE Program; PI: Barlow)
Center for Anxiety and Related Disorders
Boston University, Boston, MA
Supervisor: David H. Barlow, Ph.D., ABPP
Research Assistant, 2009-2011
• Research assistant for a project examining the effectiveness and dissemination of a computer-based cognitive behavioral intervention for anxiety and depression within a university health setting.
• Oversee all administrative aspects of the study; lead participant recruitment efforts, tracking, and correspondence; develop study materials; conduct consent meetings; data set development and maintenance.

Child and Adolescent Fear and Anxiety Treatment Laboratory
Center for Anxiety and Related Disorders
Boston University, Boston, MA  
*Supervisor: Donna B. Pincus, Ph.D.*  
*Research Assistant, 2009-2010*

- Participated in research and clinical activity within the Child and Adolescent Fear and Anxiety Program. Responsibilities include database management, adherence checks, literature review, developing data entry manuals, and participating as needed in treatment delivery.

Affective and Anxiety Disorders Clinic  
Kennedy Krieger Institute, Johns Hopkins Hospital  
Baltimore, MD  
*Supervisor: Roma Vasa, M.D.*  
*Research Assistant, 2007-2009*

- Assisted in research comparing the brain activation patterns of children with and without anxiety disorders, as well as research examining emotional attention and memory in children with and without anxiety disorders.

Department of Psychology  
Washington and Lee University, Lexington, VA  
*Supervisor: Julie Woodzicka, Ph.D.*  
*Research Assistant, 2004*

- Participated in research through a grant awarded as a Robert E. Lee Research Scholar. Participated in the development of a scale to assess awareness of and attitudes towards white privilege. Conducted research investigating gender differences in social smiling behavior.

**SUPERVISION AND MENTORSHIP EXPERIENCE**

Center for Anxiety and Related Disorders  
Boston University, Boston, MA  
*Supervisor: Lisa Smith, Ph.D.*  
*Doctoral Student Supervisor, 2014-2015*

- Serve as primary supervisor for a junior graduate student clinician treating adults and children with anxiety and related disorders.  
- Provide weekly supervision on student clinician’s individual assessments and treatment cases, progress notes and report writing.  
- Provide supervision through live observation of individual sessions.

Child and Adolescent Fear and Anxiety Treatment Laboratory  
Boston University, Boston, MA  
*Supervisor: David Langer, Ph.D.*  
*Research Assistant Coordinator, 2013-2014*
• Provide training and oversight to undergraduate and masters student research assistants at the Child Program at the Center for Anxiety and Related Disorders.
• Provided didactic seminars addressing professional development issues and examining current research in the field of child anxiety and mood disorders.

**TEACHING EXPERIENCE**

**Department of Psychology**  
**Boston University, Boston, MA**  
*Courses: Abnormal Psychology; General Psychology*  
*Supervisor: Mark Richardson, Ph.D.; Martha C. Tompson, Ph.D.; Tracy Dunne, Ph.D.*  
*Teaching Fellow, 2011; 2012; 2013*  
• Provided assistance to faculty teaching undergraduate courses in Abnormal Psychology and General Psychology. Provided support during lectures and office hours, and conducted weekly four-hour discussion sections to review course material and introduce additional topics.

**Boston University Summer Challenge Program**  
**Boston University, Boston, MA**  
*Course: Abnormal Psychology*  
*Instructor, 2012; 2013*  
• Course instructor for high school students attending the Boston University Summer Challenge Program, teaching courses in Abnormal Psychology.  
  Developed curriculum and course content, and conducted daily two-hour lectures.

**TRAININGS AND WORKSHOPS**

**Oct, 2015**  
*An Introduction to Meaning-Centered Psychotherapy in the Oncology and Palliative Care Setting*  
*1-day Training Workshop*  
*Memorial Sloan Kettering Cancer Center*  
*William Breitbart, Ph.D., Wendy Lichtenthal, Ph.D., & Allison Applebaum, Ph.D., Memorial Sloan Kettering Cancer Center*

**Oct, 2014**  
*Advanced Parent-Child Interaction Therapy*  
*2-day Training Workshop*  
*Center for Children and Families, Florida International University*  
*Rhea Chase, Ph.D., Department of Psychiatry, Duke University*

**May, 2014**  
*Advances in DBT for Adolescents and Families in Clinical and School Settings*  
*Linehan Institute Lecture*  
*The Conference Center at Waltham Woods*
Alec Miller, Psy.D., Montefiore Medical Center

Dec, 2013  Comprehensive Behavioral Intervention for Tics (CBIT)  
Training Workshop  
Center for Effective Child Therapy, Judge Baker Children’s Center  
Sabine Wilhem, Ph.D., Harvard Medical School, Massachusetts General Hospital

Oct, 2013  Advanced Parent-Child Interaction Therapy  
3-day Training Workshop  
Center for Children and Families, Florida International University  
Rhea Chase, Ph.D., Department of Psychiatry, Duke University

July, 2012  Advanced Parent-Child Interaction Therapy  
2-day Training Workshop  
Center for Anxiety and Related Disorders, Boston University  
Rhea Chase, Ph.D., Department of Psychiatry, Duke University

July, 2011  Parent-Child Interaction Therapy  
2-day Training Workshop  
Center for Anxiety and Related Disorders, Boston University  
Rhea Chase, Ph.D., Department of Psychiatry, Duke University

REFERENCES

David Barlow, Ph.D., ABPP  
Founder and Director Emeritus, Center for Anxiety and Related Disorders  
Professor of Psychology and Psychiatry  
Boston University  
648 Beacon Street, 6th Floor  
Boston, MA 02215  
dhbarlow@bu.edu  
(617) 353-9610

Jonathan S. Comer, Ph.D.  
Associate Professor of Psychology and Psychiatry  
Director, Mental Health Interventions and Technology (MINT) Program  
Co-Director, Child Anxiety and Phobia Program (CAPP)  
Center for Children and Families  
Florida International University  
11200 S.W. 8th Street  
Miami, FL 33199  
jocomer@fiu.edu  
(305) 348-7580
**Susan Evans, Ph.D.**
Professor of Psychology in Clinical Psychiatry
Director of Education in Psychology
Weill Cornell Medical College
425 East 61st Street, Penthouse Floor
New York, NY 10065
sue2002@med.cornell.edu
(212) 821-0622

**Donna B. Pincus, Ph.D.**
Associate Professor, Department of Psychological and Brain Sciences, Boston University
Director, Child and Adolescent Fear and Anxiety Treatment Program
Center for Anxiety and Related Disorders at Boston University
648 Beacon Street, 6th Floor
Boston, MA 02215
dpincus@bu.edu
(617) 353-9610