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An Analysis of Change Processes in the Transdiagnostic Treatment of Emotional Disorders in Adolescents

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AN ANALYSIS OF CHANGE PROCESSES IN THE TRANSDIAGNOSTIC
TREATMENT OF EMOTIONAL DISORDERS IN ADOLESCENTS

By

Jamie Alexa Sherman

A DISSERTATION

Submitted to the Faculty
of the University of Miami
in partial fulfillment of the requirements for
the degree of doctorate of Doctor of Philosophy

Coral Gables, Florida

August 2019

UNIVERSITY OF MIAMI

A dissertation submitted in partial fulfillment of
the requirements for the degree of
Doctor of Philosophy

AN ANALYSIS OF CHANGE PROCESSES IN THE TRANSDIAGNOSTIC
TREATMENT OF EMOTIONAL DISORDERS IN ADOLESCENTS

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SHERMAN, JAMIE ALEXA   (Ph. D., Psychology)
An Analysis of Change Processes in the   (August 2019)
Transdiagnostic Treatment of Emotional
Disorders in Adolescents

Abstract of a dissertation at the University of Miami.

Dissertation supervised by Associate Professor Jill Ehrenreich-May.
No. of pages in text. (124)

Anxiety, depression, and related emotional disorders are prevalent and impairing (Merikangas et al., 2010). They not only have high levels of symptom overlap but also share underlying temperament factors such as high neuroticism (Barlow, Sauer-Zavala, Carl, Bullis, & Ellard, 2014; Tonarely, Sherman, Grossman, Shaw, & Ehrenreich-May, under review) and low extroversion (Barlow et al., 2014; Tonarely, Sherman, & Ehrenreich-May, 2017). The Unified Protocols for Transdiagnostic Treatment of Emotional Disorders in Children and Adolescents (UP-C and UP-A, respectively; Ehrenreich-May et al., 2018) and similar core dysfunction-focused transdiagnostic therapy approaches may lead to successful treatment by targeting higher-order factors that cut across an array of emotional disorders (Marchette & Weisz, 2017). This study aimed to assess how changes in modifiable risk factors associated with the construct of neuroticism and common to emotional disorders (i.e., poor distress tolerance, heightened avoidance, impaired cognitive flexibility) as well as symptoms of emotional disorders (i.e., anxiety and depressive symptoms, severity of presenting problems) occur in concordance with the administration of different treatment components of the UP-A. One key question that this study explored was whether changes in the identified modifiable risk factors displayed by individuals with emotional disorders and emotional disorder symptoms occur directly

following the presentation of treatment components, or whether changes might instead be staggered throughout treatment. Within this study, single-case analytic strategies were employed, including the application of a multiple-baseline design and novel modeling techniques (Barlow & Nock, 2009; Jarrett & Ollendick, 2012; Manolov, Gast, Perdices, & Evans, 2014; Parker & Hagan-Burke, 2007), to characterize changes in facets of neuroticism and emotional disorder symptoms during the implementation of the UP-A. Treatment-based change was demonstrated by within treatment improvements, at both group and individual levels, in regard to symptoms of anxiety and depression, presenting problems, and facets of neuroticism, along with clinician-rated severity and impairment in relation to emotional disorders. While various patterns of change emerged throughout treatment on an individual level, the most robust findings involved changes in anxiety, experiential avoidance, and distress tolerance and, for specific subjects, changes in depression. Interestingly, while anxiety changed primarily linearly throughout treatment, experiential avoidance tended to change more pointedly following the introduction of relevant treatment components, and results were subject-dependent with regard to trajectories of change in depression and distress tolerance. Overall, change in experiential avoidance and distress tolerance tended to occur simultaneously to reductions in emotional disorder symptoms. This study helps to clarify the course of expected change in adolescent-reported variables believed to be common among a range of emotional disorders during a transdiagnostic treatment, as well as provides preliminary information regarding how to tailor the UP-A for individuals with different clinical profiles (e.g., high experiential avoidance, low distress tolerance, primary anxiety, significant depression).

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Chapter 1: Introduction

Anxiety, depression, and obsessive-compulsive and related disorders (referred to here collectively as emotional disorders) are among the most prevalent mental health concerns for children and adolescents (Merikangas et al., 2010). Prevalence rates of emotional disorders increase significantly during late childhood and adolescence (Ollendick, Shortt, & Sander, 2005; Strauss, Last, Hersen, & Kazdin, 1988). The increased incidence of these issues during this period is concerning, as over-use of emotionally-driven behaviors (e.g., avoidance, escape, aggression, etc.) may impair healthy development across social, academic, and family domains (Bittner et al., 2007; Brunner et al., 2014; Garber & Weersing, 2010; Goodwin, Fergusson, & Horwood, 2004; Strauss, Last, et al., 1988).

Theoretical work suggests that emotional disorders not only have high levels of symptom overlap but also share certain underlying temperament or "higher-order" factors such as high neuroticism and low extroversion (Barlow et al., 2014). Neuroticism, a temperament or personality-related construct often displayed by individuals with emotional disorders, may be characterized by low distress tolerance or high distress aversion, high negative affect, and high resultant behavioral and/or emotional avoidance (Barlow et al., 2014; Tonarely, Sherman, & Ehrenreich-May, 2017). A recent confirmatory factor analysis looking at neuroticism as a latent factor influencing emotional disorder symptoms among adolescents supports this theory of neuroticism in youth having clinically-significant emotional disorder symptoms, with low distress tolerance, high negative affect, and high experiential avoidance loading strongly onto this hypothesized latent factor (Tonarely et al., under review). Although, from a diagnostic

perspective, emotional disorders present in varied ways (e.g., as anxiety disorders, depression and other mood disorders, trauma and stressor related disorders, obsessive-compulsive spectrum disorders, somatic symptom disorders, etc.), they all appear to be maintained to some extent by affected individuals' maladaptive means of responding to negative or uncomfortable emotion states, likely influenced by varying facets of neuroticism. Transdiagnostic treatments employing core dysfunction approaches, defined as such due to their attendance to constructs that may be core to the development and maintenance of a range of (emotional) disorders, may ameliorate symptoms more broadly by reducing facets of neuroticism serving as modifiable risk factors across emotional disorders targeted (Marchette & Weisz, 2017). Examples of such an approach include the Unified Protocols for Transdiagnostic Treatment of Emotional Disorders in Children and Adolescents (UP-C and UP-A, respectively; Ehrenreich-May et al., 2018). The UP-C and UP-A might lead to the successful treatment of an array of emotional disorders in youth by targeting facets of neuroticism common across these frequently co-occurring problems (Garber & Weersing, 2010; Merikangas et al., 2010), including low distress tolerance, heightened experiential avoidance, and impaired cognitive flexibility (Barlow et al., 2014; Ehrenreich, Goldstein, Wright, & Barlow, 2009; Ehrenreich-May et al., 2017; Ehrenreich-May, Queen, Bilek, Remmes, & Marciel, 2014). Theoretically, specific components of the unified protocols modify each of these facets of neuroticism at varying points in treatment by modifying an individual youth's cognitions and behavioral responses to strong or intense emotional experiences, ultimately resulting in a reduction in symptoms of emotional disorders. See Figure 1 for an overview of how neuroticism and its facets theoretically lead to emotional disorder symptoms.

Core dysfunction-focused treatments for adults have been shown to lead to greater symptom reductions in individuals with multiple, co-occurring emotional disorders, as compared to treatment as usual, with improvements occurring in both principal and comorbid diagnoses (McEvoy, Nathan, & Norton, 2009). Furthermore, efficacy trials of transdiagnostic treatments for youth have provided some initial evidence suggesting improvements in both in principal and co-occurring disorders following treatment (Ehrenreich, Goldstein, Wright, & Barlow, 2009; Ehrenreich-May et al., 2017; Ehrenreich-May, Queen, Bilek, Remmes, & Marciel, 2014; Chu et al., 2016, Kennedy, Bilek, & Ehrenreich-May, 2018). Thus, an important next step is to understand whether such treatments produce changes in key facets of neuroticism believed to underscore symptom relief across a range of emotional disorders in youth and adults. This investigation takes one early step in addressing this gap in the transdiagnostic treatment literature for youth.

The Unified Protocols for Transdiagnostic Treatment of Emotional Disorders

One leading transdiagnostic, cognitive-behavioral therapy (CBT) treatment designed to target commonly occurring emotional disorders in adults is the Unified Protocol for Transdiagnostic Treatment of Emotional Disorders (UP; Farchione et al. 2012; Bullis, Fortune, Farchione, & Barlow, 2014, Barlow, Farchione, Sauer-Zavala, et al., 2017). In two recent randomized-controlled trials (RCTs) of the UP, investigators found a large effect size for reductions in the severity of both principal and comorbid diagnoses in a sample of adults with multiple co-occurring (primarily anxiety) disorders (Barlow, Farchione, Bullis, et al., 2017; Farchione et al., 2012). Results also indicated that the UP was superior to a waitlist control condition and comparable to an active

treatment comparison (i.e., diagnosis-specific CBT) in treating a range of co-occurring emotional disorders. Specifically, as compared to individuals who received anxiety-specific CBT, those who were provided the UP completed treatment within a shorter time period (i.e., up to 16 weeks vs. 16-21 weeks), demonstrated relatively lower attrition, and showed comparable symptom reduction at both post-treatment and six-month follow-up points. Such results suggest that this transdiagnostic treatment may serve as an efficient choice for individuals with co-occurring emotional disorders, rather than disorder-specific protocols, which may take more time, require therapists to learn multiple different manuals (to target each co-occurring emotional disorder), and may lead to greater attrition (Bullis et al., 2014).

While a relatively strong evidence base now exists supporting the efficacy of the UP and other transdiagnostic treatments for adults, additional research has been devoted specifically to efficacy trials of transdiagnostic treatments for youth. The Unified Protocols for Transdiagnostic Treatment of Emotional Disorders in Children and Adolescents (UP-C and UP-A, respectively; Ehrenreich-May et al., 2018) are developmentally-sensitive adaptations of the UP that have shown promise as probably efficacious treatments for children and adolescents with both anxiety and depressive disorders in multiple-baseline and open-trial research, in waitlist-controlled RCTs, and in one RCT with an active treatment comparison (Ehrenreich, Goldstein, Wright, & Barlow, 2009; Ehrenreich-May et al., 2017; Ehrenreich-May, Queen, Bilek, Remmes, & Marciel, 2014; Kennedy, Bilek, & Ehrenreich-May, 2018). The focus of the current investigation, the UP-A, includes a variety of both traditional CBT and so-called "third-wave" behavior therapy concepts and techniques, including psychoeducation, awareness strategies,

interoceptive and situational exposure, and behavioral activation, formatted to be applicable across a range of dysregulated emotion states (Kendall, 2011; March, Amaya-Jackson, Murray, & Schulte, 1998; March, Franklin, Nelson, & Foa, 2001; Rapp, Dodds, Walkup, & Rynn, 2013; Schneider et al., 2011; Weisz, McCarty, & Valeri, 2006). See Table 2 for overview of modules and techniques; see Methods section for further elaboration on components of the UP-A.

Both multiple-baseline and open-trial studies of the UP-A demonstrate significant improvements in both anxiety and depression from pre- to post-treatment (Ehrenreich et al., 2009; Trosper, Buzzella, Bennett, & Ehrenreich, 2009). The first study looking at efficacy of the UP-A was a multiple-baseline study by Ehrenreich et al. (2009) (visual inspection used as primary single-case analytic technique) of three adolescents presenting with various anxiety and depressive symptoms and meeting criteria for at least one anxiety or depressive disorder in accordance with the Anxiety Disorders Interview Schedule for DSM-IV, Child and Parent Version (ADIS-IV-C/P; Silverman & Albano, 1996) (i.e., 12-year-old male adolescent with primarily anxiety and worry,16-year-old male with primarily social anxiety, and 16-year old female with generalized anxiety, social anxiety, and depression). This study included a baseline period of two to eight weeks as well as assessments of anxiety and depressive symptoms and diagnoses at pre-baseline, post-baseline, post-treatment (after 13 sessions of treatment), and at six-month follow-up assessment points. Results of this investigation, based on clinician-rated severity of diagnoses (assigned using the ADIS-IV-C/P), provided initial evidence that treatment with the UP-A may successfully ameliorate emotional disorder symptoms.

Specifically, investigators found symptom reductions in all anxiety and depressive disorders across participants at post-treatment, and even greater improvements at the six-month follow-up point.

Trosper, Buzella, Bennett, and Ehrenreich (2009) further investigated the efficacy of the UP-A, via an open trial study of 12 adolescents (ages 12-17, 57% male) with any principal anxiety or depressive disorder (in accordance with the ADIS-IV-C/P) using a 16-session version of the UP-A protocol. Prior to receiving treatment, approximately 42% of the adolescents met criteria for one or more anxiety disorder, 58% had both depressive and anxiety disorders, and no participants had only depressive disorders. Investigators also collected adolescent- and parent-report of anxiety and depressive symptoms. Results of this study revealed significant reductions in clinician-rated severity of all anxiety and depressive disorders reported at pre-treatment by the post-treatment assessment point and that gains were maintained at three-month and six-month follow-up points. Results based on adolescent- parent-reported symptoms of anxiety and depression demonstrated reductions in adolescent (but not parent) report of both anxiety and depressive symptoms from pre- to post-treatment, and adolescent-reported symptoms (but not parent-reported symptoms) continued to decline at the three-month follow-up point. Further, adolescent-reported gains were maintained at the six-month follow-up point.

Results from a delayed-treatment waitlist-controlled RCT of 51 adolescents (12-17 years old) who completed a more flexibly administered version of the UP-A, using a maximum of 21 weekly sessions administered over no more than 24 weeks (Ehrenreich-May et al., 2017) provide additional insight into the efficacy of the UP-A as a transdiagnostic CBT protocol for adolescents with emotional disorders. Similar to

previous studies, adolescent participants had a range of anxiety and depressive disorders, and many had both anxiety and depression (76.47% of youth had both anxiety and depressive disorders). Multiple measures of emotional disorder symptoms were collected at pre-treatment, post-waitlist (for eight-week waitlist condition), mid-treatment, post-treatment, at a three-month follow-up, and at a six-month follow-up assessment, including adolescent- and parent- reported emotional disorder symptoms, adolescent-report of global impairment, clinician-rated global impairment and improvement, and clinician-rated severity of diagnoses (based on the ADIS-IV-C/P). 23 participants in the treatment arm completed at least 8 sessions of the UP-A and 19 individuals in the waitlist arm completed 8 sessions or more of treatment after the waitlist period (considered completers).

Results of this initial RCT suggest that the UP-A conveys large effects from pre- to post- treatment in some of these measures of anxiety and depression (particularly clinician-rated severity of principal diagnosis and total diagnostic severity via the ADIS-IV C/P and clinician-rated global improvement). Further, results indicate that individuals in the UP-A condition showed improvement on all self-, parent- and clinician-rated measures of symptomology and impairment at eight weeks of treatment (mid-treatment) and at post-treatment as compared to individuals in the waitlist condition (at the end of the eight-week waitlist period). As expected, slopes of symptom change from post-treatment to follow-up points pointed to much slower rates of change than during treatment, although marginal improvement did continue across measures (Ehrenreich-May et al., 2017).

Finally, results from one recent study focusing on change over time in adolescents who completed either the previously mentioned UP-A open trial or the RCT (Queen, Barlow, & Ehrenreich-May, 2014) began to answer questions about when and at what rate changes in symptoms of anxiety and depression occur during UP-A treatment using piecewise latent growth curve models (LGCM) to model symptom trajectories over the course of treatment (using pre-, mid-, and post-treatment assessment points) and from post-treatment through a six-month follow-up assessment. Specifically, authors examined trajectories of change in 59 adolescents (ages 12-17 years) who completed at least eight sessions of the UP-A. Changes in adolescent-reported (but not parent-reported) anxiety and depressive symptoms varied between individuals in this analysis. However, significant changes and rates of change between anxiety and depressive symptoms occurred similarly across subjects. Interestingly, one difference between trajectories of change in anxiety and depressive symptoms observed was that anxiety symptoms continued to decrease from post-treatment assessments through the six-month follow-up point, while depressive symptoms appeared to plateau after post-treatment. This study was the first to begin to investigate when and how symptoms relevant to different presentations of emotional disorders (e.g., anxiety, depression) change throughout UP-A treatment. Additionally, findings indicating that changes in depression were relatively less robust overall led to the restructuring of the UP-A and UP-C, involving the movement of certain components of the treatment targeting depression (i.e., opposite action/behavioral activation) earlier in order to maximize opportunity for adolescents to benefit from this skill throughout the intervention (Ehrenreich-May et al., 2018).

Since results of initial efficacy trials suggest that transdiagnostic treatments for emotional disorders are effective, research focus has recently shifted in an effort to figure out *why* these treatments work, namely by determining how changes in facets of neuroticism (i.e., low distress tolerance, heightened experiential avoidance, impaired cognitive flexibility) correspond to treatment-based change in disorder symptoms and severity (Bullis, Fortune, Farchione, & Barlow, 2014; Farchione et al., 2012). Within the adult literature, the recent investigation of several of these facets of neuroticism has suggested that changes in these variables, including maladaptive emotion regulation strategies, negative affect, fear of negative emotions, and anxiety sensitivity, are significantly related to changes in symptom measures (Conklin et al., 2015; Farchione et al., 2012; Sauer-Zavala et al., 2012). Further, one study showed that the implementation of certain core treatment components of the UP (i.e., Emotional Awareness and Cognitive Flexibility/Cognitive Reappraisal) temporally preceded changes in transdiagnostic treatment targets, namely mindfulness and reappraisal skills, as well as anxiety and depressive symptoms in an adult with a range of emotional disorder symptoms (Boswell, Anderson, & Barlow, 2014).

Several recent studies have examined change in facets of neuroticism during transdiagnostic treatments for youth. Recently, Chu et al. (2016) conducted a pilot waitlist-controlled RCT of a transdiagnostic group behavioral activation and exposure therapy program (GBAT; Chu et al., 2016) for young adolescents with clinical or sub-clinical anxiety or depression and began to ask important questions about whether transdiagnostic factors including negative thoughts and experiential avoidance might be targeted through psychological intervention. Within this study, investigators examined

clinician-rated severity of diagnoses, clinician-rated global impairment, and adolescent-reported anxiety and depressive symptoms, as well as adolescent-report on negative thoughts and experiential avoidance from pre- to post-treatment and at a four-month follow-up point. Results indicated that the transdiagnostic treatment condition was associated with greater remission rates post-treatment, as compared to the waitlist condition, in (clinician-rated) principal and secondary diagnoses as well as in (clinician-rated) clinical global impairment severity ratings. Although symptom-based outcomes (adolescent-reported depression and anxiety symptoms) were not significantly different at post-treatment, in terms of change over time in transdiagnostic factors, these authors found a marginally significant treatment effect in adolescent-report of both automatic thoughts (decreased negative thoughts; medium effect size) and experiential avoidance (increased behavioral activation; large effect size). However, only treatment-based changes in negative thoughts remained significant at the four-month follow-up assessment.

Additionally, Kennedy, Bilek, & Ehrenreich-May (2018) recently conducted a RCT comparing the Unified Protocol for Transdiagnostic Treatment of Emotional Disorders in Children, a 15-session downward adaptation (and group treatment) protocol for children with emotional disorders (UP-C; Bilek & Ehrenreich-May, 2012) to an established group CBT intervention for children with anxiety disorders. The 47 children who participated in this trial were between the ages of 7 and 12 years (46% female) and had many different emotional disorders including anxiety, depression, and obsessive-compulsive spectrum disorders. Youth were assessed via clinician, child- and parent-report of symptoms, and also completed measures of emotion dysregulation, positive and

negative affect, suppression, and cognitive reappraisal at pre- and post-treatment, and at a six-month follow-up point. Child- and parent-report measures were also obtained at mid-treatment (between weeks 7 and 8 of treatment). No differences in anxiety symptoms were observed between the UP-C and the anxiety-focused CBT treatment arms, with both treatments conveying significant improvements in child- and parent-reported anxiety symptoms (Kennedy, Bilek, & Ehrenreich-May, 2018). Both treatments also resulted in approximately 55-60% remission of clinician-rated principal diagnosis and 50-57% remission rates of all emotional disorders at post-treatment clinical interview. Interestingly, parent-reported depressive symptoms were significantly lower (controlling for pre-treatment scores) within the UP-C condition as compared to the anxiety-focused CBT condition at post-treatment. The UP-C (as compared to the anxiety-focused CBT program) also conferred greater decreases in sadness dysregulation and impaired reappraisal over the course of treatment (Kennedy et al., 2018).

Considering that transdiagnostic treatments for children (UP-C) and adolescents (GBAT; UP-A) have demonstrated efficacy in reducing both anxiety and depressive symptoms along with some initial success targeting transdiagnostic factors in youth, including sadness dysregulation, impaired reappraisal, repetitive negative thinking (UP-C; GBAT), one sensible next step in investigating the utility of the UP-A is to examine patterns of change in variables such as distress tolerance, experiential avoidance, and cognitive flexibility as well as emotional disorder symptoms (i.e., anxiety and depressive symptoms, presenting problems) during treatment (i.e., immediately following implementation of a specific component, gradually throughout treatment, immediately following or gradually following changes in another symptom cluster).

Facets of Neuroticism Targeted by the UP-A

The UP-A may successfully ameliorate emotional disorder symptoms (e.g., anxiety and depressive symptoms, obsessive-compulsive symptoms, etc.) by targeting transdiagnostic factors including features associated with neuroticism (Kennedy & Ehrenreich-May, 2016; Leyro, Zvolensky, & Bernstein, 2010; MacDermott, Betts, Gullone, & Allen, 2009; Maner & Schmidt, 2006; McLaughlin & Nolen-Hoeksema, 2011; Muris, Roelofs, Rassin, Franken, & Mayer, 2005; Tonarely & Ehrenreich-May, under review; Tonarely et al., under review; Wong & Moulds, 2011). Facets of neuroticism under investigation during this study included: low distress tolerance, high emotional/experiential avoidance, and impaired cognitive flexibility (i.e., increased rumination, reduced ability to restructure automatic distressing thoughts) (Barlow et al., 2014; Tonarely et al., under review). Broadly, according to Barlow's (2014) model of neuroticism, individuals with high levels of this trait or temperament tend to experience greater levels of distress in response to internal/external cues (i.e., low distress tolerance). As a result of this exaggerated response to distress, such individuals tend to believe the world is a dangerous place and feel unable to cope with distress. Such beliefs lead these individuals to have more frequent negative thoughts, difficulty reappraising these thoughts, and a heightened likelihood of responding to distressing thoughts via rumination (i.e., impaired cognitive flexibility). Finally, with this perceived inability to handle distressing or threatening situations and difficulty foreseeing positive outcomes, individuals with elevated neuroticism resort to behavioral strategies to prevent the

experience of distressing emotions, such as cognitive (suppression) and experiential avoidance. See Figure 1 for a summary of the theoretical model indicating how each of these factors is expected to relate directly to neuroticism.

Low distress tolerance, or the reduced ability (or low perceived ability) to handle uncomfortable physiological sensations or cognitions associated with strong or intense emotions (Leyro et al., 2010; Simons & Gaher, 2005; Tull & Gratz, 2008) is one factor associated with neuroticism. Such a perceived inability to cope with or endure emotional experiences, commonly observed in adults with clinically interfering emotional disorders (Leyro et al., 2010; Simons & Gaher, 2005; Tull & Gratz, 2008), often results in subsequent avoidance or withdrawal behaviors, and the propagation of emotional disorder symptoms (Leyro et al., 2010; Simons & Gaher, 2005; Tull & Gratz, 2008). Adolescents with emotional disorders likely experience a similar pattern. For example, an adolescent with social anxiety might feel overwhelmed by uncomfortable physiological sensations associated with anxiety when facing triggering situations (e.g., a school dance) and develop the belief that he cannot cope with being in such a situation if it were to come up again. Such beliefs about one's ability to handle distress may result in avoidance of situations in which one might again experience discomfort. This resultant pattern may contribute to the persistent avoidance central to many emotional disorders (APA, 2013). Increasing an adolescent's sense of self-efficacy to recognize and tolerate distress associated with strong emotions when evoked is an important goal of the UP-A (Ehrenreich-May et al., 2018; Ehrenreich-May et al., 2014). This is theoretically accomplished using treatment components that target awareness techniques, including interoceptive awareness, present-moment awareness, and non-judgmental awareness.

Impaired cognitive flexibility, or a reduced ability to reappraise negative automatic thoughts without resorting to ruminative strategies (Cox, Enns, & Taylor, 2001; Martin & .Dahlen, 2005; McLaughlin & Nolen-Hoeksema, 2011; Muris et al., 2005; Wilkinson, Croudace, & Goodyer, 2013; Yook, Kim, Suh, & Lee, 2010) results from the tendency of individuals with high levels of neuroticism to interpret the world as a dangerous place and themselves as unable to cope with this danger (Barlow et al., 2014). Such core beliefs result in several maladaptive processes. First, adolescents and adults with emotional disorders are likely to engage in the process of rumination (McLaughlin & Nolen-Hoeksema, 2011; Wilkinson et al., 2013; Yook et al., 2010), which can result in increased distress in response to already intense emotions experienced by individuals with these disorders (Cox, Enns, & Taylor, 2001; Martin & Dahlen, 2005; Muris, Roelofs, Rassin, Franken, & Mayer, 2005). For example, an adolescent with social anxiety and depression may think over and over about how difficult it was to speak in front of her class and continue to analyze what she might have done wrong in the situation, interpreting the event as even more anxiety-provoking than it seemed at first. Second, adolescents and adults with emotional disorders and symptoms of such have a tendency not to use reappraisal effectively to more flexibly understand themselves and the world in ways that are more productive and helpful and less negative or pessimistic (Carthy, Horesh, Apter, & Gross, 2010; Garnefski & Kraaij, 2006; Hughes, Gullone, & Watson, 2011; Martin & .Dahlen, 2005). Therefore, a depressed adolescent might have one fight with a friend, and, instead of appraising the situation as contextual in nature, may draw conclusions about his failure to be a good friend in general as a result of one fight (Cox et al., 2001; Martin & .Dahlen, 2005; McLaughlin & Nolen-Hoeksema, 2011;

Muris et al., 2005; Wilkinson et al., 2013; Yook et al., 2010). One goal of the UP-A is increasing cognitive flexibility, using treatment components that promote the identification of negative automatic thoughts, cognitive reappraisal, and opposite actions for rumination (See Table 2 for description of components of UP-A).

Those with elevated neuroticism also tend to *avoid situations or thoughts that provoke uncomfortable emotions or withdraw from such situations or stimuli altogether* (Barlow et al., 2014, APA, 2013). For example, an anxious adolescent might begin to avoid social situations if she consistently feels nervous or uncomfortable speaking to people. She may realize that it is easier to avoid the situation altogether than to try to manage her emotional disorder symptoms (Hirsch & Clark, 2004; Maner & Schmidt, 2006). Over time, avoidance of or withdrawal from uncomfortable emotional experiences reinforces the idea that distressing emotions such as anxiety and depression are dangerous and that avoidance, withdrawal, or escape behavior is the only way to cope. A depressed adolescent may similarly avoid situations due to lack of interest in participating in activities, a lack of enjoyment of previously enjoyed activities (anhedonia), or other symptoms of depression, including fatigue and low motivation (APA, 2013) . A third goal of the UP-A, therefore, is increasing one's ability to approach uncomfortable and emotion-inducing situations that might have previously been avoided or withdrawn from using emotion-focused behavioral experiments and situational exposures (Kendall, Furr, & Podell, 2010).

Assessing Treatment-Based Change

As mentioned, one important next step towards understanding how treatments like the Unified Protocols operate to produce positive youth treatment outcomes is investigating whether the implementation of these treatments actually leads to symptom change via change in core dysfunctions associated with a given approach (Marchette & Weisz, 2017). However, such investigations, particularly for previously evaluated or established evidence-based treatments like the UP-A, require large sample sizes and randomized designs. While this approach is being taken to investigate change distress tolerance and experiential avoidance during the course of the UP-A in an NIMH-funded effectiveness trial, the parameters of such are not ideally controlled for the evaluation of the timing and sequence of changes within individual subjects. Single-case design may provide an alternative methodology for the exploratory investigation of changes in various aspects of neuroticism, which may lead to reductions in surface-level symptoms of emotional disorders, as well as the timing of such changes. Knowledge gained from single-case investigations can be used to support future, larger scale trials. Further, smaller-scale studies could also provide more rapid dissemination of findings about key change processes in an evidence-based treatment like the UP-A.

Multiple-baseline designs and other forms of single-case design allow for tracking of the symptom status of one (or a few) study participant across an intervention by comparing baseline (control) and intervention (treatment) phases. As a form of time series analysis, multiple-baseline single-case design can address several questions. One type of question single-case design studies can address is that of improvement (i.e., significant reduction in symptoms over treatment). The second type of question that these

studies can answer is that of process of change (i.e., how and when do symptoms change). One limitation of this approach is that it is primarily used to assess change over time in few, non-randomized individuals. Therefore, the generalizability of results obtained via this statistical approach is limited by small sample size and lack of randomization (Manolov et al., 2014; Parker & Hagan-Burke, 2007).

The sample size limitations inherent in single-case approaches like a multiple-baseline design are at least partially ameliorated by the use of many time points to assess change in study variables. Essentially, multiple-baseline single-case analyses gain statistical power by integrating data from many time points instead of data from as many different subjects as other statistical programs do (Task Force on Promotion and Dissemination, 1995). Using a multiple-baseline approach enhances statistical control in such studies. By randomly assigning research participants to baseline conditions (2, 3, and 4 weeks in this study and in similar recent studies utilizing single-case analytic strategies), investigators are better able to use data collected over a short period of time (baseline period) to assess stability in variables of interest prior to the implementation of intervention procedures and establish greater assurance in subsequent changes observed. Since, with multiple-baseline design, each subject serves as his or her own control, the number and independence of baseline observations define the clarity of the design.

While large RCTs have contributed invaluably to the development and evaluation of evidence-based psychosocial treatments, multiple-baseline designs and other single-case approaches are unique in that they can potentially result in data sets indicating if, when, and how changes occur across treatment using a relatively low number of participants. Additionally, conducting a multiple-baseline design study is not nearly as

time-intensive as an RCT, and requires a substantially lower financial investment. Often, such a design is ideal when investigators aim to answer questions about small, time-bound changes in symptomology during the course of treatment, changes throughout treatment in individuals with rare diseases (in cases when it would be very difficult to recruit a large enough number of participants to conduct a full RCT), treatment-based changes in individuals with a very specific disorder presentation (e.g., specific comorbidities), or when evaluating the ability of novel measures to assess change during treatment (Kazdin, 1997). It may be one means for assessing the process of change in a developing intervention such as the UP-A prior to investing in a larger-scale trial of such processes.

Recently, an increase in the statistical rigor used in single-case studies has resulted in better statistical management of single-case design. This change has brought the approach back into favor (Barlow & Nock, 2009; Manolov et al., 2014; Parker & Hagan-Burke, 2007). Specifically, authors of studies examining processes of change over time within CBT paradigms (both transdiagnostic and disorder-specific) have begun to make greater use of the unique ability of single-case design to allow one to better understand trajectories and timing of change in individuals throughout treatment (Barlow & Nock, 2009; Jarrett, 2013; Jarrett & Ollendick, 2012; Manolov, Gast, Perdices, & Evans, 2014; Parker & Hagan-Burke, 2007). For example, Jarrett and Ollendick (2012) and Jarrett (2013) examined change over time in symptoms of attention-deficit/ hyperactivity disorder (ADHD) and anxiety in eight children with both ADHD and anxiety disorders using a combination of statistical approaches common in single-case studies. Strategies included the use of non-parametric Friedman tests and Wilcoxon tests

to evaluate group-level change from pre- to post-treatment and from post-treatment to follow-up points (one-week follow-up, six-month follow-up). Authors also used Simulation Modeling Analysis (SMA; Borckardt et al., 2008), a single-case analytic approach involving the evaluation of correlations between patterns of change within an observed data stream from an individual subject (i.e., change in symptoms and slope) with those from a specified slope vector, to investigate more specifically trajectories of change over the time course of treatment. Authors found significant reductions in both ADHD and anxiety symptoms throughout treatment. The use of SMA allowed investigators to also uncover patterns in timing of symptom-based changes. Specifically, Jarrett and Ollendick (2012) found that reductions in ADHD and anxiety symptoms occurred concurrently.

Boswell, Anderson, and Barlow (2014) used similar single-case methodology to begin to elucidate patterns of change during usage of the UP. Within this study, weekly data was again collected from baseline and treatment phases, and statistical modeling techniques (univariate, multivariate and interrupted time series analyses) were employed to clarify when and in what order different treatment-based changes occurred in a single individual participant. Authors showed that changes in anxiety, depression, and transdiagnostic factors occurred at expected times during a study of a single adult case treated with the original version of UP (Boswell et al., 2014). In this study, clinically significant decreases in depression and anxiety from baseline to post-treatment were observed, as well as clinically significant increases in transdiagnostic treatment targets

that may serve as buffers against the effects of facets of neuroticism on functioning (i.e., increases in mindfulness and reappraisal), which occurred after the presentation of theoretically relevant core principles of the UP.

Current Investigation

The current study focused on elucidating how treatment techniques in the UP-A might lead to change in direct cognitive, behavioral, and physiologic targets of the treatment and overall symptoms of emotional disorders in adolescents, as well as the possible timing of such changes. An increased understanding of how the UP-A works contributes to an effort to clarify expected change in variables believed to be common among a range of emotional disorders (i.e., neuroticism and related constructs), as well as the relationship of such changes to overarching symptom reductions in youth with varying presentations of emotional disorders.

The most important questions addressed using a multiple-baseline design were questions of change over time (i.e., looking for patterns of change during treatment). Analyses of such allow for the simultaneous tracking of change in multiple facets of neuroticism and symptoms being examined throughout treatment. Due to high levels of similarity between the research questions asked by Jarrett and Ollendick (2012) and Jarrett (2013) those posed in the present investigation, analyses conducted were similar to those previously implemented by these authors (i.e., non-parametric Friedman tests and Wilcoxon tests for group level analyses along with SMA for single-case analyses).

Specifically, measures of dependent variables of interest, including distress tolerance, experiential avoidance, cognitive flexibility, and anxiety and depressive symptoms were examined following introduction to specific, theoretically-related

treatment components (independent variables) were completed over the course of 16 sessions of UP-A treatment. Non-parametric Friedman tests, Wilcoxon tests, and several SMA models were run on a limited number of subjects (7 adolescents) to better understand relationships between independent (treatment components theoretically targeting facets of neuroticism and emotional disorder symptoms) and dependent (measures of facets of neuroticism and emotional disorder symptoms) variables over the span of UP-A treatment. SMA also allows for cross-lagged correlations to be conducted between independent variables of interest, which were used to explore relationships between changes in distress tolerance, experiential avoidance, and cognitive flexibility and reductions in emotional disorder symptoms (i.e., anxiety, depression, presenting problems) within individual subjects.

In summary, emotional disorders in youth are prevalent and impairing (Bittner et al., 2007; Brunner et al., 2014; Garber & Weersing, 2010; Goodwin et al., 2004; Strauss, Lahey, Frick, Frame, & Hynd, 1988), and transdiagnostic approaches such as the UP-A allow for the treatment of many different types of emotional problems within a single transdiagnostic approach (Barlow, Farchione, Bullis, et al., 2017; Ehrenreich-May et al., 2018; Ehrenreich-May et al., 2017; Farchione et al., 2012). While several recent studies have provided evidence for the efficacy of the UP-A (e.g., Ehrenreich, Goldstein, Wright, & Barlow, 2009; Ehrenreich-May et al., 2017), few studies answer questions about when or how important changes take place during a course of the UP-A.

This study was used to assess change over time during the application of a transdiagnostic, CBT program, the UP-A. Specifically, the aims of this study were: (1) to examine how distress tolerance, experiential avoidance, and cognitive flexibility change

following the completion of core treatment components of the UP-A, (2) to investigate how symptoms of emotional disorders (i.e., anxiety, depression, severity of presenting problems) change following the completion of core treatment components of the UP-A, and (3) to explore associations between changes in distress tolerance, experiential avoidance, and cognitive flexibility and emotional disorder symptoms. It was predicted that adolescents with emotional disorders would experience reductions in disorder-specific symptoms (i.e., anxiety and depressive symptoms) and that these would temporally follow changes in distress tolerance, experiential avoidance, and cognitive flexibility.

Specific Aims

Aim 1: Investigate relationships between the use of UP-A treatment components and changes in measures of facets of neuroticism.

Hypothesis 1: The administration of core modules 2-7 of the UP-A would result in observable changes in measures of distress tolerance, experiential avoidance, and cognitive flexibility. Based on previous studies (Boswell et al., 2014; Queen et al., 2014), it was expected that adolescents with emotional disorders would show significant reductions in total scores on measures of these variables during UP-A treatment. More specifically, these changes would occur after the introduction of relevant core principles and related techniques. This study was designed to determine whether change in distress tolerance, experiential avoidance, and cognitive flexibility would occur directly following the presentation of treatment components, or whether changes might instead be staggered throughout treatment. In order to investigate when and how such changes occurred, adolescent-reported measures of distress tolerance, experiential avoidance, and cognitive

flexibility were collected weekly. Adolescents' scores on the measure of distress tolerance were expected to increase throughout treatment and begin to increase following implementation of core module 6, which is designed to most strongly enhance this ability. A behavioral measure of distress tolerance (described in the Methods section) was used to assess group-level changes in distress tolerance at pre-, mid-, and post-treatment assessment points and served as supplemental to the adolescent-reported distress tolerance measure. Changes in distress tolerance measured by this task were expected to occur throughout treatment, but especially within the second half of treatment, following the presentation of module 6. Scores on measures of cognitive flexibility were expected to increase during treatment, beginning to increase following the introduction of core module 5, which most strongly features this skill. Finally, adolescents' scores on the measure of experiential avoidance were expected to decrease overall, indicating a reduction in avoidance, and begin to decrease following the implementation of core modules 3 and 7, which again most fully introduce strategies to decrease avoidance.

Aim 2: Investigate relationships between the use of UP-A treatment components and changes in measures of symptoms of emotional disorders (i.e., symptoms of anxiety and depression, severity of presenting problems).

Hypothesis 2: Based on knowledge obtained from previous RCTs focusing on the treatment of anxiety, depressive and related disorders individually (Ishikawa, Okajima, Matsuoka, & Sakano, 2007; James, James, Cowdrey, Soler, & Choke, 2013; Kendall et al., 2010), it was anticipated that significant changes in symptoms of emotional disorders (i.e., anxiety and depression) would temporally follow the introduction of treatment components theoretically related to distress tolerance, experiential avoidance, and

cognitive flexibility, and that the severity of emotional disorder symptoms would decrease overall from pre- to post-treatment. Based on previous studies (Boswell et al., 2014; Queen et al., 2014), it was expected that adolescents with emotional disorders would show significant reductions in total anxiety and depression scores and in severity ratings of presenting problems from pre- to post-treatment. Additionally, symptoms of anxiety were expected to decrease most significantly around the introduction to exposure, which is hypothesized to target anxiety most directly, while depressive symptoms were hypothesized to change most uniquely following the introduction to problem solving, which is often prominently featured in treatments targeting depression more singularly in children (Weisz et al., 2006).

Exploratory Aim 3: Explore patterns and sequencing of reductions in distress tolerance, experiential avoidance, and cognitive flexibility and symptoms of emotional disorders (i.e., symptoms of anxiety and depression, severity of presenting problems) throughout treatment.

Exploratory Hypothesis 3: Based on the idea that implementation of core treatment components was predicted to result in direct changes in distress tolerance, experiential avoidance, and cognitive flexibility (Kennedy & Ehrenreich-May, 2016; Leyro et al., 2010; MacDermott et al., 2009; Maner & Schmidt, 2006; McLaughlin & Nolen-Hoeksema, 2011; Muris et al., 2005; Tonarely & Ehrenreich-May, under review; Wong & Moulds, 2011), it was also predicted that decreases in anxiety and depressive symptoms would occur after changes in these measures of facets of neuroticism (e.g., increased distress tolerance followed by decreased emotional disorder symptoms).

Chapter 2: Method

Participants

Participants were eight clinically anxious and/or depressed adolescents between the ages of 13 and 17 years ($M = 14.94$, $SD = 1.36$; 62.5% female). Youth were assessed using the Anxiety Disorders Interview Schedule for the DSM-5, Child Version (ADIS-5-C/P; Silverman & Albano, in preparation), a revised version of a well-established, semi-structured interview assessing youth emotional disorders that has excellent inter-rater reliability, test-retest reliability, and adequate convergent validity (Lyneham, Abbott, & Rapee, 2007; Silverman, Saavedra, & Pina, 2001; Wood, Piacentini, Bergman, McCracken, & Barrios, 2002). All participants were recruited through a specialty youth anxiety and depression research clinic at a local university.

Inclusion and Exclusion Criteria

In order to be eligible for this study, youth (a) were between 13 and 17 years of age, (b) had a primary DSM-5 anxiety or depressive disorder based on results of a diagnostic interview administered by a trained clinician at intake (ADIS-5-C/P), (c) indicated elevated symptoms of depression via adolescent *and/or* parent-report of symptoms (RCADS and/or RCADS-P Depression Subscale Index T-Score $\geq$ 60) and anxiety (RCADS and/or RCADS-P Total Anxiety Subscale Index T-Score $\geq$ 60) at intake, (d) (if relevant) were on a stable dose of any SSRI/SNRI medication for at least one month prior to study enrollment, (e) spoke/read English sufficiently (and had at least one parent who could) to complete all study measures in English, (f) had a legal guardian available to sign study consents, remain present during assessments, and fill out study questionnaires. In addition to failure to meet inclusion criteria above, youth were

excluded from this study if they (a) obtained a Full Scale IQ score below 80 on the

Vocabulary and Matrix Reasoning subtests of an abbreviated IQ test (WASI-II; Maccow,

2011) indicating possible cognitive delays that could interfere with successful

completion of study procedures, or if they (b) were currently receiving psychotherapy

elsewhere. Of note, youth who did not meet criteria for the current study were not

excluded from the overarching baseline assessment process or any subsequent

treatment/clinical research services offered at this specialty clinic, but rather only

excluded from the current investigation. A total of 26 youth were screened for the study.

Of these individuals, 15 adolescents were excluded due to failure to meet inclusion

criteria. In all of these cases, this was specifically due to lack of elevated anxiety and/or

depressive disorder symptoms. Of the 11 eligible individuals, 2 individuals chose to

pursue treatment within the specialty clinic where the current study took place, but

outside of the study itself. 1 individual signed consent to participate in the study, but

immediately following enrollment, dropped out of the study due to inability to commit

time to therapy. The remaining 8 individuals were included within the current

investigation.

Within this sample, principal diagnoses included: generalized anxiety disorder

([GAD]; $n = 3$, 37.5%), social anxiety disorder ($n = 4$, 50%), and co-principal specific

phobia and obsessive-compulsive disorder ([OCD]; n = 1, 12.5%). All participants had a

principal anxiety disorder diagnosis and all participants had additional comorbid

emotional disorder diagnoses, including other anxiety disorders ($n = 7$, 87.5%) and

depressive disorders ($n = 4$, 50%), with the number of comorbid emotional disorder

diagnoses across participants ranging from 2-4 ($M = 2.87$; $SD = 0.64$). Several

participants also had externalizing diagnoses. Dimensional measures of anxiety and depression (described below) were used to supplement diagnostic data and in group-level and single-case analysis of change. Diagnostic features of the sample (including a breakdown of each adolescent's clinical diagnostic profile) are provided in Table 1. A brief case description for each participant can be found in Appendix 1.

The sample was seemingly representative of the larger Miami-Dade County community in which data was collected with 5 youth (62.5%) identified as Hispanic/Latino and 3 youth (37.5%) reporting ethnicity as Non-Hispanic/Latino. Of those Non-Hispanic/Latino participants, 2 (25%) participants reported their race as White, Non-Hispanic and 1 (12.5%) as Asian-American. Participants were largely from middle- to upper-middle class families (Mean family income = $94,750.00, SD = $38, 747.35). 5 (62.5%) of participants had parents who were married at the time of the baseline assessment, while 3 (37.5%) had parents who were divorced. All adolescents within the current study were in high school, although one was home-schooled (Mean grade level = 9.38; SD = 1.60).

Study approval was granted by the Institutional Review Board (IRB). Study personnel obtained parental consent and adolescent assent prior to conducting study procedures.

Design

A non-concurrent multiple-baseline design was used (Kazdin, 1997). Specifically, this type of design includes a series of A-B replications along with randomly assigned baseline periods (2, 3, or 4 weeks in this study). Adolescents and their parents completed questionnaires on a weekly basis (see below for details regarding data collection

procedures). Repeated measures (adolescent- and parent-report of changes in distress tolerance, experiential avoidance, and cognitive flexibility and disorder-specific symptoms) were given weekly throughout treatment with more comprehensive assessment (adolescent- and parent-report as well as clinician-rated clinical severity and diagnostic impressions) occurring at pre-treatment, post-baseline, and post-treatment time points. A supplemental behavioral measure of distress tolerance was administered at pre-, mid-, and post-treatment assessment points. Importantly, the specific combination of analyses used in the current study (nonparametric group-level comparisons to assess change at major time points [pre-, mid-, and post-treatment] as well as Simulation Modeling Analysis [SMA] to assess change over time in an individual) requires measures to be administered at a variety of time points (i.e., pre- and post- treatment, pre-, mid-, and post-treatment; weekly, respectively). Thus, change over time in scores on parent- and child-report measures as well as performance on the behavioral distress tolerance task were examined at pre-, mid-, and post-treatment at a group level, while change over time in weekly measures was examined using weekly data (baseline, treatment repeated measures) at an individual subject level. Further, change over time in clinical interview data was assessed at pre-treatment, post-baseline, and post-treatment time points.

Measures

With the exception of the ADIS-5-C/P and the BIRD task, all study measures are presented in Appendix 1.

Anxiety Disorders Interview Schedule for the DSM-5, Child and Parent Versions (ADIS-5-C/P; Silverman & Albano, in preparation). The ADIS-5-C/P is a downward extension of the Anxiety Disorders Interview Schedule for DSM-5 (ADIS-5;

Brown & Barlow, 2014). It is a semi-structured interview commonly used to assist trained clinicians in the diagnosis of DSM-5 anxiety disorders, mood disorders, and externalizing disorders in children and adolescents and was used in its advance publication format for this investigation. The ADIS-5-C/P (Silverman & Albano, in preparation) includes additional screening questions for other disorders such as psychotic disorders, eating disorders, and somatization disorders that aided evaluators in determining whether an anxiety or depressive disorder is the principal concern for those participants in the current study. The ADIS-5-C/P also allows for the assessment of Clinical Severity Ratings (CSR) for each diagnosis, with scores ranging from 0 to 8, and scores less than 4 indicating sub-threshold levels of disorder-relevant impairment.

Evidence indicates excellent inter-rater reliability for principal diagnoses using the earlier version of the ADIS for youth, the ADIS-IV-C/P ($\kappa = 0.92$) and anxiety diagnoses ($\kappa = 0.8\text{-}1.0$), as well as good agreement on comorbid diagnoses ($\kappa = 0.65\text{-}0.77$) (Lyneham et al., 2007). Silverman et al. (2001) demonstrated excellent test-retest reliability on anxiety disorders symptoms scales ranging from 0.81 to 0.99 for the child interview and 0.86 to 0.99 for the parent interview. The ADIS-IV-C/P also showed adequate convergent validity, with children meeting criteria for social anxiety disorder on the ADIS-IV-C/P scoring significantly higher on the MASC Social Anxiety Scale than children with other anxiety diagnoses, and with those meeting diagnostic criteria for separation anxiety on the ADIS-IV-C/P scoring significantly higher on the MASC Separation and Harm Avoidance Scales than children with other anxiety disorders (Wood et al., 2002). Psychometrics on the ADIS-5-C/P are currently being investigated, but the

measure's structure and components mirror those of the ADIS-IV-C/P. During the current study, a trained and reliable clinician administered the ADIS-5-C/P in order to determine emotional disorder diagnoses and severity at pre-, post-baseline, and post-treatment assessment points. The post-treatment CSRs for all emotional disorders were used to derive a dichotomously-rated variable indicating overall remission (0 = at least one CSR at or above 4/no remission; 1 = all CSRs below 4/remission).

Clinician Global Impression-Severity Scale (CGI-S; Guy, 1976). The CGI-S is a clinician-rated measure of global severity for all diagnosed emotional disorders, with higher scores corresponding to more severe impairment. This is a single-item measure rated on a 7-point Likert scale from 1 (normal, not at all ill) to 7 (among the most extremely ill of patients), relative to patients with the same diagnosis. The CGI-S was rated by clinicians at pre-treatment, post-waitlist, and post-treatment time points and used as an outcome variable for group-level analyses within this study.

Clinician Global Impression-Improvement Scale (CGI-I; Guy, 1976). The CGI-I is a measure of global improvement in severity of all emotional disorder diagnoses, with higher scores corresponding to less improvement. Similar to the CGI-S, the CGI-I is rated on a 7-point Likert scale ranging from 1 (very much improved) to 7 (very much worse). All improvement is compared to pre-treatment severity. A score of 1 (very much improved) or 2 (much improved) at post-treatment indicated meaningful improvement in emotional disorder severity and was considered indicative of treatment response, consistent with other trials (e.g., Walkup et al., 2008). Specifically, individuals were identified as 0 = not a responder (with CGI-I scores of greater than 2) or 1 = treatment responder (with CGI-I scores of 1 or 2).

Emotion Regulation Questionnaire-Child and Adolescent Form (ERQ-CA;

Gullone & Taffe, 2012; MacDermott et al., 2009). Adolescents completed the

Reappraisal Scale of the Emotional Regulation Questionnaire-Child and Adolescent

Form (ERQ-CA; Gullone & Taffe, 2012; MacDermott et al., 2009). The ERQ-CA is a

10-item, self-report measure of emotion regulation comprised of two scales: reappraisal

and suppression. Respondents indicate how much they agree with each item using

"strongly disagree", "disagree", "half and half", "agree", or "strongly agree."

Adolescents completed only the ERQ-CA Reappraisal Scale at each session throughout

their 16 weeks of therapy. Psychometric analyses have determined the ERQ-CA to have

good internal consistency, stability over a 12-month period, and good construct and

convergence validity in a sample of adolescents ages 10-18 (Gullone & Taffe, 2012;

MacDermott et al., 2009). Within the present sample, internal consistency for the ERQ-

CA Reappraisal Scale was good ($\alpha = 0.84$). However, test-retest reliability for the ERQ-

CA Reappraisal Scale was poor (0.42), indicating that caution should be taken in using

the ERQ-CA in repeated measures analysis. The ERQ-CA Reappraisal Scale served as a

measure of subjects' ability to use **cognitive flexibility** to think differently about negative

and/or ruminative thoughts characteristic of emotional disorders such as anxiety and

depression. However, due to poor test-retest reliability within the current sample (see

Table 3), information obtained via repeated measures analyses with regard to when

cognitive flexibility changes throughout treatment was interpreted with caution.

Distress Tolerance Scale (DTS; Leyro, Bernstein, Vuljanovic, McLeish, &

Zvolensky, 2011; Simons & Gaher, 2005; Tonarely & Ehrenreich-May, under

review). Adolescents completed the General Distress Intolerance (GDI) subtest of the

Distress Tolerance Scale (DTS; Leyro, Bernstein, Vuljanovic, McLeish, & Zvolensky,

2011; Simons & Gaher, 2005) weekly throughout treatment, which has been determined

to be a reliable summary score representing overall distress intolerance in Chinese youth

(You & Leung, 2012). The DTS is a 15-item, self-report measure of distress tolerance.

Although psychometrics of the English version of the scale were originally obtained in

adult samples (Leyro, Bernstein, Vujanovic, McLeish, & Zvolensky, 2011; Simons &

Gaher, 2005), recent preliminary psychometric analyses suggest that its factor structure is

similar in children and adolescents (Tonarely & Ehrenreich-May, under review), with the

12-item DTS-GDI subscale serving as a valid overall measure of general distress

intolerance. The DTS-GDI, completed weekly throughout treatment, served as a measure

of subjects' ability to deal with or tolerate uncomfortable emotions (**distress tolerance**)

and provided information about how and when this ability changes during treatment.

Since test-retest reliability has not yet been tested in American youth for the DTS-GDI,

this was assessed further during the study, in which the measure was administered

weekly. Tests indicated excellent test-retest reliability for the DTS-GDI (0.93) in the

current sample. Internal consistency values for the DTS were as follows: $\alpha = 0.91$ for

total score, $\alpha = 0.81$ DTS-GDI.

Behavioral Indicator of Resiliency to Distress Task (BIRD; Lejuez,

Daughters, Danielson, & Ruggiero, 2006). Adolescents also completed the BIRD task,

a behaviorally-indexed measure of distress tolerance that was adapted from the PASAT-

C, a validated distress tolerance measure for adults (Lejuez, Kahler, & Brown, 2003).

Although the BIRD task has not yet been validated in a clinical sample of youth, it has

been used in community samples of youth with internalizing symptoms (Daughters et al.,

2009). Psychometrics of the BIRD task have not been established. However, psychometric evaluation of the PASAT-C has shown construct validity, with research evidencing an induction of emotional distress as a result of the task, as assessed through measures of anxiety, frustration, and irritability, among others (Lejuez, Kahler, & Brown, 2003). Further, adults with borderline personality disorder terminate the PASAT-C more quickly than healthy controls, supporting the task's convergent validity (Gratz, Rosenthal, Tull, Lejuez, & Gunderson, 2006). Additionally, for substance users, quicker termination on the PASAT-C predicted early discontinuation of substance use treatment, providing evidence for the task's predictive validity (Daughters et al., 2005).

Upon beginning the BIRD task, youth are told to click a green dot that appears above a numbered box before that green dot moves to a different box in order to release a bird from its cage and gain points. When the adolescent clicks the green dot before it moves, a chirp sound is made, the bird flies out from its cage, and the participant earns a point. If the green dot is not clicked before it moves and/or a box is clicked incorrectly, a loud and unpleasant sound is made, the bird is not released from its cage, and a point is not earned. There are three levels to this task.

Prior to beginning the task, youth are provided with instructions, including acknowledgement of the frustration that may be elicited by the task. Following these instructions, youth are asked to provide their subjective units of distress (SUDs) on a 0 to 8 scale, with 0 being no distress and 8 being extreme distress. Once SUDs have been obtained, they are instructed to begin the first level. In the first level, that lasts three minutes, the latency between the time that the green dot appears and when it jumps to a new box is 5 seconds. Depending on the participant's performance, the latency increases

or decreases by 0.5 seconds. This level results in an index of skill that is derived from the average latency. In the second level, the latency begins at the average latency from level 1 for the first four minutes. This latency is cut in half for the final minute of the level. This challenge latency is designed to be extremely difficult. The third level uses the same challenge latency and can last up to 5 minutes. The participant, however, has the option to quit the task at any time during this level, whereas this option is not present in any other level. After completing level 3 of the task, another SUDs rating was obtained.

As has been done in previous distress tolerance research, monetary incentives were used to maintain motivation for the task. After each of the first two levels, the participant was given $1, for a total of $2 earned before beginning level 3. The participant was then reminded that they could quit the level at any time, but that their performance on the level would determine whether they earn $1 or $2 for the last portion of the task.

Distress tolerance is hypothesized to be indicated by how long the participant persists in the third level of the task. Less time spent on the level (i.e. quicker time to level termination) is indicative of lower distress tolerance. SUDs (subjective distress tolerance) and persistence scores from the BIRD task were used as behavioral measures of **distress tolerance** in the current study. The task was completed at pre-, mid-, and post-treatment assessment points.

Emotional Avoidance Strategy Inventory for Adolescents (EASI-A; Kennedy & Ehrenreich-May, 2016). Adolescents completed the Emotional Avoidance Strategy Inventory for Adolescents (EASI-A; Kennedy & Ehrenreich-May, 2016) weekly throughout treatment. The EASI-A is a 17-item adaptation of a self-report measure of

emotional avoidance. The 17-item version of the EASI-A is shown to have good reliability, demonstrating a 3-factor structure with subscales (factors) measuring avoidance of emotional expression, avoidance of thoughts and feelings, and distraction. It has also been shown to have good predictive validity in school-based samples of child and adolescent youth (Kennedy & Ehrenreich-May, 2016). Notably, test-retest reliability has not yet been tested for the EASI-A, and thus, this was assessed further during the study. Tests indicated 0.89 test-retest reliability. The EASI-A served as the primary measure of subjects' level of **avoidance of uncomfortable emotional experiences** and allowed for the collection of important information about how and when this tendency to avoid changes throughout treatment. Within the current sample, internal consistency values for the EASI-A were as follows: $\alpha = 0.88$ for total avoidance, $\alpha = 0.72$ for avoidance of emotional expression, $\alpha = 0.76$ for avoidance of thoughts and feelings, and $\alpha = 0.73$ for distraction.

Revised Children's Anxiety and Depression Scale-Short Form (RCADS-Short Form; Ebesutani et al., 2012, Muris, Meesters, & Schouten, 2002). The RCADS (short form) is a 25-item abbreviated version of the RCADS (child version), a 47-item self-report measure of child/adolescent anxiety and depressive symptoms. The RCADS (short form) has two subscales, designated according to DSM-IV criteria: Anxiety Total (15 items pulled equally from the 5 anxiety subscales of the RCADS [child version]) and Depression Total (10 items) subscale. Higher scores correspond to greater symptom severity. The RCADS (short form) has been demonstrated to have good reliability and validity (Ebesutani et al., 2012; Muris et al., 2002). The RCADS (short form) was administered weekly during the 16 weeks of therapy and provided important

information about treatment-based change in anxiety and depressive symptoms. Additionally, RCADS (short form) Anxiety and Depression Subscale T-Scores < 60 were used as indicators of responsiveness to treatment. Within the current sample, internal consistency values for the RCADS (short form) were as follows: $\alpha = 0.77$ for anxiety, $\alpha = 0.92$ for depression, and $\alpha = 0.89$ for overall score.

Revised Children's Anxiety and Depression Scale-Parent-Report-Short Form (RCADS-P-Short Form; Ebesutani et al., 2010). The RCADS-P (short form) is a 25-item abbreviated version of the RCADS-P (parent-report version), a 47-item parent-report measure of child/adolescent anxiety and depressive symptoms. Similar to the RCADS (short form) described above, The RCADS-P (short form) has two subscales, designated according to DSM-IV criteria: Anxiety Total (15 items pulled equally from the 5 anxiety subscales of the RCADS [parent version]) and Depression Total (10 items) subscale. Higher scores correspond to greater symptom severity. The RCADS-P (short form) has been demonstrated to have good reliability and validity (Ebesutani et al., 2010). During the present study, the RCADS-P (short form) was administered at each session during the course of the UP-A and provided important information about treatment-based change in anxiety and depressive symptoms. Also, RCADS-P (short form) Anxiety and Depression Subscale T-Scores < 60 were used as indicators of responsiveness to treatment. Within the current sample, internal consistency values for the RCADS-P (short form) were as follows: $\alpha = 0.88$ for total anxiety, $\alpha = 0.76$ for depression total, and $\alpha = 0.78$ for overall total.

Top Problems (Weisz et al., 2011). Top Problems is an assessment of presenting problems (typically three), which is typically administered weekly to youth and

caregivers throughout treatment in order to assess change over time in personally-relevant treatment targets (Weisz et al., 2011). Top Problems has been demonstrated to have good test-retest reliability, convergent and discriminant validity, sensitivity to change, slope reliability, and high levels of association between slopes of change and slopes of change observed using other empirically-supported measures of youth emotional problems throughout treatment (Weisz et al., 2011). Within this study, at week 1 of treatment, adolescents and their parents agreed upon three major presenting problems, or "top problems" to be targeted during UP-A treatment. Each week throughout treatment, adolescents and their parents rated the intensity of each problem on a scale from "0- not at all a problem" to "8- a huge problem." Changes in severity ratings of "top problems" provided important information about treatment-based change in general emotional disorder symptoms.

Intervention

Unified Protocol for Transdiagnostic Treatment of Emotional Disorders in Adolescents (UP-A; Ehrenreich-May et al., 2018). Adolescents completed 16 sessions of the Unified Protocol for Transdiagnostic Treatment of Emotional Disorders in Adolescents (UP-A; Ehrenreich-May et al., 2018). The UP-A is composed of 8 core modules and 2 optional modules (See Table 2 for an overview of all modules and theoretical targets). The first module of the UP-A, *Building and Keeping Motivation*, is designed to introduce the adolescent and his/her caregiver(s) to the structure of treatment and to increase self-efficacy for behavior change, on the part of both the adolescent and his/her caregiver(s) and, like all core modules of the UP-A, does not have a fixed session length. For the current study, however, implementation of module 1 was limited to one

session. Although the UP-A is primarily youth-focused, caregiver involvement is encouraged throughout treatment, and parent involvement, along with parent perceptions of youth problems and goals, are discussed during the first module of treatment as well.

The second module of the UP-A, *Getting to Know Your Emotions and Behaviors*, has two major purposes. First, the adolescent receives education about a variety of emotion states, tying such descriptions to their own emotional experiences. Then, the adolescent learns to identify thoughts, feelings, and behaviors involved in such emotional experiences including happiness, anger, sadness, and anxiety/fear. Within the present study, implementation of module 2 was limited to two sessions.

Module 3, *Introduction to Emotion-Focused Behavioral Experiments*, is intended to introduce the adolescent to the idea that acting opposite to how intense negative emotions may push them to act for short-term relief of related distress (e.g., approach instead of avoidance, etc.) can help improve symptoms over the long-run. In order to best understand this, adolescents are instructed to begin emotion-focused behavioral experiments of acting opposite of how feelings of sadness make one want to act, by engaging in pleasant and/or task-oriented activities (also known as behavioral activation). For this investigation, implementation of module 3 was limited to one session, with the option for continued practice alongside the introduction of new material, as needed. Opposite action is designed to decrease experiential avoidance, so examining change in this risk factor the week following introduction of core module 3 was important. Additionally, continued behavioral activation practice (opposite action for depression) is hypothesized to decrease depressive symptoms over time. These changes, however, require continued practice, and depression is believed to decrease over time due to a build

in positive affect, along with simultaneous reduction of withdrawal and avoidance behaviors. Thus, the examination of immediate changes in depression following module 3 were not considered as relevant, while changes over the course of treatment in depression, following weekly behavioral activation practice along with the introduction of cognitive skills implicated in the treatment of depression (i.e., problem-solving) were examined more thoroughly.

Core module 4, *Awareness of Physical Sensations*, includes two primary goals. First, the adolescent receives education about physical sensations that occur within one's body when one is experiencing intense emotion states. Then, the adolescent begins experimenting with interoceptive exposure in order to learn that such sensations are normal, natural, and should not be feared per se. Here, the implementation of module 4 was limited to one session. The treatment component of the UP-A introduced during module 4 is interoceptive exposure, which may theoretically increase distress tolerance, more broadly. Interoceptive exposures are also commonly used in adolescents and adults to treat physiological components of anxiety and panic (Angelosante, Pincus, Whitton, Cheron, & Pian, 2009; Craske & Waikar, 1994; Ollendick & Pincus, 2008).

Core module, 5, *Being Flexible in Your Thinking* (i.e., increasing cognitive flexibility), has three main purposes. First, the adolescent is introduced to the concept of maladaptive automatic thoughts/thinking errors (referred to as "thinking traps" in the UP-A) that often contribute to uncomfortable emotional experiences. Second, antecedent cognitive reappraisal (referred to as "detective thinking" in the UP-A) is taught and practiced in order to encourage the adolescent to increase his/her cognitive flexibility, or ability to consider more than one explanation of a given situation and that one's

automatic cognition is not always the most accurate one. The final aspect of cognitive flexibility introduced during module 5, problem solving, is a therapeutic technique that helps an individual to be more flexible in thinking about ways to behave more adaptively, and is shown to be effective in for youth with both anxiety and depressive disorders (Ehrenreich-May et al., 2017; Weisz et al., 2006). Within the current study, module 5 was limited to three sessions. The primary treatment components of the UP-A introduced during module 5 are identifying maladaptive thoughts, cognitive reappraisal, and problem solving. Cognitive restructuring and problem solving have also been used as active treatment components in RCTs with anxious and depressed youth (Butler, Chapman, Forman, & Beck, 2006; Kendall et al., 2010; Rapp et al., 2013; Weisz et al., 2006).

Core module 6, *Awareness of Emotional Experiences* (i.e., mindfulness), covers two topics. First, the clinician introduces the adolescent to the concept of present-moment awareness or paying attention to current activity within the self as well as in the environment. Second, the adolescent is taught that present-moment awareness can be extended to a non-judgmental awareness of one's emotional experiences and environment (Cayoun, 2011). For the present study, the introduction of module 6 was limited to two sessions. The primary treatment component of the UP-A introduced during module 6 is mindfulness, which theoretically reduces rumination, increases distress tolerance and decreases emotional avoidance. Mindfulness has also been used as an active treatment component in RCTs with anxious and ruminative individuals (Kendall, 2011). Distress tolerance was expected to increase following the introduction of core module 6.

Core module 7, *Situational Emotion Exposures*, emphasizes gradually exposing oneself to stimuli that cause emotional distress (e.g., anxiety, sadness, anger). Gradual

exposure techniques have been shown to be one of the most effective, if not the most effective components of CBT for anxiety (Butler et al., 2006; Ishikawa et al., 2007). Within this study, module 7 was limited to five sessions. The primary treatment component of the UP-A introduced during module 7 is exposure, which theoretically reduces experiential avoidance. Exposure has also been used as an active (and occasionally the only) treatment component in RCTs with anxious youth (Butler et al., 2006; Ishikawa et al., 2007). Thus, sessions following the introduction and practice of exposure served as important time points for examining changes in experiential avoidance and anxiety symptoms. In a sense, module 7 expands upon opposite action practices introduced in module 3, reinforcing the idea that directly and purposefully experiencing more intense emotions results in more effective coping over time. Thus, while anxiety was not expected to change as pointedly following module 3 (opposite action) the more purposeful focus on exposure activities within and outside of sessions during module 7 were expected to lead to more substantial reductions in anxiety.

During core module 8, *Keeping it Going, Maintaining Your Gains*, the adolescent reviews previously learned techniques and relapse prevention strategies, including recognizing symptoms of emotional disorders, using coping skills continuously, and contacting the clinician should symptoms worsen significantly. For this study, module 8 was limited to one session.

In terms of parental involvement, module summary forms were reviewed with the adolescent's parent or caregiver during each module administered. Additionally, a functional analysis of the parent or caregiver's emotional experiences in response to the

adolescent's emotional behaviors was also utilized with parents, as appropriate, to promote awareness of problematic parental responses to youth emotional behaviors. Parent-alone sessions were not administered in this study given time constraints.

Procedure

Participant recruitment procedures. Youth were referred to the University-based research clinic utilized in this investigation by a parent or legal guardian. Prior to the initiation of study procedures, parents of potential participants completed a phone screen in which a research assistant reviewed general questions pertaining to presenting problems as well as inclusion and exclusion criteria. Additionally, assessment, research, and treatment opportunities were discussed with eligible families. At this point, the research assistant scheduled an assessment visit during which the adolescent and his/her legal guardian(s) came into the clinic to complete baseline study procedures including psychological assessment, questionnaires (including adolescent- and parent-report questionnaires for the current study), and study-related tasks (including BIRD task administered at major assessment points throughout the current study).

Screening procedures. Following the initial phone screening, study eligibility was determined as a component of overall research and treatment research eligibility for the university research clinic. Following a subsequent diagnostic evaluation of the adolescent (i.e. ADIS-5-C/P and adolescent/parent-report questionnaires), collection of brief medical and psychological history information by the clinician administering the diagnostic evaluation, and the administration of the WASI-II by a trained research assistant, eligibility for the study was determined (see inclusion and exclusion criteria in Participant Recruitment section above). Following determination of eligibility, adolescent

and parent were offered the opportunity to participate in the current intervention study.

Once parent and adolescent expressed interest in the study, study personnel obtained

informed consent/assent for participation and informed parent and adolescent of

compensation for participating in the study (i.e., 16 sessions of the UP-A at no fee,

incentive for completing post-treatment evaluation [choice of $25.00 gift card or free

booster session and a $5.00 gift card]).

Psychological assessment procedure. ADIS-5-C/P and CGI were administered

and completed by a clinician trained to reliably assign diagnoses and severity levels

based on DSM 5 criteria by independently coding three interviews and matching

diagnoses and severity-level with a reliable clinician. Clinicians were post-doctoral and

doctoral student clinicians. Weekly clinical supervision meetings were held to review

intakes, establish case formulations and treatment recommendations based on intake

assessments, and to determine eligibility for inclusion in all research and treatment

research studies within the clinic in which this study took place. In order to further ensure

reliability, all interviews were video-recorded, and 25% of the interviews were rated on

reliability for principal diagnosis by ADIS-5-C/P reliable clinicians who did not conduct

the original interview. Previous data collected on the UP-A (Ehrenreich-May et al., 2017)

as well as data collected from the current study indicate very good ADIS-C/P inter-rater

reliability rate for principal disorder diagnoses and CSR values ($\kappa = 0.82$ for ADIS-IV-

C/P in previous study; $\kappa = 1.00$ for ADIS-5-C/P in current study).

Data collection procedure. Adolescents were randomly assigned to baseline

phases lasting 2 ($n = 3$), 3 ($n = 4$), or 4 ($n = 1$) weeks. Participants and parents completed

weekly study questionnaires over the phone during this wait period and completed the

ADIS-5 C/P and CGI over the phone with a trained clinician at post-baseline assessment

point. Adolescents were then assigned to one of four clinicians: three advanced graduate

students (within a clinical psychology Ph.D. program) or a post-doctoral clinician, all

working in an anxiety and mood disorders specialty University clinic, supervised by the

primary author of the UP-A, a clinical psychologist. Each therapist within the study was

certified to administer the UP-A, following certification guidelines determined by the

primary author of the UP-A and approved by the Unified Protocol Institute and had

previously administered the UP-A in full to at least three youth. Treatment fidelity was

assessed via coding of video-recorded treatment sessions. Specifically, following

completion of UP-A components, treatment adherence on 25% of study sessions (4

sessions rated per participant total; 2 sessions from first half of treatment and 2 sessions

from second half of treatment) was completed by trainer-level UP-A clinicians (i.e.,

clinicians who have completed a full course of UP-A with three or more adolescents,

have co-run at least one training with the author of the UP-A, and have been supervised

by the first author of the UP-A on at least one UP-A case) who were deemed reliable

adherence coders following independent coding of three sessions and matching ratings

with a previously trained rater or the author of the UP-A. Each component of UP-A

adherence was rated on a scale from 0 (skill not conveyed) to 2 (skill thoroughly

conveyed). Then, scores across items on adherence forms were summed and a mean

adherence rating for each session coded was computed (ranging from 0-2). Overall,

adherence was excellent (*Mean Adherence*= 0.91; *Standard Deviation* = 0.08; *Range* =

0.73-1.0) within the current study (See Appendix 1 for an example of UP-A adherence

forms [module 1]).

During treatment, questionnaires were distributed online via Qualtrics software 24 hours prior to each clinic visit (or clinic time point during baseline) via email. Adolescents and parents were instructed to complete questionnaires prior to their upcoming treatment session. However, should questionnaires not be completed prior to a given session, questionnaires were completed in clinic immediately prior to session and subsequently entered into Qualtrics. If baseline questionnaires were not completed within 2 days of distribution, participants were contacted every 48 hours to be reminded of questionnaire completion in order to minimize missing data. Immediately following their mid-treatment (session 8) session, adolescents completed the BIRD task with a research assistant. Within one to two weeks following treatment completion, adolescents completed post-treatment questionnaires in the clinic via Qualtrics as well as ADIS-5 C/P and CGI assessments with a trained independent evaluator. Participants also completed the post-treatment BIRD task at this time.

Participants each attended 16 sessions of weekly therapy, with sessions occurring within an average of 18 weeks (range = 15.86-20.00 weeks). Of note, one subject was removed from single-case analyses due to missing data from several baseline assessment points, but still attended all 16 sessions offered.

Data cleaning procedure. Following the completion of data collection, a double-entry data procedure was used, and any discrepancies were corrected. Then, the dataset was screened for errors and outliers. Descriptive statistics were also used to determine whether assumptions of normality and linearity were met. Data transformation was not indicated.

Statistical analysis procedure. Test-retest reliability analysis between weeks 1 and 2 of the baseline period was used to test reliability of measures being used repeatedly during the study, and test-retest reliability analysis between pre-treatment and post-baseline assessment points was used to examine ADIS-5-C/P reliability. Any study measure found to have insufficient reliability was considered for exclusion from repeated measures analyses. Any missing data was checked for randomness (rate of missing data = 0.02). A priori power analyses were used to determine adequate power is established for group level analyses (i.e., Friedman tests, Wilcoxon tests) (Jarrett, 2013; Jarrett & Ollendick, 2012), which indicated that, with 8 participants, an effect size of 1.00, power at alpha 0.05 would be 0.65 (critical chi-squared value = 2.39). Post-hoc power analyses indicated adequate power and large effect sizes across group-level analyses (effect size range = 0.89-1.00; alpha error probability = 0.05, power range = 0.55-0.65). In terms of single-case analyses, general guidelines used for single-case analytic approaches (i.e., sampling at least once per week, approximately equal sampling frequency within each phase of treatment and at baseline) were implemented to determine sampling frequency needed, given any missing data (Borckardt et al., 2008).

Data was analyzed using a grouping of statistical approaches. This specific combination of analyses was chosen due to its common use in the single-case and clinical replication literature (Jarrett, 2013; Jarrett & Ollendick, 2012; Manolov et al., 2014; Parker & Hagan-Burke, 2007). The first several of analytic approaches were used for weekly measures at pre-treatment, post-baseline, mid-treatment, and post-treatment time points. Given the small sample size and lack of a normal distribution inherent in this study, nonparametric tests were utilized.

Specifically, Friedman tests were used for study measures with more than two time points (i.e., weekly self- and parent-report questionnaires from pre-treatment, mid-treatment, post-treatment time points; BIRD task data). Wilcoxon tests were used for measures with only two time points (i.e., diagnostic interview data). Similar to methodology employed in recent single-case studies (Jarrett, 2013; Jarrett & Ollendick, 2012), Post-hoc Wilcoxon tests followed nonparametric Friedman tests for pre-treatment, mid-treatment, and post-treatment comparisons.

The Jacobson and Truax (1991) method, which involves implementing alternative means for calculating clinical significance, including the calculation of a "reliable change index" (RCI), was used to determine whether change reflected more than just measurement error (using CSRs as well as RCADS-A and RCADS-P scores from pre- to post-treatment as well as statistics on test-retest reliability from larger samples indicated above in Measures section) and to determine whether change occurred during baseline period (based on clinician-rated CSRs and CGI during the pre-treatment and post-baseline ADIS-5 C/P assessments). If significant change occurred in adolescent- or parent-report measures during baseline period, suggesting lack of stability within baseline phase, further investigation was to be conducted to determine whether subject and/or measures completed by a specific subject should be excluded from repeated measures analyses.

The definition of "recovery", also established by these authors, is defined in the present study as moving outside of a disordered population (e.g., moving 2 SDs away from the mean score on any symptom-based measure of the population with emotional disorders) or moving within the distribution of the normal population (e.g., moving

within 2 SDs of the mean of the unaffected population). Participants in this study were considered "recovered" if CSRs of principal diagnoses met the criterion of moving, at post-treatment, 2 SDs away from the mean of a larger sample of individuals with emotional disorders at baseline ($N = 259$ for RCADS-A, $N = 273$ for RCADS-P, $N = 376$ for CSR of principal diagnosis, $N = 371$ for CGI-S), from the clinic in which the current sample was recruited. As mentioned, sub-clinical CSRs for all diagnoses (all CSRs of 3 or below; no clinical emotional disorder diagnosis) as well as CGI-I scores indicating a significant response to treatment (CGI-I scores of a 1 or a 2) were used as additional indicators of treatment response (Ginsburg et al., 2011), as were RCADS-A and RCADS-P subscale T-Scores < 60.

Again, similar to methodology employed in recent studies (Jarrett, 2013; Jarrett & Ollendick, 2012), analysis of single-case data was completed using Parker and Hagan-Burke's (2007) clinical outcomes approach, which was established specifically for the analysis of single-case data. Using this method, weekly data points (encompassing baseline and treatment points) obtained from each individual subject were sorted from highest to lowest, with higher scores representing relatively more elevated symptoms. "Successful" performance was illustrated by those treatment phase data points that were lower than the n highest points (n = the number of baseline data points) and those baseline phase data points that were lower than the n highest points. A success rate difference was calculated along with more specific treatment and baseline success rates. Success rates were computed for each participant individually. Then, individual success

rates were aggregated across individuals. Since the current investigation collected < 20 data points/subjects per phase, and individual success rates are unreliable for this sample size, success rates were not calculated for the individual subjects.

Simulation Modeling Analysis (SMA; Borckardt et al., 2008) was also employed for single-case data analysis. Using SMA, changes in the level of symptoms/facets of neuroticism and the slope of change in these variables was examined by analyzing the correlation between the data stream and four specified slope vectors (See Figure 3 for a summary of slope vectors used within the current investigation). As specified by Jarrett and Ollendick (2012), bootstrapping methods were used to determine the significance of the effect. Specifically, bootstrapping methods were implemented to create simulations that take into account both phase lengths (i.e., length of baseline and treatment phases) and autocorrelation of the data stream.

Although visual inspection has historically been known as a primary approach for analyzing single-case data, SMA has recently become more commonly used due to its relatively greater specificity and the broader application of findings. Specifically, SMA accounts for the fact that single-case data are auto-correlated (i.e., sequential ratings by the same informant are not independent) by allowing for examination of the slope of symptom change and significance of the effect using simulation methods that take the phase length and autocorrelation of the data stream into account, while visual inspection cannot account for this autocorrelation (Borckardt et al., 2008, Manolov et al., 2014). Also, as mentioned above, SMA allows for the testing of the data stream in relation to standard and custom slope vectors. Data streams were correlated with four slope vectors in order to determine which active treatment components lead to changes in

symptoms/facets of neuroticism (i.e., the completion of each treatment component and subsequent changes in anxiety or depressive symptoms, top problems, and measures of distress tolerance, experiential avoidance, and cognitive flexibility). When the data stream is tested against a given slope, a significant correlation represents one that would occur less than 5% of the time among 5,000 randomly generated data streams (with these randomly generated streams having the same number of data points and degree of autocorrelation as the original stream). Overall, SMA is substantially more reliable than visual inspection and results in much lower Type I and Type II errors (Borckardt et al., 2008).

The goal of exploratory aim 3 was to gather preliminary data to better understand whether anxiety and depression and the severity of these symptoms decrease following changes in a specific facet of neuroticism (e.g., does a substantial decrease in anxiety occur following a decrease in experiential avoidance?). Importantly for this specific part of the study, SMA also allows for the delineation of temporal relationships between two variables throughout the course of therapy, a multivariate process. This set of analyses, for example, helped to determine whether the reduction in a direct treatment target of the UP-A (e.g., a decrease in score on the measure of experiential avoidance) is temporally followed by a decrease in emotional disorder symptoms (e.g., anxiety symptoms). In order to examine such relationships, SMA uses cross-lagged correlations between the two measures (e.g., experiential avoidance score and anxiety symptom score) and determines the significance of the effect using simulation methods that take the autocorrelation estimates for each lag into account (Borckardt et al., 2008, Manolov et al., 2014; Jarrett & Ollendick, 2012). For example, the actual cross-lagged correlation in the data stream is

compared to 5,000 randomly generated data streams that have similar properties to the original data stream (i.e., number of data points and degree of auto-correlation for a particular lag). An exact probability is then estimated (e.g., How many times out of the 5,000 simulations was the cross-correlation in the actual data stream larger than the cross-correlations found in the random data streams?). SMA evaluates cross-lagged correlations from Lag -5 to Lag +5. Positive lags suggest that Variable 1 change (i.e., experiential avoidance) precedes Variable 2 change (i.e., anxiety), while negative lags suggest that Variable 2 precedes Variable 1. Numbered lags suggest the number of weeks separating the changes (e.g., a significant correlation at Lag -2 would suggest that anxiety changes 2 weeks prior to experiential avoidance). If this cross-correlation is positive, it suggests that changes in experiential avoidance and anxiety are positively correlated at this specific lag, while a negative correlation suggests that changes in experiential avoidance and anxiety are negatively correlated at this specific lag. A conservative approach was taken by making Bonferroni post-hoc corrections for all single-case analyses.

Chapter 3: Results

See Table 3 for a summary of test-retest reliability findings across study measures. Overall, all study measures with the exception of the ERQ-CA (reappraisal) demonstrated good to excellent test-retest reliability and all measures had good to excellent internal consistency. As a result of poor test-retest reliability, the ERQ-CA (reappraisal scale) was eliminated from all repeated measures analyses. All included measures demonstrated good to excellent internal consistency, both between and within scales (see Table 3 for a summary of internal consistency for all measures). Correlations among continuous variables ranged from 0.88 to 0.02, with measures of the same symptoms across informants as well as subscales within the same measure being most highly correlated with one another and measures of distress tolerance, experiential avoidance, and cognitive flexibility demonstrating low to medium correlations.

Baseline stability needs to be established for any multiple-baseline study prior to interpreting any results. In this investigation, baseline stability was examined in several ways. In order to establish diagnostic stability, differences in clinician-rated CSRs for principal emotional disorder diagnoses as well as clinician-rated CGI-S were examined by comparing pre-treatment and post-baseline mean scores, using T-tests. Neither measure changed significantly from pre-treatment to post-baseline assessment points, suggesting minimal change in subjects' clinical presentation and a relatively stable baseline. Baseline versus treatment success rate calculations, discussed later in this section (Parker & Hagan-Burke, 2007), provided further evidence for relatively stable baseline periods overall in the study (see Single-Case Analysis section for details). Another way to assess baseline stability is at the individual subject level. SMA allows for

the comparison of baseline and treatment phases for each individual subject. Data from participants displaying unstable baseline periods on specific measures was interpreted with caution (noted within discussion of analyses below). Any participant whose trajectory of change across baseline and treatment phases was not consistent with vector 2, but rather vectors 1, 3, or 4, demonstrated at least some change during baseline.

As mentioned, a variety of group-level and single-case analyses were used to address aims 1 and 2 of the current investigation (i.e., when emotional disorder symptoms change during UP-A treatment, when facets of neuroticism change during UP-A treatment, respectively).

Group-Level Analyses

Table 5 provides descriptive statistics of clinician-rated variables (CSR, CGI) at pre- and post-treatment assessment points. Monte Carlo corrections were used to assess power for group level analyses (Friedman tests, Wilcoxon tests). First, Friedman tests were conducted to investigate treatment-based change in measures of emotional disorder symptoms (i.e., adolescent- and parent-reported anxiety and depression on the RCADS-A and RCADS-P, respectively; adolescent- and parent-reported top problems [mean]), adolescent-reported distress tolerance [DTS-GDI] and experiential avoidance [EASI-A], and distress tolerance scores from the BIRD task (i.e., SUDs, persistence scores) by comparing pre-treatment, mid-treatment, and post-treatment scores. Meaningful reductions in anxiety and depressive symptoms were demonstrated by significant decreases in the RCADS-A and RCADS-P total scores (RCADS-A $\chi^2[2, N = 8] = 9.74, p = 0.005$; RCADS-P $\chi^2[2, N = 7] = 7.19, p = 0.021$) and in significant reductions in parent-reported anxiety (RCADS-P Anxiety; $\chi^2[2, N = 7] = 7.19, p = 0.020$) and parent-

reported depression (RCADS-P Depression; $\chi^2[2, N = 7] = 6.64, p = 0.038$) more specifically. Significant change was also supported by change in adolescent- and parent-reported severity of presenting problems (Adolescent-Rated Top Problems $\chi^2[2, N = 7] = 10.29, p = 0.004$; Parent-Rated Top Problems $\chi^2[2, N = 7] = 6.50, p = 0.040$). In line with the hypothesis that facets of neuroticism would illustrate treatment-based change from pre- to mid- to post-treatment, adolescent-reported experiential avoidance (EASI-A $\chi^2[2, N = 8] = 7.55, p = 0.017$) also decreased significantly between major assessment points.

Interestingly, post-hoc Wilcoxon tests used to investigate these positive outcomes further revealed that changes in adolescent-reported emotional disorder symptoms on the RCADS-A were primarily driven by symptom reductions from mid- to post-treatment, with no significant changes in these symptoms occurring between pre- and mid-treatment assessment points ($p = 0.017$). The RCADS-P results did not show the same pattern. While adolescent-rated top problems showed significant reductions both from pre- to mid-treatment and from mid- to post-treatment ($p = 0.025$; $p = 0.008$, respectively), parent-rated top problems only reduced significantly from pre- to mid-treatment (p = 0.031). Post-hoc comparisons looking at adolescent-reported experiential avoidance on the EASI-A revealed a pattern similar to that observed with adolescent-reported emotional disorder symptoms on the RCADS-A in that adolescent-reported avoidance primarily decreased from mid- to post-treatment, or in the latter portion of the UP-A intervention ($p = 0.031$).

Contrary to our hypotheses, pre-, mid-, post-treatment comparisons of scores on adolescent-reported disorder-specific measures (anxiety and depression subscales of the RCADS-A) did not show significant treatment-based change at the group level.

Similarly, no significant group-level changes were found from pre- to mid- to post-treatment on adolescent-reported measures of distress tolerance (DTS-GDI) or on adolescent performance on the BIRD task (SUDs or persistence).

Wilcoxon tests were conducted to further investigate treatment-based changes in variables of interest administered at all assessment points and also to examine clinician-rated change in emotional disorder severity (CSRs on the ADIS 5 C/P) and emotional disorder related impairment (CGI) rated at pre- and post-treatment assessment points. These analyses evidenced treatment-based changes in overall emotional disorder symptoms indicated by both adolescents (RCADS-A) and parents (RCADS-P) from pre- to post-intervention ($p = 0.004$; $p = 0.029$, respectively), along with adolescent- and parent-reported anxiety and depression symptoms, more specifically (RCADS-A Anxiety $p = 0.008$; RCADS-A Depression $p = 0.015$; RCADS-P Anxiety $p = 0.034$; RCADS-P Depression $p = 0.044$). Changes in adolescent- and parent-rated top problems illustrated a similar pattern, with significant pre- to post-treatment changes reported by both informants (Adolescent-Rated Top Problems $p = 0.008$; Parent-Rated Top Problems $p = 0.031$). Treatment-based changes in adolescent-reported features of emotional disorders also were observed from pre- to post-treatment. Specifically, adolescents indicated a significant increase in distress tolerance (DTS-GDI) from pre- to post-treatment ($p = 0.038$). Despite the fact that distress tolerance was observed to increase over the course of treatment based on DTS-GDI scores, no significant change in BIRD task performance across participants was observed, indicating that the BIRD task may not be sensitive to treatment-based change in distress tolerance. Also contrary to hypotheses, despite

showing significant change from mid- to post-treatment, adolescent-rated avoidance (EASI-A) did not change significantly from pre- to post-treatment, further indicating that change in this variable may occur primarily in the latter portion of UP-A treatment.

In addition to significant improvements in child- and parent-reported emotional disorder symptoms and presenting problems, clinician-rated diagnostic severity (CSRs) and impairment (CGI) also decreased significantly from pre- to post-treatment (Principal Diagnosis CSR $p = 0.003$; CGI-S $p = 0.003$). Wilcoxon tests also were used to demonstrate baseline stability, and pre- to post-baseline Wilcoxon tests revealed a lack of significant change in principal emotional disorder CSRs and CGI-S ratings ($p = 0.500$; $p = 0.502$, respectively). See Table 4 for descriptive statistics of all adolescent- and parent-reported measures (RCADS-A, RCADS-P, adolescent Top Problems, parent Top Problems, DTS-GDI, EASI-A) as well as BIRD task scores (SUDs, persistence) at major assessment points (pre-, mid-, and post-treatment).

To further assess clinician-rated improvement in emotional disorders, Jacobson and Truax's method was used to calculate a reliable change index (RCI) for ADIS-5-C/P principal emotional disorder CSRs, all clinical emotional disorder CSRs, and RCADS-A /RCADS-P anxiety and depression subscales. Using an RCI of 1.96 in accordance with this method (Jacobson & Truax, 1991), none of the subjects demonstrated reliable change in principal diagnosis CSR from pre-treatment to post-baseline assessment points, providing additional evidence for baseline stability overall. From pre- to post-treatment assessment points, 100% of participants demonstrated reliable change during treatment in principal diagnoses on the ADIS-5-C/P, 75% of subjects showed reliable change in every clinical emotional disorder diagnosis on the ADIS-5 C/P, and 100% evidenced reliable

change according to CGI-S scores. In terms of RCADS-A and RCADS-P subscales, 12.5% of individuals demonstrated reliable change based on adolescent-reported anxiety (RCADS-A Anxiety), 37.5% of adolescents indicated reliable change based on adolescent-reported depression (RCADS-A Depression), and 42.9% of parents indicated reliable change in anxiety and depression on the RCADS-P Anxiety and RCADS-P Depression scales (see Table 5 for a summary of RCI results).

Next, "Recovery" was calculated for diagnostic (clinician-rated) as well as adolescent- and parent-report (RCADS-A and RCADS-P subscales, respectively) data from pre- to post-treatment. Using the criteria of moving 2 standard deviations away from the mean of individuals in a larger sample of youth with anxiety and depressive disorders at baseline as being demonstrative of recovery, 75% of participants met criteria for recovery based on change in the severity of the individuals' principal diagnosis (cutoff for recovery as 3.48 based on mean principal diagnosis CSR obtained by a larger sample of 376 children and adolescents within specialty clinic at baseline with clinically impairing emotional disorders) and 37.5% evidenced recovery based on change in CGI-S scores (cutoff for recovery as 2.95 based on mean CGI obtained by a larger sample of 371 children and adolescents within specialty clinic at baseline with clinically impairing emotional disorders). 75% of participants reported subclinical levels of anxiety and depression on the RCADS-A, 50% were subclinical at post-treatment on the RCADS-P Anxiety subscale, and 75% were subclinical based on the RCADS-P Depression subscale. Treatment effects were investigated further using alternative criteria for indicating improvement, including subclinical diagnostic status (CSRs ≤ 3) and responder status (CGI-I ≤ 2). Within the current sample, 75% of individuals met subclinical

diagnostic status for principal diagnosis and 62.50% of participants met subclinical status for all emotional disorders assigned at the pre-treatment assessment point. 100% of participants met responder status based on clinician-reported CGI-I at the post-treatment assessment point. See Table 5 for a summary of clinical outcome results.

Overall, group-level analyses suggest significant and important changes throughout treatment, indicated by changes in adolescent-, parent-, and clinician-rated emotional disorder symptoms (i.e., anxiety and depressive symptoms, top problems severity, CSR of principal emotional disorder diagnosis, and CGI) as well as adolescent-report on some aspects of neuroticism (i.e., distress tolerance and experiential avoidance).

Single-Case Analyses

Initial single-case analyses involved computing success rate differences, which were calculated overall (Parker & Hagan-Burke, 2007) by comparing baseline points to treatment points for weekly data. Chi-squared tests revealed treatment points to be significantly more successful than baseline points overall based on adolescent- and parent- reported emotional disorder symptoms (on the RCADS-A and RCADS-P as well as anxiety and depression subscales of the RCADS-A and anxiety subscale of the RCADS-P) as well as adolescent-reported distress tolerance and experiential avoidance (on the DTS-GDI and EASI-A, respectively). Importantly, results from success rate calculations for the RCADS-P depression subscale produced a non-significant chi-squared statistic, indicating that change in the RCADS-P depression subscale throughout treatment may be due to chance alone and that results obtained using this measure should be interpreted with caution. See Table 6 for all chi-squared statistics, along with

confidence intervals and p-values, as well as odds ratios indicating how much more likely one was to demonstrate treatment success during the treatment phase than during the baseline phase.

Best fitting slope vectors for change in emotional disorder symptoms and features throughout treatment. Table 7 presents best-fitting slope vectors for change in emotional disorder symptoms and facets of neuroticism, throughout treatment overall. For each case, the strongest correlation is reported in the table, along with the significance of each correlation. These analyses involved baseline/treatment comparisons and results provide insight into whether patterns of change in symptoms and features occurred between baseline and treatment time points. Vector 2 (minimal to no change during baseline followed by a linear increase or decrease in symptoms during treatment) is most consistent with hypotheses, with Vector 1 (linear decrease or increase in symptoms during baseline followed by a linear decrease or increase in symptoms during treatment) and Vector 4 (linear decrease or increase in symptoms during both baseline and treatment phases) representing unstable baseline periods but indicating significant change during treatment nonetheless. Vector 3 (linear decrease or increase in symptoms during baseline, no change in symptoms during treatment) indicates little to no treatment effect overall.

Adolescent-rated anxiety and depression (RCADS-A). For slope changes on adolescent-reported emotional disorder symptoms overall (RCADS-A Total), subjects 1, 5, and 7 did not show a significant change trajectory, as demonstrated by correlations with specified slope vectors, indicating a need to use caution when interpreting later single-case results for these subjects using this measure. Subjects 2, 3, 4, and 6

demonstrated significant fit with specific trajectories of change during treatment. Subject 4 exhibited stability during baseline and a linear decrease in symptoms during treatment (Vector 2), while subjects 3 and 6 showed change consistent with Vector 1 (symptoms increasing during baseline and decreasing during treatment).

For slope changes on adolescent-reported anxiety (RCADS-A Anxiety), Subjects 1, 5, and 7 again showed no significant trajectory of change. Similar to results from the RCADS-A Total, subjects 2, 3, 4, and 6 exhibited significant fit with specific trajectories of change during treatment. Subjects 2 and 4 showed stability during baseline and a linear decrease in symptoms during treatment (Vector 2), subject 7 had change consistent with Vector 1 (symptoms increasing during baseline and decreasing during treatment), and subject 3 demonstrated change consistent with Vector 4 (symptoms decreasing linearly throughout both baseline and treatment phases).

For slope changes on adolescent-reported depression (RCADS-A Depression), subjects 1, 3, 5, and 7 showed no significant trajectory of change. Once again, caution must be used when interpreting later single-case results for these subjects using the RCADS-A. Subjects 2, 4, and 6 demonstrated significant trajectories of change. Subjects 2 and 4 each demonstrated change most consistent with Vector 2 (stability during baseline and a linear decrease in symptoms during treatment), while subject 6 showed significant change most consistent with Vector 1 (symptoms increasing during baseline and decreasing during treatment).

In general, on the RCADS-A, subjects 1, 5, and 7 demonstrated change inconsistent with the most common trajectories of change during treatment. In multiple cases, change that was observed, although minimal, suggested little to no treatment effect

based on the RCADS-A, or a slight worsening in symptoms. Subject 3 showed change in anxiety but no significant change in depressive symptoms, and subjects 2, 4, and 6 demonstrated change most consistent with hypothesized change trajectories.

Parent-rated anxiety and depression (RCADS-P). For slope changes on parent-reported emotional disorder symptoms overall (RCADS-P Total), subjects 1, 3, 5, 6, and 7 showed no significant trajectory of change. Subjects 2 and 4 demonstrated significant fit with specific trajectories of change during treatment. Subject 4 exhibited stability during baseline and a linear decrease in symptoms during treatment (Vector 2), while subject 2 demonstrated change consistent with Vector 4 (symptoms decreasing linearly throughout both baseline and treatment phases).

For slope changes on parent-reported anxiety (RCADS-P Anxiety), only subject 2 showed significant fit with a specific trajectory of change. Similar to results from the RCADS-P Total, subject 2 again exhibited change most consistent with Vector 4 (symptoms decreasing linearly throughout both baseline and treatment phases).

For slope changes on parent-reported depression (RCADS-P Depression), only subjects 1 and 4 exhibited significant fit with a specific trajectory of change based on this measure. Both subjects 1 and 4 demonstrated change most consistent with Vector 4 (symptoms decreasing linearly throughout both baseline and treatment phases).

Adolescent-rated distress tolerance (DTS-GDI). For slope changes on adolescent-reported distress tolerance (DTS-GDI), subjects 1, 5, 6, and 7 showed no significant trajectory of change within baseline and treatment periods. Subjects 2, 3, and 4 exhibited significant fit with specific trajectories of change. Subjects 2 and 3 showed change consistent with Vector 1 (symptoms increasing during baseline and decreasing

during treatment), while subject 4 demonstrated change consistent with Vector 4

(symptoms decreasing linearly throughout both baseline and treatment phases). Overall,

on the DTS-GDI, subjects 1, 5, 6, and 7 demonstrated change inconsistent with

trajectories of change. Change that was observed, although minimal, suggested little to no

treatment effect based on the DTS-GDI (subject 5), a slight decrease in symptoms

(subject 6), or a slight worsening in symptoms (subjects 1 and 7).

Adolescent-rated experiential avoidance (EASI-A). For slope changes on

adolescent-reported experiential avoidance (EASI-A), subjects 1, 4, and 7 showed no

significant trajectory of change during baseline and treatment phases. Subjects 2, 3, 5,

and 6 exhibited significant fit with specific trajectories of change during treatment.

Subject 6 demonstrated change most consistent with Vector 2 (stability during baseline

and a linear decrease in symptoms during treatment). Subjects 2 and 5 showed symptoms

increasing during baseline and decreasing during treatment (Vector 1), and subject 3

demonstrated change consistent with Vector 4 (symptoms decreasing linearly throughout

both baseline and treatment phases). On the EASI-A, subjects 1, 4, and 7 demonstrated

change inconsistent with the most common trajectories of change during treatment,

indicating that further analyses focusing on measuring symptom change using this

measure with these subjects should be completed with caution. In these cases, little to no

change consistent with hypothesized vectors was observed.

Best fitting slope vectors for change in emotional disorder symptoms and at

hypothesized points of change. Table 8 presents best-fitting slope vectors for change in

emotional disorder symptoms and facets of neuroticism immediately following the

introduction of specific treatment components hypothesized to target each

symptom/feature. For each case, the strongest correlation is reported in the table, along with the significance of each correlation. These analyses involved within-treatment comparisons and results provide insight into whether patterns of change in symptoms and features occur following the completion of specific treatment components, with phase 1 corresponding to first portion of treatment prior to the introduction of the treatment component in question and phase 2 corresponding to treatment occurring after the treatment component is introduced (e.g., looking at weekly change in anxiety symptoms before exposure versus after exposure). Vector 2 points to minimal to no change during phase 1 of treatment followed by a linear increase or decrease in symptoms during treatment, with Vector 1 corresponding to a linear decrease or increase in symptoms during phase 1 followed by a linear decrease or increase in symptoms during phase 2 (opposite directions of change), Vector 4 signifying a linear decrease or increase in symptoms throughout both phases of treatment, and Vector 3 is interpreted as a linear decrease or increase in symptoms during phase 1 and no change in symptoms during phase 2 of treatment. Results from any subject who did not demonstrate change during treatment consistent with any specified slope vectors were interpreted, as indicated, but with caution.

Adolescent and parent-rated anxiety (RCADS-A-Anxiety; RCADS-P-Anxiety) following introduction to exposure. For slope changes on adolescent-reported anxiety (RCADS-A Anxiety), around the introduction to exposure (following session 1 of module 7), Participants 2, 3, 4, and 6 all displayed a similar pattern of change, involving a linear decrease in anxiety symptoms throughout treatment (Vector 4), with no major slope change following introduction to exposure. Consistent with previous RCADS-A Anxiety

results using baseline and treatment phases, subjects 1, 5, and 7 did not demonstrate significant trajectories of change in the RCADS-A Anxiety around the introduction to exposure.

For slope changes on parent-reported anxiety (RCADS-P Anxiety), around the introduction to exposure (following session 1 of module 7), subject 2 demonstrated a linear decrease in anxiety up until exposure, with no change in anxiety following exposure (Vector 3). Further, although subjects 1 and 6 did not demonstrate change consistent with trajectories of change during treatment overall (reported above), both subjects showed a significant within-treatment change consistent with Vector 2 (no change in anxiety prior to exposure and a subsequent linear decrease in anxiety following exposure). Consistent with previous RCADS-P Anxiety results using baseline and treatment phases, subjects 3, 4, 5, and 7 did not show significant trajectories of change in the RCADS-P Anxiety around the introduction to exposure.

Adolescent and parent-rated depression (RCADS-A-Depression; RCADS-P-Depression) following introduction to problem solving. For slope changes on adolescent-reported depression (RCADS-A Depression), around the introduction to problem solving (following session 3 of module 5), patterns of change differed among participants. Subject 4 demonstrated no significant change around the introduction to problem solving, despite significant treatment-based change overall (reported above). Subject 2 reported change in depressive symptoms in line with Vector 3, with depressive symptoms decreasing linearly up until the introduction of problem solving and then remaining stable after that. Although subject 3 did not demonstrate change consistent with trajectories of change during treatment overall (reported above), this participant

similarly reported symptoms around the introduction to problem solving consistent with Vector 3. Subject 6 showed change in depressive symptoms consistent with Vector 2, with no apparent change in symptoms until problem solving was introduced, and a linear decrease in depression following its introduction. Consistent with previous RCADS-A Depression results using baseline and treatment phases, subjects 1, 5, and 7 did not demonstrate significant trajectories of change in the RCADS-A Depression around the introduction to Problem Solving.

For slope changes on parent-reported depression (RCADS-P Depression), around the introduction to problem solving (following session 3 of module 5), patterns of change varied among participants. Both subjects 1 and 4 demonstrated results consistent with Vector 2, in which depressive symptoms remained stable until the introduction to problem solving and then decreased linearly until the end of treatment. Meanwhile, although subject 6 did not demonstrate change consistent with trajectories of change during treatment overall, this subject did show changes in depression around problem solving consistent with Vector 1, with depressive symptoms increasing until the introduction to problem solving and decreasing after this point. Consistent with previous RCADS-P Depression results using baseline and treatment phases, subjects 2, 3, 5, and 7 did not demonstrate significant trajectories of change in the RCADS-P Depression around the introduction to Problem Solving.

Adolescent-rated distress tolerance (DTS-GDI) following introduction to awareness. For slope changes on adolescent-reported distress tolerance (DT; DTS-GDI), around the major awareness module (following session 2 of module 6), patterns of change varied among participants. Subjects 2 and 3 exhibited a steady linear increase in

DT throughout treatment, both before and after module 6, a pattern most consistent with Vector 4. Subject 4 demonstrated no change in distress tolerance until after module 6, at which time this participant demonstrated a linear increase in DT, in line with Vector 2. Additionally, although subject 6 did not demonstrate change consistent with trajectories of change during treatment overall (reported above), this subject did show a linear increase in DT, but only later in treatment, following module 6 (Vector 2).

     Adolescent-rated experiential avoidance (EASI-A) following introduction to opposite action and exposure. For slope changes on adolescent-reported experiential avoidance (EASI-A Total), around the introduction to opposite action (following module 3) and the introduction to exposure (following session 1 of module 7), various patterns of change were identified. Specifically, several subjects showed significant change around modules 3 and 7, while others only demonstrated significant slope change following module 7. While subjects 5 and 6 did not demonstrate any significant changes in avoidance around module 3, subjects 2 and 3 did demonstrate significant change. Both subjects exhibited changes consistent with Vector 2 with showed little apparent change in avoidance up until module 3 and a subsequent linear decrease in avoidance following this module. These same participants (subjects 2 and 3) also demonstrated change in experiential avoidance around the introduction to exposure consistent with Vector 4, in which linear change throughout most of treatment was observed (with the majority of change presumably occurring after module 3). Subject 6 reported change consistent with Vector 2, whereby significant change in experiential avoidance was linear but did not occur until after the introduction to exposure. Meanwhile, subject 5 demonstrated a clear

and significant level change (pre/post exposure) in symptoms, but change did not adhere to specified vectors (see Table 8 for a breakdown of each subject's change trajectories).

Multivariate Process Analysis. Table 9 provides a summary of multivariate change processes measures by cross-correlations observed between variables of interest. In reference to the temporal relations found between distress tolerance (DTS-GDI) and adolescent- and parent-reported anxiety (RCADS-A Anxiety, RCADS-P Anxiety, respectively), a consistent pattern emerged. Across informants, all significant lags were equal to 0, indicating that distress tolerance and anxiety changed concurrently. Specifically, significant Lag 0 cross-lagged correlations between adolescent-reported anxiety and distress tolerance were observed in subjects 2 and 4, with decreases in anxiety occurring simultaneously to increases in distress tolerance. Similar lag 0 cross-lagged correlations were revealed via parent-reported anxiety in subjects 2 and 6.

Distress tolerance (DTS-GDI) and adolescent/parent-rated depression (RCADS-A Depression; RCADS-P Depression). For the temporal relationship between distress tolerance (DTS-GDI) and adolescent- and parent-reported depression (RCADS-A Depression, RCADS-P Depression, respectively), several different patterns were found between adolescent-reported depression, while no significant cross-correlations were revealed using the RCADS-P Depression. Specifically, significant cross-lagged correlations between adolescent-reported depression and distress tolerance were observed in subjects 2 and 6, with decreases in depression occurring simultaneously to (subject 6, Lag 0) or several weeks prior to (subject 2, Lag -2) changes in distress tolerance.

Experiential Avoidance (EASI-A) and adolescent/parent-rated anxiety

(RCADS-A Anxiety, RCADS-P Anxiety). In terms of temporal relations between experiential avoidance (EASI-A) and adolescent- and parent-reported anxiety, several different patterns emerged with significant lags mostly at Lag 0 but ranging from Lag 0 to Lag +1. Significant cross-lagged correlations between adolescent-reported anxiety and experiential avoidance were observed in subjects 1, 2, 3 and 6, with decreases in anxiety occurring simultaneously to (subjects, 2, 3, and 6, Lag 0) or one week after (subject 1, Lag +1) decreases in avoidance. However, considering that subject 1 did not demonstrate a significant trajectory of change in either variable on its own, this latter result should be interpreted with caution. In regard to parent-reported anxiety and experiential avoidance, all subjects with significant cross-lagged correlations (subjects 2 and 6) exhibited a pattern consistent with Lag 0, with parent-reported anxiety decreasing concurrently with decreases in experiential avoidance.

Experiential Avoidance (EASI-A) and adolescent/parent-rated depression

(RCADS-A Depression, RCADS-P Depression). In reference to temporal relationships between experiential avoidance (EASI-A) and adolescent- and parent-reported depression, various patterns again emerged with the most common pattern again being Lag 0 and ranging from Lag 0 to Lag +1 once again. Significant cross-lagged correlations between adolescent-reported depression and experiential avoidance were observed in subjects 1 and 6, with decreases in depression occurring simultaneously to (subject 6, Lag 0) or one week after (subject 1, Lag +1) decreases in experiential avoidance. As mentioned earlier, considering a lack of significant findings when examining these variables in isolation, subject 1's results should be interpreted with caution. In terms of

parent-reported depression and experiential avoidance, significant cross-lagged

correlations were similarly observed in subjects 1 and 6, with decreases in experiential

avoidance occurring simultaneously to decreases in depression, as hypothesized, in

subject 6, at Lag 0. However, subject 1 demonstrated different and somewhat unexpected

patterns with and increases in experiential avoidance occurring simultaneously to

decreases in depression, also at Lag 0, to be interpreted with caution once again.

Chapter 4: Discussion

This study aimed to assess change over time during the course of a transdiagnostic psychotherapy program for adolescents with emotional disorders, the UP-A (Ehrenreich-May et al., 2018). Specifically, goals were (1) to examine whether and when distress tolerance, experiential avoidance, and cognitive flexibility, variables traditionally associated with the construct of neuroticism, change relative to treatment components that target these variables in the UP-A, (2) to investigate whether and when symptoms of emotional disorders (i.e., anxiety, depression, severity of top problems) change during the course of the UP-A, and (3) to explore associations between changes in experiential avoidance, distress tolerance, and cognitive flexibility and emotional disorder symptoms during the UP-A. It was hypothesized that adolescents with emotional disorders would experience reductions in symptoms and that these changes would temporally follow changes in purported facets of neuroticism.

Treatment-based change was demonstrated by within treatment improvements, at both group and individual levels, in symptoms of anxiety and depression, presenting problems, and facets of neuroticism, along with clinician-rated severity and impairment in relation to emotional disorders. The most robust treatment effects were illustrated by concurrent decreases in anxiety and experiential avoidance during treatment, and by increases in self-reported distress tolerance (on the DTS-GDI). Specific subjects (specifically 3 out of the 4 subjects with clinical depression at baseline) also demonstrated substantial reductions in depression. Change trajectories generally varied between subjects, with some individual participants demonstrating change in emotional disorder symptoms as well as facets of neuroticism following the application of

theoretically related treatment components, and others showing more generalized treatment effects. Overall, change in aspects of neuroticism tended to occur simultaneously to reductions in emotional disorder symptoms.

Diagnostic outcomes were positive and remission/recovery rates were generally consistent with other UP-A trials (Ehrenreich-May et al., 2017) with approximately 60-65% of participants classified as subclinical on all emotional disorders at post-treatment and moderate to high RCI and recovery rates overall across clinical outcome variables. Group-level improvements were observed in anxiety and depressive symptoms, presenting problems, experiential avoidance, and distress tolerance. The fact that change in the majority of measures of emotional disorder symptoms and facets of neuroticism were observed from mid- to post-treatment and not from pre- to mid-treatment indicates that skills may need to accumulate and clients may require practice using skills before broader treatment-based change can occur, or that some of the active treatment components (e.g., awareness, exposure) occur initially or build up through continued practice during the latter half of treatment. It may also be that this type of adolescent sample with relatively significant symptoms of both anxiety and depression requires more time for change to be consolidated versus a sample that may have less complex fear or anxiety disorders alone (Liber et al., 2010). The tendency for most substantial treatment-based change to occur towards the latter half of the UP-A also underscores that eight sessions of treatment may not be enough for significant change to occur in this type of highly comorbid sample.

The fact that adolescent-rated top problems generally reduced earlier in treatment and continued to change throughout treatment suggests that adolescents may observe the initiation of change prior to the occurrence any measurable change in overarching symptoms or via other self-report measures. We could further speculate that the top problems measure provides value as a more personalized change measure that could be particularly sensitive to more subtle, but ideographically relevant indicators of treatment success (Weisz et al., 2011). If this is the case, adolescents might be expected, as was observed here, to report on change in top problems (i.e., issues that they wished to see change in, identified at the start of treatment) prior to change on more general self-report measures.

Single-case findings were more complex to interpret and different patterns were exhibited across subjects. At the group level, treatment success rates were superior to baseline success rates overall based on adolescent- and parent- reported emotional disorder symptoms (anxiety, depression) as well as adolescent-reported features of emotional disorders (distress tolerance, experiential avoidance). Overall, parent-reported depression changed little throughout the course of the intervention. However, it is also important to note that group-level success rate calculations do not take individual differences into account. Therefore, it is imperative, in multiple-baseline single-case studies, to examine trajectories of treatment-based change on the level of the individual.

With regard to adolescent-reported anxiety, 4 out of 7 subjects showed decreases in anxiety throughout treatment. In terms of when anxiety changes during treatment, results suggest that, for all 4 of the individual adolescents who demonstrated treatment-based changes in anxiety, reductions in anxiety occurred in a linear fashion throughout

treatment and this linear slope did not change significantly with the introduction to exposure. These results suggest that anxiety does change linearly throughout UP-A treatment for most adolescents with anxiety and depression and that the broader set of UP-A strategies, not just one treatment element on its own (e.g., exposure), may lead to treatment-based change in this symptom cluster.

For adolescent-reported depression throughout treatment, 3 out of 7 subjects (3 of the 4 subjects with clinical depression at baseline; all 3 of which had subclinical depression following treatment) demonstrated significant treatment-based reductions in depression. However, trajectories of within-treatment change varied. While one subject showed change in depression only after the introduction to problem solving, others demonstrated change prior to the introduction to problem solving. Therefore, some of these individuals may be responding to cognitive techniques, such as problem solving, more specifically, and others are potentially making progress prior to the introduction to problem solving, perhaps more so in response to the accumulative effects of weekly opposite action exercises (i.e., behavioral activation) completed continuously for these individuals following module 3 of the UP-A.

As mentioned, parent-report of emotional disorder symptoms was somewhat less reliable than adolescent report. Based on parent-report, only 1 out of 7 subjects demonstrated a linear decrease in anxiety throughout treatment. In terms of processes of change based on parent-report, results were more mixed, with one subject demonstrating change before, but not after, the initiation of exposure and two others demonstrating change after exposure.

It is important to take into account that parent-reported depression measured by the RCADS-P Short Form failed to demonstrate a treatment effect based on success rate differences between baseline and treatment phases, indicating that caution should be taken generally when interpreting additional single-case results using this measure. For parent-reported depression, 2 out of 7 subjects demonstrated change overall (one of these two possessed clinical depression at baseline), with depressive symptoms decreasing throughout treatment. Interestingly, parent-report regarding depression revealed a similar pattern to that demonstrated by adolescents, with some (minimal in one case) change in depression occurring, as hypothesized, after the introduction to problem solving, for 3 out of 7 subjects. Overall, patterns revealed by parent-report of anxiety and depressive symptoms were inconsistent with adolescent report, with different subjects displaying change in emotional disorder symptoms depending on which informant's report was examined. One explanation for null or conflicting findings on parent-report of emotional disorder symptoms is that adolescent-report may be more reliable and accurate than parent-report of anxiety and depression symptoms in adolescent samples with internalizing symptoms (Smith, 2007); hence, the more substantive change in adolescent-report of both anxiety and depressive symptoms, as compared to parent-report, is less surprising.

Although a certain amount of parent-child discrepancy in report of psychological issues is to be expected (Becker-Haimes, Jensen-Doss, Birmaher, Kendall, & Ginsburg, 2017), this pattern of inconsistency in reports of psychopathology is in line with findings from previous work on the UP-A (Trosper et al., 2009) and might be particularly acute in samples of adolescents with internalizing disorders, in which such adolescents may share

less with their parents about emotional disorder symptoms and for whom many symptoms of internalizing disorders are less observable than externalizing concerns, making parents less reliable informants for adolescent internalizing disorders (Smith, 2007). Moreover, since adolescents spent the majority of time in treatment alone with their therapists in the UP-A, parents do not necessarily hear about all of the ways in which their adolescent is making treatment-based changes. Some parents might see anxiety reductions with the initiation of therapy and application of coping skills, while others might observe the change later, when skills have been practiced more in-depth and with exposure applications.

For distress tolerance measured by the DTS-GDI, 3 out of 7 subjects exhibited change overall, with all of these subjects showing an increase in distress tolerance throughout treatment. Among individuals in the present study, distress tolerance changed in two different ways. For 2 out of 7 subjects, distress tolerance increased linearly throughout treatment, indicating that the UP-A and its components as a whole seemed to help increase self-reported distress tolerance. However, for another 2 subjects, distress tolerance did not begin to linearly increase until after awareness strategies were introduced, which is in line with the hypothesis that awareness strategies (e.g., present-moment awareness and non-judgmental awareness) may serve to increase one's ability to tolerate distress. The finding that trajectories of change in distress tolerance varied substantially across individuals, with some showing change only later in treatment, suggests that distress tolerance may be a more dynamic process than hypothesized.

These findings suggest that different adolescents experience changes in self-reported distress tolerance at different points in the intervention, which could depend on

their symptom profiles. Although it has been shown to measure one's ability to tolerate distress in adolescent samples (Tonarely & Ehrenreich-May, under review; You & Leung, 2012), items on the DTS pull for information about one's perceived ability to cope with distress generally. Items on the scale about not feeling able to handle distress may be interpreted differently by different individuals. For those with high levels of anxiety, items describing intolerance of distress may be interpreted as intolerance of anxiety, while those with higher levels of sadness or anger might interpret such items differently. Individuals with heightened anxiety may show a tendency to respond to distress tolerance items in a manner consistent with their fear of strong emotion states, a response more consistent with anxiety sensitivity (fear that symptoms of anxiety are dangerous) than distress tolerance per se. This may indicate that the DTS is actually a measure of both anxiety sensitivity and distress tolerance for some individuals (i.e., affect tolerance; Bernstein, Zvolensky, Vujanovic, & Moos, 2009). In fact, the broader label of affect tolerance in reference to both distress tolerance and anxiety sensitivity has been used increasingly in the literature on the adult UP, with affect intolerance recently being examined as a core mechanism of change in the UP (Barlow, Farchione, Sauer-Zavala, et al., 2017). Perhaps a measure assessing affect intolerance more pointedly would have produced more consistent change trajectories across participants. Although the BIRD task was implemented as an additional measure of distress tolerance here, the lack of correspondence between BIRD task (primarily a frustration tolerance task) results and DTS scores points to a need for further exploration with regard to how to best define distress/affect tolerance in youth and to track it throughout treatment.

Along with anxiety, decreases in experiential avoidance changed most consistently at hypothesized times among adolescents in this investigation. Specifically, 4 out of 7 individuals demonstrated decreases in experiential avoidance throughout treatment overall, supporting theoretical work suggesting that avoidance serves as a key target of the UP-A. Patterns in experiential avoidance were also very informative, as they provided important insight into potential trajectories of change within UP-A treatment. Specifically, several subjects showed significant change around modules 3 (opposite action introduction) and 7 (exposure), while others only demonstrated significant decreases in experiential avoidance following module 7. These predictable patterns of change illustrate that avoidance has multiple points of entry within the UP-A. Perhaps for some individuals, the idea of doing the opposite of what an emotion leads one to want to do is enough to elicit behavioral change, while others required more practice with opposite action (i.e., weekly practice outside of session up until exposure was introduced) and/or a more specific and applied introduction to exposure, which typically occurs during the first session of module 7 (i.e., introduction to theories of exposure, tasks getting easier with practice, in-session, therapist assisted exposure practice).

Several factors may have contributed to these between-subject differences. First, it is possible that the subjects who reported decreases in experiential avoidance earlier in treatment were engaging in greater levels of out of session opposite action practice between modules 3 and 7 than those who improved later in treatment, despite the fact that all subjects reported similar levels of out of session practice. Another explanation for the finding is that the individuals who improved more slowly were unable to make as much progress with opposite action outside of session, despite completing planned home

learning assignments. For subject 5, for example, a lack of confidence in her ability to pursue treatment-related goals may have played a role in her lack of significant behavioral change until later in treatment. For this subject, despite her therapist's attempts to convince her that she was capable of taking larger steps towards opposite action goals, she tended to insist on taking smaller steps towards depression and social anxiety-related targets. Subject 6, who showed this similar pattern, was unique in that she presented with moderate to severe OCD in addition to several other emotional disorders, including specific phobia of vomiting, social anxiety disorder, generalized anxiety disorder, and depression. This client showed the most improvement in her OCD symptoms following the introduction to module 7, which likely led to the greatest change in her ratings of experiential avoidance. Implications regarding the treatment of OCD using the UP-A and suggestions for how the UP-A could be used to best target OCD, with these results in mind, are discussed later in this section.

The role of avoidance in the UP-A is important, and the design of the treatment allows for the tailoring of avoidance-related materials to the needs of individuals with a variety of symptom presentations (i.e., module 3, module 4, module 7). Youth might begin to experience reductions in avoidance behaviors at one, several, or all of these points in treatment, and presumably continue reducing avoidance behaviors throughout the remainder of the treatment. This idea of avoidance as a point of personalization throughout UP-A modules is supported by results of the current study, whereby some adolescents showed avoidance-related change earlier in treatment (at module 3) and others did not demonstrate significant changes in avoidance until module 7. Despite social anxiety having been identified as a predictor of poorer treatment response in prior

CBT trials (Kennedy, Tonarely, Sherman, & Ehrenreich-May, 2018; Wergeland et al., 2016), individuals with primary social anxiety within the current study had some of the strongest treatment responses, which might result from the early and persistent emphasis on opposite action and exposure throughout the UP-A. Consistent with this potential explanation, two of the three subjects with primary social anxiety within the present investigation exhibited the greatest reductions in both avoidance behaviors and anxiety, with changes in experiential avoidance following the introduction of module 3 (opposite action).

This unique finding may be the result of several important aspects of both the UP-A and this sample. First, the idea of acting opposite of how an emotion makes one want to act is introduced early in treatment (during modules 2 and 3), allowing adolescents to spend the majority of treatment engaging in low level activation or exposures, prior to the introduction of planned situational exposure later in treatment, which may have led to greater treatment effects for individuals who are primarily affected by social anxiety. The correspondence between social anxiety and depression during adolescence may also play a role here (Beesdo et al., 2007; Bittner et al., 2007; Costello, Mustillo, Erkanli, Keeler, & Angold, 2003). Specifically, all of the adolescents in the current sample with social anxiety disorder also had significant depressogenic symptoms. Therefore, it could be that these individuals' avoidance behaviors at the start of treatment stemmed from anhedonia or low mood symptoms combined with social anxiety symptoms. The UP-A, through targeting both anxiety and depression in adolescents, may therefore be particularly well-suited for these individuals with clinically significant social anxiety and depression.

While the majority of subjects demonstrated consistent treatment-based change, several individuals (subjects 1, 5, and 7) did not demonstrate significant change on the majority of measures. Subject 1's results can at least be partially explained by the fact that this participant was the youngest individual in the study and had significant attention problems, which could have contributed to inconsistent responses on adolescent-report questionnaires. It is also important to note that, although subject 1 reported minimal change in emotional disorder symptoms and features of emotional disorders, her mother reported significant change in anxiety and depression throughout the intervention.

More puzzling are the results from subjects 5 and 7. In these cases, adolescents and their parents agreed that minimal change had occurred overall in the UP-A. Importantly, both of these participants continued to exhibit clinically significant anxiety post-treatment as well, indicating that the UP-A was less effective for these individuals. One explanation for these findings involves taking into account the symptom presentations of each of these subjects. Qualitatively, both participants presented with more severe deficits in emotional awareness, significant problems with distress regulation, and difficulty breaking down and understanding emotional experiences. Such presentations could contribute to some null results and a need for additional practice using awareness skills to tolerate more difficult emotional triggers. The more rigid, trial-based structure of the protocol used within the current study is contrary to the modular structure in which it is written (Ehrenreich-May et al., 2018) and may have made it more difficult for therapists to incorporate additional awareness practice, which may have been particularly problematic for these subjects. Such adolescents also required especially

gradual introduction to exposure targets, so additional exposure sessions in which these participants could work up to tolerating distress in the face of more intense triggers might have increased their ability to make more significant treatment gains.

Implications of the results of the current study are threefold. First, group- and individual-level analyses provide future validation for the use of the UP-A for adolescents with multiple, co-occurring emotional disorders, including anxiety, depression, and OCD. Second, theoretical facets of neuroticism, including experiential avoidance and distress tolerance appear to change during the course of UP-A treatment, which provides support for the idea that these facets of neuroticism are modifiable through UP-A treatment. Additionally, for some, change in facets of neuroticism occurred at expected times during treatment, indicating that experiential avoidance, and, in some cases, self-reported distress tolerance sometimes changes following the introduction of active treatment components (i.e., opposite action practice, exposure, awareness) designed to ameliorate the effects of these risk factors on youth with emotional disorders. Third, single-case trajectories of change provide support for the importance of tailoring treatments to individual clients. For example, since modules 3 and 7 seem to target experiential avoidance most pointedly, a client with particularly high levels of experiential avoidance may experience earlier treatment gains if administered these modules as soon as possible.

Notably, the individual subject who showed the greatest late-treatment reductions in experiential avoidance (following module 7) was unique in that she had moderate to severe OCD. This pattern is important to note since, for other subjects, out of session opposite action practice generally focused on depression and social anxiety, while

for this subject, opposite action practice focused on OCD targets. Given that the client

with OCD responded best to in-session exposures (versus home-based opposite action

work), perhaps individuals with OCD might respond best to an earlier introduction to in-

session exposure. However, this solution is not always feasible during treatment with the

UP-A, due to the fact that pursuing in-session exposure earlier in treatment could

interfere with a therapist's ability to introduce other active treatment components. One

way to incorporate additional OCD exposures without sacrificing time in session devoted

to the introduction and practice of other treatment components is to provide greater

support for between-session opposite action/exposure, which is suggested in the UP-A

manual.

It is important to consider that anxiety and depression appear to be targeted

throughout UP-A treatment, with change presenting in a primarily linear fashion,

indicating that the intervention is particularly helpful, in its current form, for coping with

a range of emotional disorders. This may be at least partially due to the fact that

experiential avoidance and distress tolerance (particularly sensitive targets of the UP-A)

are addressed continually throughout treatment from early on via opposite action

strategies for depression, anxiety, and other emotional behaviors, interoceptive

exposures, awareness activities, and finally, through in-session exposure. Further, the

adolescents treated in the current study had complex clinical presentations and moderate

to severe psychopathology (See Table 1 for a breakdown of clinical presentations

exhibited by participants. See Appendix 1 for brief case description of each participant).

Despite presenting with a variety of co-occurring clinical concerns, participants, for the

most part, improved, and many were subclinical after completing only 16 sessions of

therapy, suggesting that the UP-A may be used to provide short-term treatment to individuals with complex clinical presentations, with comparable treatment lengths to disorder-specific CBT interventions.

Summary, Additional Implications, and Limitations of the Current Investigation

In terms of limitations, some but not all subjects demonstrated change consistent with hypothesized slope vectors for each measure investigated. Somewhat unstable baselines, even for subjects with valid data, make conclusions more difficult to draw as well. Additionally, with parent-report proving less sensitive to change than predicted, many of the conclusions drawn in terms of trajectories of change using single-case data rely on adolescent-report alone. Although not terribly surprising for research on adolescent emotional disorders (Becker-Haimes et al., 2017), this fact is concerning, as data from multiple informants is generally more complete and provides multiple perspectives on an individual's psychopathology (Smith, 2007). Additionally, with the exception of the BIRD task as one measure of distress tolerance, which did not result in observable change over the course of the intervention, this study involved all subjective measurement. More objective measures (e.g., psychophysiological measures, cognitive tasks, etc.) may reduce issues such as informant biases and difficulties with reporting on one's own emotional state. Further, despite the fact that efforts were put forth to select individuals representative of the broader population of adolescents with multiple co-occurring emotional disorders, factors including limited sample size and lack of an active control comparison condition reduce generalizability of findings. One additional

technical limitation is that test-retest data was limited on some of the measures used in the current study, which contributed to a need to remove one measure altogether from analyses (i.e., ERQ-CA Reappraisal).

Also, findings involving sequencing of changes in symptoms and features of emotional disorders were lacking due to the fact that emotional disorder symptoms and facets of neuroticism appeared to change concurrently, rather than changes in features of emotional disorders preceding symptom changes, as hypothesized. Several factors might contribute to this unexpected finding. First, reports on emotional disorder symptoms and facets of neuroticism could be conflated, especially when reported on by the same informant at the same time. Another possible explanation is that, if neuroticism is a core feature of emotional disorders, as theorized, it could make sense that modifiable risk factors related to neuroticism may change along with emotional disorder symptoms instead of prior to reductions in emotional disorder symptoms, in that change in symptoms of emotional disorders may represent a more immediate downward effect of changes in facets of neuroticism. The utilization of novel experimental designs incorporating more frequent sampling, such as ecological momentary assessment (EMA) (Shiffman, Stone, & Hufford, 2008), may allow for more accurate predictions about temporal relationships between change in factors associated with neuroticism and emotional disorder symptoms.

Strengths of the present investigation include a low attrition rate and consistently high session attendance across participants along with a high sampling frequency resulting in the ability to examine both treatment-based change and temporal relationships between variables of interest. Overall, results of this investigation provide

additional evidence for the efficacy of the UP-A as a transdiagnostic treatment for adolescents with multiple different emotional concerns, including both anxiety and depression and for the UP-A's ability to modify core transdiagnostic features of emotional disorders, including distress tolerance and experiential avoidance. Specifically, individuals with social anxiety and depression, which are typically less responsive to psychosocial treatments alone (Wergeland et al., 2016), exhibited the most significant treatment-based changes, indicating that the UP-A may be particularly helpful for these individuals. Results also contribute to our understanding of how transdiagnostic treatments such as the UP-A work. Results from this study provide insight into change trajectories of treatment targets, including emotional disorder symptoms and facets of neuroticism, as well as individual differences in these processes. Based on this study, anxiety, experiential avoidance, and self-reported distress tolerance appear to be most strongly affected by the UP-A, while depression was significantly affected by the treatment for most individuals with significant depression.

Considering that this application of the UP-A resulted in particularly strong effects for adolescents with comorbid anxiety and depressive disorders, future work might focus on examining these change processes in larger samples of youth, especially in primarily depressed youth, who tend to be less responsive to CBT (Weisz et al., 2006). It may also prove important to further investigate better ways to target and assess cognitive reappraisal and potentially distress tolerance as transdiagnostic treatment targets in youth with emotional disorders.

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Figures

Figure 1. *Neuroticism's Influence on Emotional Disorders (based on Barlow et al., 2014)*

Neuroticism:
Tendency to experience frequent and intense negative emotions in response to stress

Facets of Neuroticism
(Direct Targets of Unified Protocols):
→ Exaggerated aversive/distress reaction to internal/external cues (Low tolerance for distress)
→ Automatic negative thoughts and difficulty restructuring these thoughts (Impaired Cognitive Flexibility)
→ Efforts to control/suppress emotions, perceived inability to cope (rumination, cognitive/experiential avoidance, compulsions)

Emotional Disorders:
Negative reinforcement cycle and poor emotional self-efficacy maintain this process:
→ Emotional disorders (e.g., anxiety, depression, obsessive-compulsive disorder)

Figure 2. *Tested Slope Vectors*
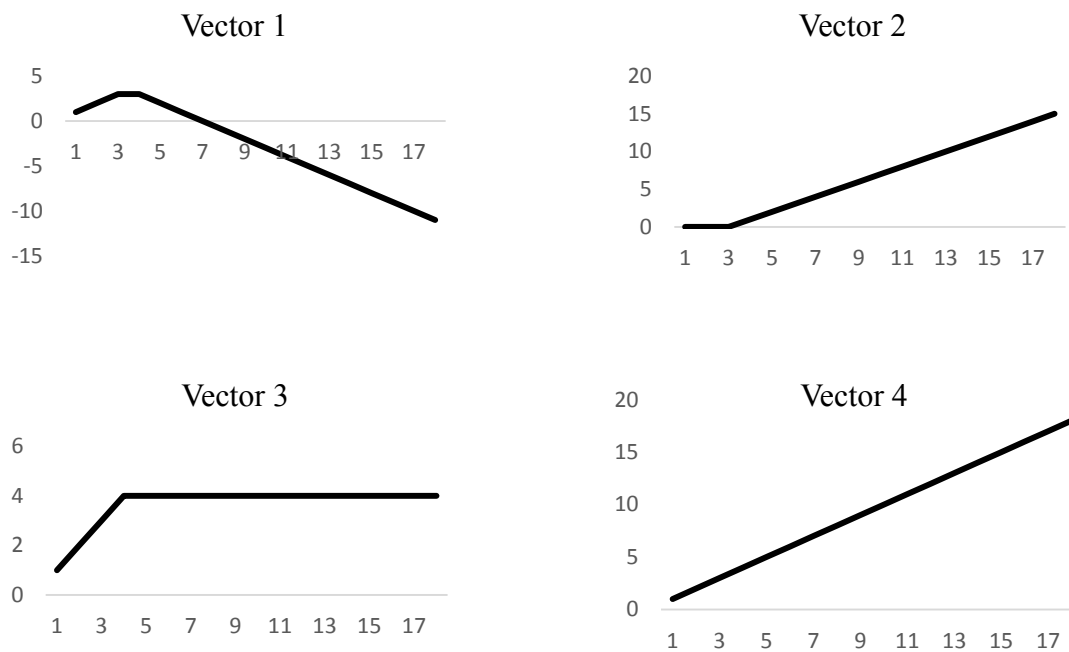
Note. Simulation modeling analyses slope vectors. Positive correlations correspond to these slopes. Negative correlations represent mirror images of these slopes.

Tables

Table 1. *Diagnostic Summary of Sample*

I D	RCADS-A Anxiety	RCADS-A Depression	RCADS-P Anxiety	RCADS-P Depression	Diagnoses at Baseline (on ADIS-5 C/P)
1	**62.17**	48.39	**68.24**	**75.52**	**GAD**; ADHD; Specific Phobia, BII
2	**65.92**	**100.16**	**70.76**	**81.83**	**Social Anxiety Disorder**; PDD with current MDE; GAD
3	**61.67**	46.25	**73.30**	52.73	**Social Anxiety Disorder**, GAD, ADHD, Other Specified Depressive Disorder
4	48.72	39.23	**67.04**	**75.04**	**GAD**; PDD
5	41.57	53.84	**60.68**	59.75	**Social Anxiety Disorder**; GAD; MDD
6	**69.66**	51.12	**106.02**	**62.90**	**Specific Phobia (Vomit)**; **OCD**; GAD; Social Anxiety Disorder
7	**67.79**	**70.19**	**75.79**	59.75	**GAD**; Specific Phobia, BII
8	**77.87**	**62.27**	56.54	**63.04**	**Social Anxiety Disorder**, GAD, Agoraphobia

Note. Bold = scores indicate elevation at baseline; principal diagnosis. RCADS-A = Revised Children's Anxiety and Depression Scale-Short Form; RCADS-P = Revised Children's Anxiety and Depression Scale-Parent-Report-Short Form. GAD = generalized anxiety disorder; PDD = persistent depressive disorder; MDE = major depressive episode; BII = blood, injection, or injury.

Table 2. *Overview of UP-A Core Modules and Techniques*

Module	Module Techniques	Module Targets
Module 1: Orienting to Treatment and Enhancing Motivation **(1 session)**	Orienting to treatment, establishing top problems and goals, identifying barriers, and enhancing motivation for change	*N/A*
Module 2: Emotion Education **(2 sessions)**	Identifying emotions and functions of such, breaking emotions down into parts, functional assessment of emotional experiences	*Decreasing cognitive avoidance of emotional experiences*
Module 3: Introduction to Emotion-focused Behavioral Experiments **(1 session)**	Explaining opposite action and emotion-focused behavioral experiments (modifying maladaptive action tendencies), conducting behavioral activation as one type of emotion-focused behavioral experiment	*Decreasing maladaptive behavioral action tendencies (e.g., avoidance) occurring in response to strong emotions*
Module 4: Awareness of Physical Sensations **(1 session)**	Establishing relationship between physiological sensations and intense emotions, increasing awareness of physiological sensations, conducting behavioral experiments via interoceptive exposure	*Increasing tolerance of physical sensations* *Decreasing avoidance of physical sensations* *Increasing cognitive flexibility around physical sensations*

Module 5: Being Flexible in Your Thinking (3 sessions)	Introducing thinking flexibly and automatic appraisals, teaching common "thinking traps", linking thoughts to action via antecedent cognitive reappraisal and problem solving	*Increasing cognitive flexibility during emotional experiences (e.g., increasing reappraisal of thoughts [cognitive restructuring] and decreasing avoidant action tendencies [problem solving])*
Module 6: Emotional Awareness (2 sessions)	Introducing and practice present- moment and non-judgmental awareness, conducting behavioral experiment using awareness strategies with emotionally evocative stimuli	*Decreasing focus on maladaptive thoughts and worry (rumination, suppression)* *Increasing tolerance of emotional experience*
Module 7: Situation-Based Emotion Exposures (5 sessions)	Explaining rationale for further behavioral experiments (e.g., situational, imaginative exposures), conducting exposures to situations and imagined situations that elicit problematic emotional behaviors (e.g., avoidance)	*Decreasing experiential avoidance* *Increasing cognitive flexibility (i.e., reappraisal before, after exposures)* *Increasing distress tolerance (eliciting uncomfortable emotional experiences)*
Module 8: Relapse Prevention (1 session)	Reviewing skills and progress towards goals, establishing relapse prevention plan	*N/A*

Table 3. *Test Re-Test Reliability and Internal Consistency for Study Measures*

Measure/Subscale	Test Re-Test Reliability
RCADS-A Total	0.97
RCADS-A Depression	0.98
RCADS-A Anxiety	0.92
RCADS-P Total	0.94
RCADS-P Depression	0.94
RCADS-P Anxiety	0.98
EASI-A Total	0.89
DTS-GDI	0.93
ERQ-CA Reappraisal	0.42

Measure/Subscale	Internal Consistency (α)
RCADS-A Total	0.89
RCADS-A Depression	0.92
RCADS-A Anxiety	0.77
RCADS-P Total	0.78
RCADS-P Depression	0.76
RCADS-P Anxiety	0.88
EASI-A Total	0.88
DTS-GDI	0.81
ERQ-CA Reappraisal	0.84

Note. RCADS-A = Revised Children's Anxiety and Depression Scale-Short; ERQ-CA = Emotion Regulation Scale for Children and Adolescents; DTS-GDI = Distress Tolerance Scale-Global Distress Intolerance; EASI-A = Emotional Avoidance Strategy Inventory for Adolescents.

Table 4. *Emotional Disorder Symptoms and Features of Emotional Disorders Over Treatment*

Measure/Subscale	Pre Mean/SD	Mid Mean/SD	Post Mean/SD
RCADS-A Total	29.13 (11.19)	25.50 (12.81)	**16.13(12.64)**
RCADS-A Anxiety	15.75 (7.87)	14.88 (7.34)	**8.88 (7.45)**
RCADS-A Depression	13.38 (6.26)	10.63 (6.50)	**7.25 (5.42)**
RCADS-P Total	23.14 (6.36)	24.43 (9.27)	**13.29 (4.86)**
RCADS-P Anxiety	13.86 (6.07)	14.57 (8.89)	**7.57 (3.74)**
RCADS-P Depression	9.29 (2.75)	9.86 (3.98)	**5.71 (3.64)**
Top Problems-A	5.31 (1.02)	**3.86 (1.82)**	**2.00 (1.61)**
Top Problems-P	5.75 (1.69)	**4.25 (1.52)**	3.33 (1.91)
DTS-GDI	27.50 (7.13)	29.50 (6.41)	**39.25 (11.85)**
EASI-A	39.88 (12.23)	38.13 (7.99)	**27.88 (13.84)**
BIRD SUDs	0.71 (2.43)	0.38 (1.69)	0.50 (1.85)
BIRD Persistence	263.45 (79.10)	203.13 (136.73)	209.12 (135.21)

Note. RCADS-A = Revised Children's Anxiety and Depression Scale-Short Form; RCADS-P = Revised Children's Anxiety and Depression Scale-Parent-Report-Short Form; Top Problems-A = adolescent's report on severity of presenting problems; Top Problems-P = parent's report on severity of presenting problems; DTS-GDI = Distress Tolerance Scale-Global Distress Intolerance; EASI-A = Emotional Avoidance Strategy Inventory for Adolescents; BIRD = Behavioral Indicator of Resiliency to Distress Task; SUDs = subjective units of distress (post task-pre task); BIRD Persistence = seconds spent in level 3 of task

*Bold = p < 0.05 indicating treatment effect on Friedman/Wilcoxon Test

Table 5. *Reliable Change Index and Recovery*

Response to Treatment	Pre Mean/ SD	Post Mean/ SD	Percentage Improved (RCI)	Percentage Recovered	Percentage Subclinical (CSRs ≤ 3) (T-Score < 60)	Percentage Responder Status (CGI-I ≤ 2)
Principal Diagnosis CSR	6.37 (0.52)	**3.75** **(0.71)**	100% (8/8)	75% (6/8)	75% (6/8)	---
All Clinical CSRs	---	---	75% (6/8)	---	62.5 % (5/8)	---
CGI-S	6.38 (0.52)	**3.13** **(1.13)**	---	37.5% (3/8)	---	---
CGI-I	---	*1.63* *(0.74)*	---	---	---	*100%* *(8/8)*
RCADS-A Anxiety	15.75 (7.87)	**8.88** **(7.45)**	12.5% (1/8)	---	75% (6/8) (2/8 clinical at pre)	---
RCADS-A Depression	13.38 (6.26)	**7.25** **(5.42)**	37.5% (3/8)	---	75% (6/8) (2/8 clinical at pre)	---
RCADS-P Anxiety	13.86 (6.07)	**7.57** **(3.74)**	42.9% (3/7)	---	57.1% (4/7) (3/7 clinical at pre)	---
RCADS-P Depression	9.29 (2.75)	**5.71** **(3.64)**	42.9% (3/7)	---	71.4% (5/7) (3/7 clinical at pre)	---

Note. Improved= reliable change index (RCI) > 1.96; RCI = $(CSR_{post} - CSR_{pre})/S_{diff}$; recovered = ≤ $Mean_{pretreatment}$ - 2 $SD_{pretreatment}$(cutoff for recovery, CSR < 3.48, cutoff for recovery CGI < 2.95); not completed for RCADS-A or RCADS-P due to limited sample size resulting in large SDs and lack of availability of norms for population mean/SD for specific scales. CSR = clinician severity rating on ADIS-5 C/P; CGI-S = Clinical Global Impairment-Severity; CGI-I = Clinical Global Impairment-Improvement; Revised Children's Anxiety and Depression Scale-Short Form; RCADS-P = Revised Children's Anxiety and Depression Scale-Parent-Report-Short Form.
*Bold = p < 0.05 indicating treatment effect on Wilcoxon Test

Table 6. *Success Rate Calculations*

	RCADS-A Anx	RCADS-A Depress	RCADS-P Anx	RCADS-P Depress	DTS-GDI	EASI-A
Chi-Square Statistic	21.4	21.4	21.4	0.42	12.23	13.21
P-Value *(95% CI)*	<0.001 *(3.13-22.56)*	<0.001 *(3.13-22.56)*	<0.001 *(3.13-22.56)*	ns *(0.50-4.01)*	<0.01 *(1.94-13.47)*	<0.01 *(2.06-14.66)*
Odds Ratio (BL/TX)	8.4	8.4	8.4	1.41	5.11	5.5

Note. RCADS-A = Revised Children's Anxiety and Depression Scale-Short Form; RCADS-P = Revised Children's Anxiety and Depression Scale-Parent-Report-Short Form; Anx = Anxiety Subscale; Depress = Depression Subscale; DTS-GDI = Distress Tolerance Scale-Global Distress Intolerance; EASI-A = Emotional Avoidance Strategy Inventory for Adolescents.
DF=1 for all success rate calculations.

Table 7. *SMA: Overall Treatment Effects and Baseline Stability*

ID	RCADS-A Total	RCADS-A Anx	RCADS-A Dep	RCADS-P Total	RCADS-P Anx	RCADS-P Dep	DTS-GDI	EASI-A
1	-0.28(3)	-0.49(3)	-0.09(1)	-0.69(4)	-0.69(3)	-0.68(4)*	0.16(1)	-0.22(1)
2	-0.93(4)*	-0.86(2)*	-0.90(2)*	-0.83(4)*	-0.91(4)*	-0.54(4)	-0.96(1)*	0.94(1)*
3	0.91(1)*	-0.87(4)*	0.82(1)	0.55(1)	-0.58(4)	0.46(3)	-0.80(1)*	-0.95(4)*
4	-0.84(2)*	-0.73(2)*	-0.84(2)*	-0.85(2)*	0.80(1)	-0.77(4)*	0.62(4)*	0.16(2)
5	-0.56(3)	-0.59(1)	-0.64(3)	-0.61(1)	-0.31(1)	0.67(4)	0.74(3)	0.84(1)*
6	0.91(1)*	0.93(1)*	0.82(1)*	0.64(1)	0.70(1)	-0.34(2)	-0.75(1)	-0.82(2)*
7	-0.55(1)	-0.50(1)	-0.54(4)	0.25(1)	0.10(1)	-0.53(1)	-0.65 (2)	-0.33(3)

Note. Number in parentheses corresponds to best-fitting slope. Slopes were calculated by dividing data into phase one (baseline) and phase two (treatment). RCADS-A = Revised Children's Anxiety and Depression Scale-Short Form; RCADS-P = Revised Children's Anxiety and Depression Scale-Parent-Report-Short Form; DTS-GDI = Distress Tolerance Scale-Global Distress Intolerance; EASI-A = Emotional Avoidance Strategy Inventory for Adolescents; ID = identification number.
*p < 0.05 (Bonferroni corrected for multiple comparisons).

Table 8. *SMA: Trajectories of Within-Treatment Change*

ID	Anx-A/ Exposure (mod 7)	Anx-P/ Exposure (mod 7)	Dep-A/ Problem-Solving (mod 5)	Dep-P/ Problem-Solving (mod 5)	DT/ Aware (mod. 6)	Avoid/ Opposite Action (mod. 3)	Avoid/ Exposure (mod 7)
1	0.35 (2)	-0.62 (2)*	0.23 (2)	-0.75 (2)*	-0.52 (3)	-0.34 (3)	0.26 (2)
2	-0.81 (4)*	-0.84 (4)*	-0.90 (3)*	-0.37 (3)	0.96 (4)*	-0.97 (2)*	-0.96 (4)*
3	-0.92 (4)*	-0.44 (4)	-0.82 (3)*	-0.80 (2)	0.82 (4)*	-0.93 (2)*	-0.91 (4)*
4	-0.72 (4)*	-0.78 (4)	-0.78 (4)	-0.76 (2)*	0.66 (2)*	0.22 (3)	0.49 (1)
5	0.64 (1)	0.76 (1)	-0.15 (2)	0.61 (3)	0.58 (1)	-0.81 (4)	-0.81 (4)
6	-0.91 (4)*	-0.86 (2)*	-0.89 (2)*	0.68 (1)*	0.88 (2)*	-0.74 (2)	-0.82 (2)*
7	0.24 (2)	-0.56 (2)	-0.57 (4)	0.60 (3)	-0.64 (3)	-0.39 (3)	0.12 (2)

Note. Number in parentheses corresponds to best-fitting slope. Slopes were calculated by dividing data into phase one (prior to introduction of a specific skill [exposure, problem-solving, awareness, opposite action]) and phase two (following introduction of skill). Anx-A = adolescent-reported anxiety on RCADS-A (Revised Children's Anxiety and Depression Scale-Short Form); Dep-A = adolescent-reported depression on RCADS-A (Revised Children's Anxiety and Depression Scale-Short Form); Anx-P = parent-reported anxiety on RCADS-P (Revised Children's Anxiety and Depression Scale-Parent-Report-Short Form); Dep-P = parent-reported depression on RCADS-A (Revised Children's Anxiety and Depression Scale-Parent-Report-Short Form); DTS-GDI = Distress Tolerance Scale-Global Distress Intolerance; EASI-A = Emotional Avoidance Strategy Inventory for Adolescents; ID = identification number.
*$p < 0.05$ (Bonferroni corrected for multiple comparisons).

Table 9. *SMA: Multivariate Change Processes (Cross-Lagged Correlations)*

ID	Anx-A/ DT	Anx-P/ DT	Dep-A/ DT	Dep-P/ DT	Anx-A/ Avoid	Anx-P/ Avoid	Dep-A/ Avoid	Dep-P/ Avoid
1	-0.51(3)	-0.37(-4)	-0.55 (0)	0.44(4)	0.70(1)*	-0.36(3)	0.75(1)*	-0.65(0)*
2	-0.78(0)*	-0.83(0)*	-0.77(-2)*	-0.38(0)	0.83(0)*	0.80(0)*	0.77(0)	0.39(-4)
3	-0.64(0)	-0.54(4)	-0.64(0)	-0.61(0)	0.88(0)*	0.57(3)	0.72(-1)	0.78(0)
4	-0.70(0)*	-0.47(-4)	-0.46(0)	-0.55(-1)	-0.47(1)	-0.56(1)	-0.24(4)	0.44(4)
5	-0.53(-5)	-0.49(-5)	0.50(0)	0.61(3)	-0.49(-3)	-0.58(-3)	0.25(-1)	-0.56(-1)
6	0.77(0)	-0.86(0)*	0.90(0)*	-0.59(0)	0.73(0)*	0.82(0)*	0.80(0)*	0.73(0)*
7	-0.49(4)	0.39 (2)	0.50(1)	-0.61(1)	-0.49(4)	-0.56(2)	-0.51(-2)	-0.34(2)

Note. Number in parentheses corresponds to best fitting lag. Positive lags indicate positive correlation among variables and negative lags indicate negative correlation between variables. Positive lags indicate that variable 1 (feature of emotional disorders; distress tolerance/avoidance) changes prior to variable 2 (emotional disorder symptoms; anxiety/depression), while negative lag indicates that variable 2 changes prior to variable 1. A lag of 0 indicates that variables 1 and 2 change concurrently. Anx-A = adolescent-reported anxiety on RCADS-A (Revised Children's Anxiety and Depression Scale-Short Form); Dep-A = adolescent-reported depression on RCADS-A (Revised Children's Anxiety and Depression Scale-Short Form); Anx-P = parent-reported anxiety on RCADS-P (Revised Children's Anxiety and Depression Scale-Parent-Report-Short Form); Dep-P = parent-reported depression on RCADS-A (Revised Children's Anxiety and Depression Scale-Parent-Report-Short Form); DT = distress tolerance (DTS-GDI; Distress Tolerance Scale-Global Distress Intolerance); Avoid = avoidance (EASI-A; Emotional Avoidance Strategy Inventory for Adolescents); ID = identification number. *p < 0.05 (Bonferroni corrected for multiple comparisons).

Appendix 1

Copies of Measures and Subject Descriptions

A. Emotion Regulation Questionnaire-Child and Adolescent Form (ERQ-CA; Gullone & Taffe, 2012; MacDermott et al., 2009)

These 10 questions are about how you feel inside, and how you show your emotions/feelings. Some of the questions may seem similar to one another, but they are different in important ways.

1. When I want to feel happier, I think about something different.	Strongly Disagree	Disagree	Half and half	Agree	Strongly Agree
2. I keep my feelings to myself	Strongly Disagree	Disagree	Half and half	Agree	Strongly Agree
3. When I want to feel less bad (e.g., sad, angry or worried), I think about something different.	Strongly Disagree	Disagree	Half and half	Agree	Strongly Agree
4. When I am feeling happy, I am careful not to show it.	Strongly Disagree	Disagree	Half and half	Agree	Strongly Agree
5. When I'm worried about something, I make myself think about it in a way that helps me feel better.	Strongly Disagree	Disagree	Half and half	Agree	Strongly Agree
6. I control my feelings by not showing them	Strongly Disagree	Disagree	Half and half	Agree	Strongly Agree
7. When I want to feel happier about something, I change the way I'm thinking about it.	Strongly Disagree	Disagree	Half and half	Agree	Strongly Agree
8. I control my feelings about things by changing the way I think about them.	Strongly Disagree	Disagree	Half and half	Agree	Strongly Agree
9. When I'm feeling bad (e.g., sad, angry, or worried), I'm careful not to show it.	Strongly Disagree	Disagree	Half and half	Agree	Strongly Agree
10. When I want to feel less bad (e.g., sad, angry, or worried) about something, I change the way I'm thinking about it.	Strongly Disagree	Disagree	Half and half	Agree	Strongly Agree

B. Distress Tolerance Scale (DTS; Leyro, Bernstein, Vuljanovic, McLeish, & Zvolensky, 2011; Simons & Gaher, 2005)

Please rate how much you agree with each of the following sentences on a scale from 1 to 5

	Strongly Agree	Mildly Agree	Neither Agree nor Disagree	Mildly Disagree	Strongly Disagree
1. Feeling distressed or upset is unbearable to me	1	2	3	4	5
2. When I feel distressed or upset, all I can think about is how bad I feel.	1	2	3	4	5
3. I can't handle feeling distressed or upset	1	2	3	4	5
4. My feelings of distress are so intense that they completely take over.	1	2	3	4	5
5. There's nothing worse than feeling distressed or upset.	1	2	3	4	5
6. My feelings of distress or being upset are just an acceptable part of life.	1	2	3	4	5
7. I can tolerate being distressed or upset as well as most people.	1	2	3	4	5
8. My feelings of distress or being upset are not acceptable.	1	2	3	4	5
9. I'll do anything to avoid feeling distressed or upset.	1	2	3	4	5
10. Other people seem to be able to tolerate feeling distressed or upset better than I can.	1	2	3	4	5
11. Being distressed or upset is always a major ordeal for me.	1	2	3	4	5
12. I am ashamed of myself when I feel distressed or upset.	1	2	3	4	5
13. My feelings of distress or being upset scare me.	1	2	3	4	5
14. I'll do anything to stop feeling distressed or upset.	1	2	3	4	5
15. When I feel distressed or upset, I must do something about it immediately.	1	2	3	4	5
16. When I feel distressed or upset, I cannot help but concentrate on how bad the distress actually feels.	1	2	3	4	5

C. Emotional Avoidance Strategy Inventory for Adolescents (EASI-A; Kennedy & Ehrenreich-May, 2016)

For each question, circle the appropriate number in the column to the right to indicate the degree to which you feel the statement is characteristic or true of you.

Not at all true of me	A Little true of me	Somewhat true of me	Very true of me	Extremely true of me
0	1	2	3	4

1. I avoid watching "heavy" or "intense" movies or TV shows.	0	1	2	3	4
2. I try to avoid situations that might make me have unpleasant thoughts and feelings.	0	1	2	3	4
3. I do whatever I can to avoid feeling sad or worried or afraid.	0	1	2	3	4
4. When I am upset I try to make myself feel better by eating, or taking medications.	0	1	2	3	4
5. I try to make myself feel better in hard or stressful situations.	0	1	2	3	4
6. I'll "lose it" if I don't distract myself from my feelings.	0	1	2	3	4
7. When I feel upset, I watch TV or play on the internet to take my mind off of it.	0	1	2	3	4
8. When I feel upset, I go to sleep to feel better.	0	1	2	3	4
9. If I begin to feel upset, I try to do something else to take my mind off of it.	0	1	2	3	4
10. I try to avoid uncomfortable situations.	0	1	2	3	4
11. When I have thoughts and feelings I don't like, I try not to think about them.	0	1	2	3	4
12. When something bad happens, I continue with my day and pretend nothing happened.	0	1	2	3	4
13. I try to face my problems head on.	0	1	2	3	4
14. I try to put upsetting things out of my mind, so that I won't keep thinking about them.	0	1	2	3	4
15. I'd rather keep my opinion to myself than get into an argument or fight.	0	1	2	3	4
16. Even if people ask what's bothering me, I pretend nothing's wrong.	0	1	2	3	4

Not at all true of me	A Little true of me	Somewhat true of me	Very true of me	Extremely true of me
0	1	2	3	4

17. I try hard to forget about the things that make me worried or upset.   0   1   2   3   4

18. To avoid having to make hard decisions, I stay away from hard or stressful situations.   0   1   2   3   4

19. I try not to seem sad even when I feel that way.   0   1   2   3   4

20. When things do not go as well as I hoped, I try not to show that I am upset or sad about it.   0   1   2   3   4

21. I have a hard time showing my true feelings.   0   1   2   3   4

22. I try hard to calm myself down when I start getting angry.   0   1   2   3   4

23. I often put off tasks that are important to me.   0   1   2   3   4

24. Staying busy helps me avoid upsetting thoughts or ideas.   0   1   2   3   4

25. I prefer to keep conversations happy or light.   0   1   2   3   4

26. I avoid heavy or intense conversations.   0   1   2   3   4

27. I work or concentrate in school so I won't have to focus so much on my problems.   0   1   2   3   4

28. When I am feeling stressed, I need to do something to make myself feel better.   0   1   2   3   4

29. I avoid talking about stressful or tough situations.   0   1   2   3   4

30. When I have a problem, I try to think about it as though it were happening to someone else.   0   1   2   3   4

31. No matter how nervous or upset I am, I try to seem calm.   0   1   2   3   4

32. I have a hard time telling others how much they mean to me.   0   1   2   3   4

33. The best way for me to deal with my feelings is to feel or experience them fully.   0   1   2   3   4

D. Revised Children's Anxiety and Depression Scale-Short Form (RCADS-Short Form; Ebesutani et al., 2012)

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.

1. I feel sad or empty	Never	Sometimes	Often	Always
2. I worry when I think I have done poorly at something	Never	Sometimes	Often	Always
3. I would feel afraid of being on my own at home	Never	Sometimes	Often	Always
4. Nothing is much fun anymore	Never	Sometimes	Often	Always
5. I worry that something awful will happen to someone in my family	Never	Sometimes	Often	Always
6. I am afraid of being in crowded places (like shopping centers, the movies, buses, busy playgrounds)	Never	Sometimes	Often	Always
7. I worry what other people think of me	Never	Sometimes	Often	Always
8. I have trouble sleeping	Never	Sometimes	Often	Always
9. I feel scared if I have to sleep on my own	Never	Sometimes	Often	Always
10. I have problems with my appetite	Never	Sometimes	Often	Always
11. I suddenly become dizzy or faint when there is no reason for this	Never	Sometimes	Often	Always
12. I have to do some things over and over again (like washing my hands, cleaning or putting things in a certain order)	Never	Sometimes	Often	Always
13. I have no energy for things	Never	Sometimes	Often	Always
14. I suddenly start to tremble or shake when there is no reason for this	Never	Sometimes	Often	Always
15. I cannot think clearly	Never	Sometimes	Often	Always
16. I feel worthless	Never	Sometimes	Often	Always
17. I have to think of special thoughts (like numbers or words) to stop bad things from happening	Never	Sometimes	Often	Always
18. I think about death	Never	Sometimes	Often	Always
19. I feel like I don't want to move	Never	Sometimes	Often	Always
20. I worry that I will suddenly get a scared feeling when there is nothing to be afraid of	Never	Sometimes	Often	Always
21. I am tired a lot	Never	Sometimes	Often	Always
22. I feel afraid that I will make a fool of myself in front of people	Never	Sometimes	Often	Always
23. I have to do some things in just the right way to stop bad things from happening	Never	Sometimes	Often	Always
24. I feel restless	Never	Sometimes	Often	Always
25. I worry that something bad will happen to me	Never	Sometimes	Often	Always

E. Revised Children's Anxiety and Depression Scale-Parent-Report-Short Form (RCADS-P-Short Form; Ebesutani et al., 2010)

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.

1. My child feels sad or empty	Never	Sometimes	Often	Always
2. My child worries when he/she thinks he/she has done poorly at something	Never	Sometimes	Often	Always
3. My child feels afraid of being alone at home	Never	Sometimes	Often	Always
4. Nothing is much fun for my child anymore	Never	Sometimes	Often	Always
5. My child worries that something awful will happen to someone in the family	Never	Sometimes	Often	Always
6. My child is afraid of being in crowded places (like shopping centers, the movies, buses, busy playgrounds)	Never	Sometimes	Often	Always
7. My child worries what other people think of him/her	Never	Sometimes	Often	Always
8. My child has trouble sleeping	Never	Sometimes	Often	Always
9. My child feels scared to sleep on his/her own	Never	Sometimes	Often	Always
10. My child has problems with his/her appetite	Never	Sometimes	Often	Always
11. My child suddenly becomes dizzy or faint when there is no reason for this	Never	Sometimes	Often	Always
12. My child has to do some things over and over again (like washing hands, cleaning, or putting things in a certain order)	Never	Sometimes	Often	Always
13. My child has no energy for things	Never	Sometimes	Often	Always
14. My child suddenly starts to tremble or shake when there is no reason for this	Never	Sometimes	Often	Always
15. My child cannot think clearly	Never	Sometimes	Often	Always
16. My child feels worthless	Never	Sometimes	Often	Always
17. My child has to think of special thoughts (like numbers or words) to stop bad things from happening	Never	Sometimes	Often	Always
18. My child thinks about death	Never	Sometimes	Often	Always
19. My child feels like he/she doesn't want to move	Never	Sometimes	Often	Always
20. My child worries that he/she will suddenly get a scared feeling when there is nothing to be afraid of	Never	Sometimes	Often	Always
21. My child is tired a lot	Never	Sometimes	Often	Always
22. My child feels afraid that he/she will make a fool of him/herself in front of people	Never	Sometimes	Often	Always
23. My child has to do some things in just the right way to stop bad things from happening	Never	Sometimes	Often	Always
24. My child feels restless	Never	Sometimes	Often	Always
25. My child worries that something bad will happen to him/her	Never	Sometimes	Often	Always

F. CGI

Severity of Illness:
Considering your total clinical experience with this particular population, how mentally ill is the patient at this time?

NO PSYCHIATRIC ILLNESS
SLIGHT: Psychiatric illness slight, doubtful, or transient; no functional impairment
MILD: Little functional impairment; and/or symptoms are mild in severity or intensity
MODERATE: Functions with effort; and/or symptoms are moderate in severity or intensity
MODERATE-SEVERE: Limited functioning; and/or
symptoms are moderate to severe in severity or intensity
SEVERE: Functions mainly with assistance; and/or symptoms are very severe or intense
EXTREMELY SEVERE: Completely nonfunctional; and/or symptoms are extremely severe or intense

Global Improvement:
Rate improvement whether or not in your judgment improvement is due entirely to treatment. Compared to his/her condition **at admission to the project,** how much has he/she changed?

VERY MUCH IMPROVED: Symptoms have markedly improved
MUCH IMPROVED: Symptoms have significantly improved
MINIMALLY IMPROVED: Symptoms have slightly improved
NO CHANGE: Symptoms have not changed for the
better or worse
MINIMALLY WORSE: Symptoms have slightly worsened
MUCH WORSE: Symptoms have significantly worsened
VERY MUCH WORSE: Symptoms have markedly worsened

G. Top Problems (Weisz et al., 2011)

For Adolescent: In this space, write down the main reasons for coming to treatment. Include things that bother you, as well as things that other people in your life think are a problem. These things could include feelings of intense sadness, anxiety, or anger. Problems could also include attitudes or behaviors that lead to getting in trouble, or things you do that might be harmful to you or others. <u>After identifying three "top problems," work with your therapist to identify a goal for treatment related to each problem or concern.</u>

<u>**Adolescent**</u>

1. _____

What is my goal? _____

2. _____

What is my goal? _____

3. _____

What is my goal? _____

H. Example of UP-A Clinician Adherence Forms (Module 1)

Total Length of Recording/Session?: _____ **Total Estimated UP-A Minutes:** _____

GOAL TABLE OF CONTENTS:
Module 1 goal 1: Orient youth and family to treatment concepts and structure
Module 1 goal 2: Obtain three top problems from youth, as well as severity ratings for each top problem
*Module 1 goal 3: Strengthen the adolescent's motivation for change
Module 1 goal 4: Discuss parent's motivation for treatment, obtain parent ratings of youth top problems

Please rate how thoroughly the therapist presented each concept related to the goals listed above. If a goal was not covered, do not rate that section.
Elements that factor into this rating include: thoroughness with which material is explained, use of age-appropriate language, generating appropriate examples to explain concepts, and checking to ensure the client understands the material.

> 0 – Concept was not conveyed
> 1 – Concept was moderately conveyed
> 2 – Concept was thoroughly conveyed
> N/A – Not Applicable
> *Indicates optional items

MODULE 1 GOAL 1

Item	Rating
1. Therapist attempted to establish rapport with adolescent (i.e. asks the adolescent how their week went, asks him/her about his/her interests, asks about friends and family)	
2. Therapist explained the purpose of UP treatment	
3. Therapist explained the purpose and importance of out-of-session practice	
4. Therapist explained the course of treatment	
5. Therapist explained the use of workbook materials	
6. Therapist discussed level of parental involvement with adolescent, including the need for parent check-ins	

MODULE 1 GOAL 2

1. Therapist briefly asked why the adolescent thinks they are in treatment	
2. Therapist explained Defining the Main Problems form to adolescent	

3. Therapist obtained top problems from adolescent	
4. Therapist obtained top problem severity ratings from adolescent	
5. Therapist had adolescent develop SMART goals	

*MODULE 1 GOAL 3

1. Therapist helped adolescent to identify "baby steps" for achieving SMART goals	
2. Therapist used motivational interviewing techniques (e.g., establishing change-talk, assessing motivation, discussing motivation/barriers) to strengthen motivation for treatment with adolescent	
3. Therapist completed decisional balance exercise with adolescent using the Decisional Balance Sheet	

MODULE 1 GOAL 4

1. Therapist explained Defining the Main Problems form to parent	
2. Therapist obtained top problems from parent	
3. Therapist obtained severity ratings for top problems from parent	
*4. If necessary, therapist using motivational interviewing techniques (e.g., establishing change-talk, assessing motivation, discussing motivation/barriers) to strengthen motivation for treatment with parent	
*5. If necessary, therapist assesses any potential barriers parent may have for engaging with treatment	

I. Subject Descriptions by ID Number

Subject 1: Subject 1 was a 13-year-old female with a history of ADHD, primarily inattentive presentation, as well as generalized anxiety disorder and specific phobia of blood, injury and injections (BII). She presented with generally flat affect as well as mild social skills deficits and resultant interpersonal concerns (i.e., maintaining friendships was difficult for her and she worried about interactions with peers). She also worried a great deal about her own health, often seeking reassurance for health-related concerns (e.g., stomachaches, headaches, sore throat) and often experienced limited-symptom panic attacks in response to worries. In addition to general worries, Subject 1 also experienced distress regarding receiving injections, blood tests, and other medical procedures (e.g., throat cultures) and had recently avoided several medical appointments due to these fears. Subject 1 made the most observable progress following Module 4 during which she practiced sitting with distressing physical sensations through interoceptive exposures. By the end of treatment, Subject 1 was able to receive injections with minimal concern and was able to manage many of her health-related and interpersonal concerns using her favorite skill, detective thinking. At post-treatment she had subclinical generalized anxiety disorder and specific phobia, BII and clinical ADHD.

Subject 2: Subject 2 was a 15-year-old female with primary social anxiety disorder as well as persistent depressive disorder with a persistent major depressive episode and generalized anxiety disorder. She presented as a friendly and polite adolescent, who appeared consistently engaged in therapy and motivated for change. She had long-standing and severe social anxiety, which interfered with her ability to complete school presentations, participate in school, and make friends. She also ruminated a great deal

about her social difficulties and had low self-esteem. Subject 2 experienced significant sleep disturbance in that it took her several hours to fall asleep and she frequently napped during the day. She also expressed persistent worries surrounding school, changes in routine, new situations, family concerns, and her safety. As a result of her emotional distress, Subject 2 expressed fleeting suicidal ideation at intake and also had a history of non-suicidal self-injury (i.e., cutting behaviors). By the end of treatment, Subject 2 expressed moderate levels of social anxiety, but noted feeling able to handle her anxiety using coping skills. Her depression had remitted to subclinical level and her worries within non-social domains were mild. At post-treatment she still had clinical social anxiety (although severity had reduced), but her persistent depressive disorder and generalized anxiety disorder were both subclinical.

Subject 3: Subject 3 was a 15-year-old male with a history of ADHD, primarily inattentive presentation, primary social anxiety disorder, generalized anxiety disorder, and other specified depressive disorder. Similarly to Subject 2, he presented as a friendly and polite adolescent, who appeared attentive and interested during therapy sessions. His social anxiety symptoms interfered with his ability to make and keep friends, engage in classroom activities, and engage in extra-curricular activities. Prior to participating in the study, he would typically eat his lunch in the bathroom in order to avoid peer interactions. In addition to social concerns, Subject 3 experienced significant worries across domains including his own safety, school, and perfectionism. He also endorsed multiple symptoms of depression, including anhedonia and irritable mood throughout the school year. On one occasion, in response to intense social anxiety regarding an upcoming class presentation, Subject 3 had self-medicated using alcohol from his

parents' liquor cabinet. By the end of treatment, Subject 3 had successfully managed to make new friends, participate in extracurricular activities, and get an afterschool job. At his post-treatment evaluation, all of his prior diagnoses were considered subclinical, with the exception of ADHD.

Subject 4: Subject 4 was a 13-year-old male with primary generalized anxiety disorder and secondary persistent depressive disorder. He presented as somewhat immature for his age and displayed mild difficulty maintaining attention during therapy sessions, requiring some repetition of materials. He was an outgoing adolescent who displayed some mild social skills deficits, making friendships somewhat difficult for him. Prior to beginning treatment, he worried a great deal about school, social interactions, his appearance, and his future, and was observed to seek reassurance often from his mother. In addition to his worries, Subject 4 displayed persistent symptoms of depression, including sad mood, irritability, fatigue, anhedonia, feelings of worthlessness, guilt, and low self-esteem. A significant history of bullying had reportedly contributed to these concerns. Following intervention, Subject 4 displayed minimal anxiety and depressive concerns and was able to manage any remaining emotional disorder symptoms using coping skills learned in therapy. At his post-treatment assessment, all of his emotional disorder diagnoses were subclinical.

Subject 5: Subject 5 was a 14-year-old female with primary social anxiety disorder as well as generalized anxiety disorder and major depressive disorder, recurrent, in partial remission. She presented as a friendly adolescent, who used humor often when discussing her own concerns, seemingly to deflect discussion about such topics. She was quite socially skilled, although she often stated that she was not. Her social anxiety concerns

partially related to embarrassment about her own appearance and led her to wear a sweater wherever she went to cover herself as much as possible. Other social concerns related to friendships and others' impressions of her and led her to avoid participating in class and cling to friends in social situations. She also worried a great deal about her health, world events, new situations, and the future. She was particularly worried about her mental health and what her worries would lead to in the future. In response to feeling worried and overwhelmed, Subject 5 sometimes sat in the bathroom crying until her mother came in to comfort her. Subject 5 also reported significant symptoms of depression, including periods of tearfulness and feeling sad and overwhelmed for no reason, anhedonia, low energy, trouble concentrating, and guilt. She also had a history of non-suicidal self-injury, which she engaged in when she felt upset about social interactions. By the end of treatment, Subject 5 noted feeling more secure in social situations and minimal to no depressive symptoms, although she still ruminated and worried about social interactions with her friends. She presented with subclinical social anxiety and depression, and generalized anxiety disorder post-treatment.

Subject 6: Subject 6 was a 14-year-old female with co-principal OCD and a specific phobia of vomiting as well as generalized anxiety disorder and social anxiety disorder. She also had a history of intermittent major depression, although she was not experiencing a major depressive episode at the start of therapy. Subject 6 presented as a somewhat shy adolescent who avoided eye contact upon first meeting her therapist, although she warmed up to her therapist within a session of therapy. She appeared anxious and fidgety and was observed to shut down (i.e., cry, place her head on the table) during exposure activities. She demonstrated a great deal of avoidance and checking

behaviors due to her specific phobia and OCD (i.e., checking ingredients on labels, avoiding eating most foods) and also engaged in constant repeating behaviors (i.e., walking in and out of doorways for prolonged periods of time, repeatedly closing doors and cabinets). Additionally, she had initiated home schooling prior to beginning the study, reportedly because she felt socially anxious at school and also experienced worries about getting sick or vomiting while in school. She also worried about school, her performance in dance, her safety, global affairs, and her future. Her social concerns involved doing something embarrassing in front of peers and at least partially resulted in her home schooling and also kept her from engaging in outside of school activities that she might have enjoyed. Subject 6 appeared engaged and motivated for treatment towards the beginning of therapy. However, around Module 5, she experienced what seemed to be a major depressive episode and had difficulty applying coping skills and focusing on session content. By Module 6, she again was able to engage in session. However, when introduced to the idea of exposure, Subject 6 was hesitant to participate in exposures, afraid of feeling overwhelmed by them, seeing as she had some difficulty with OCD-focused out of session opposite action practice. However, with scaffolding and small steps, Subject 6 was able to participate in exposures around eating new foods without checking ingredients and her fears of vomiting as well as resisting walking in and out of doorways. By her post-treatment assessment, Subject 6 was engaging in minimal compulsions and was able to us exposure principles and other coping skills to manage her emotional concerns. At post-treatment, all of her emotional disorders were subclinical.

Subject 7: Subject 7 was a 17-year-old female with primary generalized anxiety disorder as well as specific phobia of blood, injury and injections (BII). She was an extremely

friendly adolescent who had a great sense of humor, although she seemed to use humor as a defense mechanism at times. She worried a great deal about academics, athletic performances (she was a competitive athlete), interpersonal issues (conflicts with friends), and being alone. She often experienced limited-symptom panic attacks as a result of her worries, during which time her mother would calm her down or her friends would take her to the bathroom to calm down. Subject 7 noted feeling incapable of calming herself down when upset. As a result of her worries about being alone, Subject 7 slept in her mother's bedroom and felt unable to sleep in her own room at all, even for naps during the day. She planned to attend college locally to avoid having to sleep alone. In addition to general worries, Subject 7 also experienced distress regarding receiving injections or blood tests and had avoided several injections and doctor's appointments due to these concerns. Although she did not exhibit clinically significant symptoms of depression at the time of the study, she had a history of recurrent major depressive episodes, during which she had experienced some fleeting suicidal ideation. Although she was still sleeping in her mother's room and worrying a great deal about being alone following therapy, she noted feeling more in control of her worries in other domains and felt able to face her fear of injections. At post-treatment, Subject 7 presented with clinical generalized anxiety disorder (although it had lessened in severity) and subclinical specific phobia, BII.

Subject 8: Subject 8 (not included in single-case analyses) was a 15-year-old male with primary social anxiety disorder as well as generalized anxiety disorder and agoraphobia. He also had subclinical depression. He presented as a shy and reserved adolescent who typically looked down at his lap periodically during interactions with his therapist. His

social anxiety symptoms interfered with his ability to participate in class and football (he was a competitive athlete). His performance anxiety in social situations affected his ability to reach his potential at football games, especially when college recruiters were in attendance. He also avoided parties and get-togethers and tended to spend nights and weekends in his room due to his social anxiety. In addition to social worries, Subject 8 worried a great deal about friendships, forgetting things, being on time, doing things "just right", his own health, and his mother's health and safety. Subject 8 also expressed significant fear about experiencing distressing physical feelings when on a boat or in another setting where he might not be able to escape, and resultantly avoided these kinds of situations or left these situations almost immediately upon entering them. Following treatment, Subject 8 was able to engage more with peers and consistently attended parties and get-togethers. Although he continued to display low self-esteem and some level of ruminative thought post-intervention, Subject 8 noted that he was increasingly able to use his coping skills to work through his worries. At post-treatment, he presented with clinical generalized anxiety disorder (although it had lessened in severity), and subclinical social anxiety and agoraphobia.