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## Acceptance and Commitment Therapy for Adolescent Difficulties with Emotion Regulation: An Open Trial

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ACCEPTANCE AND COMMITMENT THERAPY FOR ADOLESCENT  
DIFFICULTIES WITH EMOTION REGULATION:  
AN OPEN TRIAL

Julissa A. Duenas, Ph.D.

Western Michigan University, 2016

Research suggests that youth rates of mental health problems are high and that evidence-based treatments for these populations exist; however, there is a significant problem in accessibility of mental health services. Recent movements in the mental health field have shifted focus to transdiagnostic dimensions of behavior in attempt to target a broader range of psychological difficulties across larger populations. One such construct, emotion regulation, has been defined as an ability to have awareness and acceptance of emotions and control urges and impulses in order to behave towards a goal. Emotion regulation has been linked to numerous internalizing and externalizing behavioral patterns seen in adolescents and aligns well with areas targeted by Acceptance and Commitment Therapy (ACT). The purpose of this single-subject, A/B design, study was to examine the efficacy of a six-session ACT protocol for adolescents experiencing difficulties with emotion regulation. The study used the Difficulties in Emotion Regulation Scale as the primary outcome measure, in addition to several self-report measures of general psychological functioning and processes related to the ACT model, and two computerized behavioral analogues of constructs related to emotion regulation. Eight participants enrolled in the study and six completed the pre- and post-treatment assessments. Four of the six completers demonstrated reliable improvements in emotion

regulation. Some participants also demonstrated movement in the process measures targeted by ACT. The results of this study provide support for the use of ACT with adolescents and show preliminary promise for utilizing ACT to target emotion regulation.

ACCEPTANCE AND COMMITMENT THERAPY FOR ADOLESCENT  
DIFFICULTIES WITH EMOTION REGULATION:  
AN OPEN TRIAL

by

Julissa A. Duenas

A dissertation submitted to the Graduate College  
in partial fulfillment of the requirements  
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## INTRODUCTION

### **Adolescent Mental Health and Treatment Research**

Prevalence rates of youth mental health problems are strikingly high, with some researchers reporting rates as high as 75% among youth under the age of 24 (Kessler et al., 2005). More specifically, the onset of mental health difficulties between the ages of 12-24 is highly associated with disorders that persist into later life years (Kessler et al., 2005). Further, some have stated that mental health issues are the primary contributor of disease burden in youth (Patel, Flisher, Hetrick, & McGorry, 2007).

In light of these prevalence rates, research efforts have attempted to develop and evaluate psychological interventions that can help target youth mental health issues. Unfortunately, there continues to be a large gap between knowledge of evidence-based psychological interventions and actual rates of youth receiving treatment (U.S. Public Health Service, 2000). Using the nationally representative data set from the National Comorbidity Survey, Costello and colleagues (2014) found that only a small proportion of youth diagnosed with at least one psychiatric disorder receive mental health care. In other words, we know that effective treatments exist, but few youth are actually accessing services and this finding appears to hold across communities and family income levels (Verhulst et al., 2003).

The ongoing and important nature of this problem led to the surgeon general's statement that "many are falling through the cracks" (U.S. Public Health Service, 2000, p. 11). Since then, it has been well documented that new policies and practices are necessary to both increase youth access to mental health and continue to study the effectiveness of interventions among community youth (Costello et al., 2004; Tolan &

Dodge, 2005). In moving forward, treatment outcome research may be impacted by the direction in which the mental health field is shifting.

Treatment outcome research has been significantly influenced by the current psychiatric diagnostic system (Kozak & Cuthbert, 2016). Researchers have noted that the current classification system focuses on symptoms and diagnoses, which leads to treatment efforts that focus on symptom relief rather than curative or preventive efforts (Insel, 2014). However, the National Institute of Mental Health (NIMH)'s recent adoption of research domain criteria (RDoC) provides a research framework that aims to move away from the current diagnostic system for psychiatric disorders and aims to obtain a more precise understanding of the biological and psychosocial dimensions of functioning (Insel et al., 2010; Lilienfeld, 2014). This framework aims to improve classification and, ultimately, treatment outcomes (Insel et al., 2010; Insel, 2014). While the primary focus of RDoC is to identify biological markers of disorders, the move away from purely diagnostic categories is one that has important implications for the field in terms of treatment outcome research (Hershenberg & Goldfried, 2015).

From a behavioral psychology perspective, this idea of moving away from diagnostic categories and moving toward more useful classification systems is not new. Hayes and colleagues (1996) outlined the limitations of syndromal classification systems and proposed the use of functional diagnostic dimensions. They suggested that functional dimensions are useful in identifying processes of etiology and maintenance of problematic behaviors and, more importantly, point to specific interventions. Further, they suggested that such framework is more amenable to research that integrates differing theories of similar processes (Hayes et al., 1996).

## **Emotion Regulation**

Emotion regulation is a construct in line with this view of functional dimensions of behavior and allows for a transdiagnostic approach to conceptualizing and treating mental health difficulties. Gratz and Roemer (2004) proposed a definition of emotion regulation based on a comprehensive review of the literature, limitations with prior definitions of emotion regulation, and evidence suggesting that attempts to control emotions, as opposed to emotional acceptance, may exacerbate difficulties with emotion regulation. They defined emotion regulation as: awareness and acceptance of emotions, the ability to control impulsive behaviors and urges resulting from emotions in order to behave toward a goal, even in the face of negative emotions, and the ability to flexibly use regulation strategies to meet goals and environmental demands. Difficulties in these areas are indicative of emotion dysregulation (Gratz & Roemer, 2004). There is consensus, across different theoretical perspectives and definitions of emotion regulation, that difficulties with emotion regulation are associated with psychological difficulties (Bradley, 2000; Plutchik, 1993).

For adolescents, in particular, emotion regulation is an important construct to continue exploring (Van Beveren & Braet, 2015). The developmental nature of adolescence is associated with normative environmental stressors that often effect emotional states (Daughters et al., 2009; McLaughlin, Hatzenbuehler, Mennin, & Nolen-Hoeksema, 2011). In fact, some researchers have stated that the normative adolescent trajectory involves increased emotional reactivity, increased environmental stressors, and decreased environmental support for emotion regulation, all of which can potentially

increase vulnerability to experiencing emotion dysregulation (Van Beveren & Braet, 2015).

Adolescents who do not have effective emotion regulation skills may attempt to under- or over-control negative emotions (Plutchik, 1993) and may seek immediate relief of negative emotions by engaging in behaviors often categorized as externalizing or internalizing patterns (Daughters et al., 2009). Externalizing symptoms, characterized by behavioral disinhibition, impulsivity, novelty seeking, and difficulties with constraint, are commonly categorized in diagnostic labels such as Conduct Disorder, Oppositional Defiant Disorder, and Attention Deficit Hyperactivity Disorder (Cummings et al., 2013). Internalizing symptoms, characterized as a propensity for negative affect such as fear and distress, are associated with disorders such as Major Depressive Disorder and anxiety disorders (Cummings et al., 2013). Researchers have found empirical support that emotion regulation is related to externalizing and internalizing behavioral problems commonly observed in youth and that youth's responses to emotions effect school performance and self-esteem (Fernandez-Berrocal, Alcaide, Extremera, & Pizarro, 2006; Petrides, Frederickson, & Furnham, 2004).

Much of the research examining emotion regulation in adolescents has focused on examining the associations between difficulties in emotion regulation and specific psychological symptom profiles (e.g., internalizing and externalizing patterns, as previously outlined). For example, Adrian and colleagues (2009) found that adolescents with internalizing problems showed greater difficulty with awareness and understanding of emotions than those with externalizing behavioral profiles. However, Bunford, Evans, and Langford (2014) conducted a study in which they found that adolescents diagnosed

with ADHD showed greater difficulties in awareness of emotions, greater inattention to emotions, and difficulty controlling emotional impulsivity. Thus, these findings suggested that treatments for externalizing profiles also target emotion regulation skills.

It has been difficult to discern the direction of the relationship between emotional dysregulation and mental health symptoms. That is, it is unclear whether emotion dysregulation is a risk factor for psychological problems or whether experiencing mental health problems influences individuals' ability to effectively regulate emotions (McLaughlin, Hatzenbuehler, Mennin, & Nolen-Hoeksema, 2011). As a result, researchers have stated that difficulties in emotion regulation can be both an etiologic and maintaining factor for mental health issues (Van Beveren & Braet, 2015). In a study examining two potential trajectories in a sample of adolescents, McLaughlin and colleagues (2011) found that difficulties in emotion regulation predicted symptoms of anxiety, aggressive behavior, and eating disorder symptoms. However, the second potential trajectory, that symptoms would predict emotion dysregulation, did not yield sufficient support. Therefore, the authors concluded that emotion dysregulation is a risk factor for adolescent mental health difficulties, and as such, should be a target of intervention in both treatment and preventive efforts (McLaughlin et al., 2011). Directly targeting emotion regulation deficits can help improve current psychological functioning and potentially minimize the persistence of such problems later in life (Cummings et al., 2013).

### **Treatments for Emotion Regulation**

Few studies, however, have examined the treatment aspect of this transdiagnostic construct in adolescents. Some treatments for emotion regulation focus on changing

dysfunctional thoughts (Southam-Gerow & Kendall, 2002). Others take a different approach, focusing instead on the behavioral choices one makes despite the presence of difficult thoughts and emotions. The theory behind Dialectical Behavior Therapy (DBT; Linehan, 1993) suggests that emotion dysregulation is at the core of the maladaptive behaviors, such as self-harm, seen in individuals with symptoms of borderline personality disorder. From this perspective, targeting emotion dysregulation helps clients learn to respond to emotions in ways that allow one to behave towards a goal (Linehan, 1993). Although DBT has been researched more extensively in adult populations, recent adaptations for adolescents have demonstrated promising results with several psychological difficulties that have emotion regulation deficits at the core (e.g., borderline personality symptoms, mood disorders, externalizing disorders, and eating disorders; see MacPherson, Cheavens, & Fristad, 2013, for a review). One limitation of DBT is that it requires extensive training and structure in its implementation. Full DBT treatment consists of attending both individual and group sessions (MacPherson, Cheavens, & Fristad, 2013), which is not always accessible to youth and families.

Another treatment approach, Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 1999), suggests that experiential avoidance of private experiences, defined as an attempt to escape or avoid private experiences such as emotions, thoughts, memories, and bodily sensations, is at the core of suffering. ACT is a treatment approach that focuses on accepting emotional experiences as they are, without attempting to escape or avoid them (Hayes et al., 1996). Emotion regulation has been linked to the functional diagnostic dimension of experiential avoidance in a few recent studies with direct treatment implications. Venta, Hart, and Sharp (2012) found that

experiential avoidance partially mediated the relationship between alexithymia and emotion dysregulation. That is, experiential avoidance seemed to interfere with adolescents' ability to regulate their emotions and suggests that experiential avoidance should be targeted in treatment for emotion dysregulation. Similarly, Schramm, Venta, and Sharp (2013) found that experiential avoidance provided an incremental and individual contribution to borderline personality disorder features, beyond the contribution of emotion dysregulation to those symptoms. This, again, suggests the importance of targeting experiential avoidance in treatment of emotion dysregulation. In addition, one recent study found that emotion dysregulation and psychological inflexibility shared similarities and that both were mediators of depression severity (Paulus, Vanwoerden, Norton, & Sharp, 2016).

The overarching goal of ACT is to increase flexibility in behavioral patterns with the goal of being open, centered, and engaged in life through mindfulness, acceptance and committed action skills (Hayes, Strosahl, & Wilson, 2012). In the ACT model, psychological flexibility is defined as contacting the present moment and behaving in the service of one's personally chosen values (Hayes et al., 2012). Viewed as a model of psychopathology, psychological inflexibility is influenced by six core processes: "inflexible attention, experiential avoidance, cognitive fusion, attachment to the conceptualized self, disruption of values, and inaction, impulsivity, or avoidant persistence" (Hayes et al., 2012, p. 62). Experiential exercises are used to target the six processes and counteract them by: establishing attention to the present moment, accepting difficult private experiences without attempts to control, suppress or escape them, learning to step back and notice private events as ongoing experiences rather than literal



truths, viewing oneself as part of a context, connecting with what is personally important and meaningful, and engaging in values-based activities.

This model lends itself well to Gratz and Roemer's (2004) definition of emotion regulation. The first part of the emotion regulation definition, an awareness and acceptance of emotions, aligns with the aim of mindfulness and acceptance skills. Similarly, the inhibition of impulsive behaviors in the face of negative emotions in order to act toward a goal aligns well with the commitment and values-based action strategies in ACT. The overlap between the construct of emotion regulation and the ACT model of treatment suggests that ACT may be an appropriate intervention for this transdiagnostic construct. The ACT model inherently helps clients to fully experience difficult emotions in order to work towards goals. From an ACT perspective, difficulties in regulating emotions create a problem only when they are getting in the way of a person pursuing valued behaviors (Blackledge & Hayes, 2001).

To date, ACT has been applied to a wide variety of psychological problems in adult populations. In a meta-analysis, Hayes, Luoma, Bond, Masuda, and Lillis (2006) found a moderate effect size for clinical outcome studies, a moderate effect size for studies comparing ACT to other active conditions, and a large effect size for studies comparing ACT to waitlist or placebo conditions. While there is less research on ACT with youth populations, the existing evidence is promising.

In a review of studies utilizing ACT with children, adolescents, and families Coyne, McHugh, and Martinez (2011) outlined evidence of the conceptual model of ACT for youth. They reviewed studies that have applied ACT with promising outcomes among several case studies and a randomized controlled trial of youth with anxiety symptoms,

and individual case studies for: chronic pain, anorexia nervosa, and psychosis. More recent studies have reported evidence for ACT in adolescent populations for the treatment of: OCD, autism spectrum, learning disorders, stress, depression, and post-traumatic stress disorder (Halliburton & Cooper, 2015; Hayes, Boyd, & Dewell, 2011; Livheim et al., 2014). In addition, there have been studies incorporating ACT components in a parenting intervention (Coyne, McHugh, & Martinez, 2011). The evidence in these studies point to support for both symptom improvements as well as movement on ACT-specific process variables (Halliburton & Cooper, 2015). Thus, researchers concluded that ACT has promise for use with children, has utility as an intervention for transdiagnostic difficulties, and additional research is necessary to examine applications of ACT with youth populations (Halliburton & Cooper, 2015; Swain, Hancock, Dixon, & Bowman, 2015). Swain and colleagues (2015) stated that studies evaluating ACT with youth populations should also incorporate measures of day-to-day functioning and quality of life, in addition to standard clinical outcome measures, as this aligns well with the aim of ACT.

### **Behavioral Measurement**

Related to the issue of outcome measures, the primary reliance on self-report questionnaires and diagnostic interviews in treatment outcome studies has long been documented. In an effort to address this issue, recent research efforts have begun developing and validating novel ways to measure behavior, in order to move research away from examining outcomes primarily based on changes in symptoms and diagnoses. For example, researchers have moved toward attempting to link laboratory tasks simulating behaviors of interest in attempt to measure behavior more directly (Lejuez,

Aklin, Zvolensky, & Pedulla, 2003). These types of behavioral measures serve as analogues that allow researchers to assess broader constructs of interest.

Two recent computer-based behavioral analogue measures of constructs related to emotion regulation have been examined and validated with adolescent samples.

Adolescent risk-taking propensity, measured by the Balloon Analogue Risk Taking – Youth (BART-Y; Lejuez et al., 2002), has been found to be associated with measures of behavioral impulsivity (Lejuez, Aklin, Zvolensky, & Pedulla, 2003). A behavioral analogue measure of risky behavior is relevant to the construct of emotion regulation as adolescents may engage in risky behavior in attempt to regulate negative emotional states (Amstadter et al., 2012a). Distress tolerance is an additional construct that is related to emotion regulation. Individuals with low distress tolerance have been described as having difficulties engaging in goal-related actions when they are experiencing negative emotional states (Amstadter et al., 2012b). The Behavioral Indicator of Resiliency to Distress (BIRD; Lejuez, Daughters, Danielson, & Ruggiero, 2006) is a behavioral analogue task that provides a measure of low or high distress tolerance in adolescents by inducing a potentially distressing scenario and measuring the adolescents' ability to persist in a behavioral goal (Amstadter et al., 2012b).

Taken together, there is substantial evidence suggesting that many commonly seen mental health problems in youth are related to emotion dysregulation. Further, functional approaches to treatment are indicated, as they are in line with a focus on increasing individual's functioning and quality of life, as opposed to simply reducing symptoms or ceasing to meet diagnostic criteria of a disorder. ACT aligns well with these areas.

## **Statement of Purpose**

The purpose of this open trial was to examine the efficacy of ACT for adolescents experiencing difficulties with emotion regulation. The study incorporated self-report measures of emotion regulation, overall functioning and quality of life, and processes relevant to the ACT model. In addition, it included behavioral analogue measures of two constructs related to emotion regulation (risk-taking propensity and distress tolerance). The primary study hypothesis was that participants would have a significant decrease in reported difficulties with emotion regulation (that is, they would report better emotion regulation skills) after participating in the six-sessions of ACT.

## **METHOD**

### **Design**

The study was an open clinical trial utilizing a single subject A/B design, where A was Baseline and B was the treatment phase (ACT). The repeated measure (Difficulties in Emotion Regulation Scale) was collected at the start of each session and additional measures were administered at pre-treatment (Assessment 1), post-treatment (Assessment 2) and 1-month follow-up (Assessment 3).

### **Participants**

Fifteen participants between the ages of 14 and 18 were referred for initial screening from two Midwestern schools through referral from Kalamazoo Communities in Schools Foundation (KCISF) site coordinators. The KCISF site coordinators' role in the schools includes determining student needs and linking the student with resources provided through school or community programs. When the KCIS staff members identified a student experiencing psychosocial concerns, she would describe the study to

the teen and their caregivers as one of an array of resources that would typically be presented. If the adolescent and caregiver expressed interest in learning more about the research study, a meeting was scheduled with the adolescent, caregiver, and a member of the study team to go over the consent and assent documents.

At the informed consent/assent meeting, potential participants were provided with an overview of the study. If an adolescent and their caregiver agreed to participate in the study, they were asked to provide written consent and assent. At this session, Assessment 1 was conducted to determine eligibility for the study. In order to be included in the study, at Assessment 1 participants needed a score equal to or greater than 100 on the Difficulties in Emotion Regulation Scale (DERS). This cut-off score was determined by using the mean and standard deviation of the normative psychometric data from a large group of adolescents ( $M = 78.9$ ,  $SD = 23.2$ ; Weinberg & Klonsky, 2009) and adding one standard deviation to the mean to identify a group reporting regulation difficulties. The mean plus one standard deviation yielded a score of 102, which was rounded down to 100 in an attempt to be inclusive in this exploratory study. Potential participants were excluded only if they had a recent initiation of or change in psychotropic medications, defined as a change during the 8-weeks prior to Assessment 1. The only other exclusionary criterion was if the adolescent was participating in other counseling services. Of the 15 students identified for possible participation, eight completed consent, assent, and met inclusionary criteria.

## **Measures**

**Additional Services Form.** This brief measure contained two Yes/No questions related to the exclusionary criteria of the study: Current participation in other

psychotherapy and whether there were any changes in psychotropic medications during the previous eight weeks. This was the first form the participant completed at Assessment 1. If they met either exclusionary criteria they did not move on to complete any other Assessment 1 measures and were provided with a referral list for other services.

**Demographic Form – Teen.** This measure contained questions pertaining to age, sex, grade in school, and ethnicity. In addition, it contained one item from the Multigroup Ethnic Identity Measure (MEIM; Phinney, 1992). The included item asked participants to respond to the question: “My ethnicity is:” and selecting among six specific ethnic group labels or the option of “Other,” which provided a space to write in the label the participant identified with. Participants were also asked to indicate the ethnicity of their father and mother. This demographic form also contained one item from the MacArthur Scale of Subjective Social Status-Youth Version (MSSSS; Goodman et al., 2001). The item consisted of a ladder in which the teen was asked to rate their subjective socio-economic status by placing their family’s SES within U.S. society. The participant completed this measure at Assessment 1.

**Demographic Form – Parent/Legal Guardian.** This measure contained questions related to background information on the participant’s family, including caregiver demographic information and family history of mental illness. The parent/legal guardian was asked to complete it at Assessment 1.

**Difficulties in Emotion Regulation Scale (DERS).** The DERS (Gratz & Roemer, 2004) is a 36-item Likert-type scale questionnaire that assesses emotion regulation from a contemporary behavioral framework. Higher total scores on this measure suggest greater difficulties with regulating emotions. The DERS consists of 6-subscales: non-acceptance

of emotional responses (Nonaccept), difficulties engaging in goal-directed behavior (Goals), impulse control difficulties (Impulse), lack of emotional awareness (Aware), limited access to emotion regulation strategies (Strategies), and lack of emotional clarity (Clarity). While initially validated with a college sample (Gratz & Roemer, 2004), it has been found to be a valid measure of emotion dysregulation in adolescents, with adequate internal consistency for the individual subscales and correlations with various psychological difficulties related to emotion dysregulation in a diverse U.S. sample and a Turkish sample (Neumann, Van Lier, Gratz, & Koot, 2010; Ritschel, Tone, Schoemann, & Lim, 2015; Saritas-Atalar, Gecoz, & Ozen, 2015; Weinberg & Klonsky, 2009). This measure was given at each assessment point (Assessment 1, 2, and 3) and was used as the primary outcome measure in the study.

In addition, the study researchers sorted the 36 DERS items to develop two split-versions of the full scale (DERS-A and DERS-B). This was done by taking the 36 items and pairing each individual item to another item on the measure most similar to it in terms of its content. This yielded 17 pairs of similar items with two remaining items that were included in both versions, due to a lack of match amongst the other items. Thus, the DERS-A and DERS-B each consisted of 19 items, with two items overlapping on both versions. At the start of each ACT session, one of the versions was administered; for example, at ACT session 1 the DERS-A was administered and each subsequent session alternated between DERS-B and DERS-A for the remaining ACT sessions.

In order to compare the results of the 19-item DERS-A/B with the full DERS, an adjusted score was calculated. The score on each obtained DERS-A/B was divided by the total number of items (19). The quotient was then multiplied by the total number of items

on the full DERS (36). This product served as an adjusted score allowing for comparisons across assessment points.

**The Ohio Youth Problems, Functioning, and Satisfaction Scales (The Ohio Scales) Youth Rating – Short Form.** The Ohio Scale Youth Rating – Short Form (Ogles, Melendez, Davis, & Lunnen, 2001) was developed for youth ages 12-18 as a measure of clinical outcomes. The Problem Severity scale consists of 20 questions on a 0-5 Likert-type scale and assesses common presenting problems associated with child and adolescent psychological disorders, where higher scores indicate greater problems. The Functioning scale consists of 20 questions on a 0-4 Likert-type scale and assesses level of functioning in daily activities, where lower scores indicate lower functioning. There are also two 4-item scales: Hopefulness and Satisfaction. The former measures hopefulness regarding the self and future, with lower scores indicative of more hopefulness. The Satisfaction scale provides a measure of satisfaction with mental health services received, with lower scores indicating greater satisfaction with services. The scale is scored such that a score can range from 4 (*extremely satisfied*) to 24 (*extremely dissatisfied*).

In the initial validation study, which included both community and clinical samples, the Ohio Scales demonstrated adequate internal consistency for each subscale, adequate test-retest reliability, construct validity, and sensitivity to change (Ogles et al., 2001). The Ohio Scales were found to significantly correlate with other measures of problem severity, functioning, and satisfaction (Ogles et al., 2001). This measure was administered at each major assessment intervals (Assessments 1, 2, and 3). The Problem



Severity, Functioning, and Hopefulness scores are part of the main outcome measures and the Satisfaction data is presented within each participants' individual analyses.

**Centers for Disease Control and Prevention (CDC) Health-Related Quality of Life – 4 Questionnaire (HRQOL – 4).** One item from the CDC's (2000) Health Related Quality of Life – 4 Questionnaire was included as an overall measure of the impact of mental health difficulties on quality of life. The CDC's full measure has been used in several large-scale studies, including the Behavioral Risk Factor Surveillance System. The item provided to participants asks them to write a number of days, from the past 30 days, in which their mental health was not good. This measure was administered to participants at each of the major assessment points (Assessments 1, 2, and 3).

**Avoidance and Fusion Questionnaire for Youth – 8 (AFQY-8).** The AFQY-8 (Greco, Lambert, & Baer, 2008) is an 8-item, 5-point Likert-type scale, developed for children and adolescents that measures both cognitive fusion and experiential avoidance, which are important processes within the ACT model. This measure has demonstrated acceptable internal consistency and similar psychometric properties to the original, full scale 17-item form (Greco, Lambert, & Baer, 2008). Responses are scored from 0 (*not at all true*) to 4 (*very true*). Although the full AFQY reportedly has better internal consistency than the shorter version (Grego, Lambert, & Baer, 2008), the AFQY-8 was used in the study to minimize participant burden during assessments. This measure was administered to the teen at each assessment period (Assessments 1, 2, and 3).

**Behavioral Activation for Depression Scale – Short Form (BADSF).** The BADSF (Manos, Kanter, & Luo, 2011) is a 9-item, 7- point Likert-type scale that measures behavioral activation (i.e., engagement in one's life) and avoidance. The

measure has demonstrated good internal consistency in a college sample. More recently, the BADS-SF was validated with a sample of depressed adolescents (Petts, Foster, Douleh & Gaynor, 2016). The BADS-SF was chosen for the current study because it provides a measure of engagement in the committed action process of ACT. The BADS-SF was administered to participants at each assessment period (Assessments 1, 2, and 3).

**Behavioral Inhibition/Behavioral Activation System (BIS/BAS).** The BIS/BAS (Carver & White, 1994) is a 24-item, 4-point Likert-type scale, questionnaire that assesses behavioral inhibition (BIS) and behavioral activation (BAS) systems. The BIS portion assesses aversive motivation; that is, inhibition of behavior that may lead to aversive outcomes and sensitivity to punishment. It serves as a measure of inhibition of behavior that may lead to negative consequences (Campbell-Sills, Liverant, & Brown, 2004). BIS has been found to be related to anxiety, fear, and negative affect (Carver & White, 1994). The BAS measures appetitive motivation, or motivation towards goals that may lead to the experience of pleasure. It has three subscales embedded: Reward Responsiveness, Drive, and Fun Seeking. It has been found to be associated with positive affect. A factor analyses of the measure found support for the structure of the two major subscales. In addition, the subscales within the BAS have been found to have adequate reliability (Jorm et al., 1997). It has also been validated with a clinical outpatient sample of adolescents (Campbell-Sills, Liverant, & Brown, 2004). In the current study, the BIS/BAS was utilized to conduct exploratory analyses with the two behavioral analogue measures. This measure was given at each major assessment point (Assessments 1, 2, and 3).

**Balloon Analogue Risk Task – Youth (BART-Y).** The BART-Y (Lejuez, Aklin, Daughters, Zvolensky, Kahler, & Gwadz, 2007) is a modified version of the Balloon Analogue Risk Task, which has been used as a measure of risk-taking behavior primarily with adult populations (Lejuez et al., 2002). In the BART-Y, participants are shown a screen in which a balloon, a pump, and a button labeled “collect prize” are shown. Participants are shown a total of 30 balloons, with one presented at a time, and are instructed to click the pump until either the balloon pops or until they chose to click “collect prize.” All balloons have different explosion points ranging from 1-128 pumps. For every pump that does not make the balloon explode, participants receive virtual points that can be moved to the virtual bank by clicking “collect prize.” The prize can be transferred to the virtual bank anytime prior to the balloon exploding. The average number of pumps for the balloons that did not explode is calculated and interpreted as a proxy for risk-taking propensity. In a reliability and validity study (Lejuez et al., 2007), the BART-Y was related to a self-report measure of sensation seeking and to a measure of risk behavior. In this study, the BART-Y was administered at Baseline Session 2 and at Assessment 2.

**Behavioral Indicator of Resiliency to Distress (BIRD).** The BIRD (Lejuez, Daughters, Danielson, & Ruggiero, 2006) is a computer-based measure of distress tolerance. In this task, participants are presented with ten boxes that are numbered. The instruction is to click on a green dot that appears above a box before the dot moves to another box. If the participant successfully clicks the green dot before it moves, a bird on the screen flies out of a cage, a pleasant sound is presented, and a point is earned. However, if the green dot is not clicked successfully, the bird does not exit the cage, an

unpleasant sound is presented, and no point is earned. The first level is 3 minutes long and the latency between each presentation of a dot titrates based on the participant's performance. The second level lasts 5 minutes and is more difficult because the dot moves more quickly (i.e., shorter latency). The third level, also 5 minutes long, is the most difficult because it contains the lowest latency period presented on the first two levels. In this final level, the participant has the option to escape the task by clicking an "end task" button on the screen. The participant's response is interpreted as either high distress tolerance (i.e., persists on the task for the entire 5-minute period) or low distress tolerance (i.e., chooses to end the task before completing the 5-minute period).

The BIRD has been found to be related to negative reinforcement processes; that is, attempts to escape distressing emotions, and has been examined in relation to externalizing and internalizing symptoms (Daughters et al., 2009). The BIRD was administered during Baseline Session 2 and at Assessment 2.

## **Procedure**

**Assessment 1.** The assessment began after the completion of the consent and assent process. When the written consent was provided, the participant was asked to complete several self-report measures, beginning with the Additional Services Form. If the potential participant did not meet either of the exclusionary criteria (concurrent psychotherapy and/or a psychotropic medication change in the prior 8-weeks) they were asked to complete the DERS. If the teen had a minimum DERS score of 100, the participant was asked to complete the remaining self-report measures (demographic form, Ohio Scales, HRQOL, AFQY – 8, BADS – SF and BIS/BAS). If the participant did not meet inclusion criteria and/or met exclusionary criteria, the teen and caregiver were

provided with a list of alternative treatment options. If the participant met inclusionary criteria and did not meet any exclusionary criteria, a meeting was scheduled to complete the computerized laboratory measures the following week (Baseline Session 2).

**Baseline Session 2.** One week following the Assessment 1 meeting, the assessor met with the participant to complete the DERS and the computerized measures (BART-Y and BIRD).

**Acceptance and Commitment Therapy Sessions.** Up to 6 weekly sessions of ACT were available for participants during 6 weeks. The data collected at the first ACT session (DERS-A), prior to receipt of any treatment, served as a third baseline data point. The first ACT session focused on introducing the treatment model and gathering information from the participant about what emotions and thoughts he/she was struggling with and how those were affecting his/her functioning in daily life. The focus of the second session was to introduce and clarify values. The third through fifth sessions focused on setting specific goals for valued-actions and identifying specific barriers to action (e.g., when emotions/thoughts come up that make it difficult to act based on a goal) and using specific mindfulness, cognitive defusion, acceptance, and self-as-context skills to address the reported difficult thoughts and emotions. The remaining session (ACT session 6) focused on reviewing skills and identifying future goals and potential barriers to skill use.

**Assessment 2.** One week following the last ACT session (9-weeks following Assessment 1) an assessor met with the participant to administer the following self-report measures: Additional Services Form, DERS, Ohio Scales, HRQOL, AFQY – 8, BADS – SF, and BIS/BAS, along with the BART-Y and BIRD.

**Assessment 3.** Four weeks after Assessment 2, an assessor attempted to make contact with the participant to conduct the follow-up assessment and administered the following self-report measures: DERS, Ohio Scales, HRQOL, AFQY – 8, BADS – SF, and BIS/BAS.

### **Treatment Integrity**

Twenty-six percent of all ACT sessions ( $n = 8$ ) were coded by trained doctoral students. The sessions were selected quasi-randomly based on timeline in treatment (beginning, middle, or end of treatment sessions). Ratings were provided on general behavior therapy competence, an overall rating for the ACT therapist, and adherence to the treatment protocol.

General therapy competence was measured on a Likert scale ranging from 1 (*Poor*) to 5 (*Excellent*) for each session, on the extent to which the therapist demonstrated understanding and interpersonal effectiveness, as well as the extent to which the therapist: collaborated with the participant, elicited feedback, and administered homework. The average general competence score was 4.98 ( $SD = 0.16$ ) across all the coded sessions. An item was also included to provide an overall rating of the ACT therapist utilizing the same 1 to 5 scale ( $M = 4.88$ ,  $SD = 0.35$ ).

Adherence to the ACT protocol was coded based on the items relevant to each particular session. Session adherence was coded on a Likert-scale from 1 (*Not at all*) to 5 (*Extensively*). For ACT session 1, the following items were coded: Did the therapist provide psychoeducation on the three functions of emotions?; Did the therapist identify at least one difficult emotion and at least one positive emotion that the client experiences?; Did the therapist introduce the idea that although it may appear that emotions control our

actions, we can choose our actions?; Did the client use one ACT-consistent exercise or metaphor during the session?. Adherence items for the second ACT session included the following: Did the therapist check-in on homework?; Did the therapist introduce the idea of values?; Did the therapist distinguish values from goals?; Did the therapist guide the teen in selecting at least one immediate values-based goal and at least one short-term goal?. ACT sessions 3, 4, and 5 contained the same adherence items: Did the therapist check-in on homework?; To what extent did the therapist discuss one relevant ACT area (acceptance, defusion, self-as context, contact with present moment?; To what extent did the therapist use ACT consistent metaphors and exercises for the area of focus with this client?; Did the therapist include practice of new ACT skill for homework on diary card?. The final session (ACT session 6) included the following adherence items: Did the therapist check-in on homework?; To what extent did the therapist review previously introduced ACT skills?; Did the therapist guide the teen in selecting values-based activity goals for homework?; Did the therapist engage the client in a discussion of skills learned over treatment? The ACT adherence rating across all coded sessions was 4.57 ( $SD = 0.83$ ).

## RESULTS

### Sample Characteristics

A sample of eight participants aged 14-18 ( $M = 15.88$ ,  $SD = 1.36$ ) provided consent, assent, and met inclusionary criteria to enroll in the study. The sample was recruited from Kalamazoo Central High School and Loy Norrix High School and participants ranged from grades 9 – 12 with the following proportions: 37.5% ( $n = 3$ ) in 9<sup>th</sup> grade, 25% ( $n = 2$ ) in 10<sup>th</sup> grade, 12.5% ( $n = 1$ ) in 11<sup>th</sup> grade, and 25% ( $n = 2$ ) in 12<sup>th</sup>

grade. Participants self-identified with diverse ethnic backgrounds with the following breakdown: 62.5% ( $n = 5$ ) identified as African-American, 12.5% ( $n = 1$ ) identified as American Indian/Native American, 12.5% ( $n = 1$ ) identified as White/Caucasian, and 12.5% ( $n = 1$ ) identified multiple ethnicities: Native American, Hispanic, and Caucasian ethnic background. In terms of socioeconomic status, participants self-reported income with an average MSSSS score of 4.81 ( $SD = .92$ ), which is 2.39 points below the normative mean of 7.2 ( $SD = 1.3$ ; Goodman et al., 2001). Participants' family annual income reported by caregivers was as follows: 12.5% ( $n = 1$ ) less than \$5,000, 25% ( $n = 2$ ) between \$20,000 – 24,999, and 12.5% ( $n = 1$ ) \$35,000 – 49,999, with the remaining four participants choosing not to respond to this item.

### **Sample Means and Standard Deviations**

Table 1 contains the raw scores during each of the major assessment points for all outcome and process measures, along with the behavioral analogue task scores, for the eight participants enrolled in the study. DERS scores at Assessment 1 indicated that the current sample of adolescents endorsed significant difficulties with emotion regulation ( $M = 130.25$ ,  $SD = 14.58$ ;  $n = 8$ ). This is evident when compared to the normative means in an adolescent community sample ( $M = 78.9$ ,  $SD = 23.2$ ; Weinberg & Klonsky, 2009). Responses on the Ohio Scales – Problem Severity ( $M = 44.50$ ,  $SD = 10.77$ ;  $n = 8$ ) suggested that the current sample endorsed problem severity that fell between the ranges of clinical and non-clinical samples. That is, the current samples' mean on the Problem Severity scale was less severe than the clinical sample but more severe than the community sample reported by Ogles and colleagues (2001). However, the current sample endorsed lower general functioning on the Ohio Scales – Functioning



Table 1

*Participant Raw Scores by Measure at Assessments 1, 2, and 3*

Participant	101		108		144		150		124	
Measure	A1	A2	A1	A2	A1	A2	A1	A2	A1	A2
DERS	140	74	136	139	104	85	147	105	130	127
Ohio – PS	51	8	44	50	30	29	42	12	44	42
Ohio – F	50	75	51	40	52	63	40	58	33	33
Ohio – H	17	7	14	9	8	12	17	8	18	18
HRQOL	20	6	10	15	15	14	30	2	18	10
AFQY – 8	27	9	23	25	13	13	27	15	17	15
BADS – SF	28	41	27	26	35	33	14	29	17	19
BART – Y	37.10	43.42	7.61	7.40	21.87	20.36	53.23	49.58	35.11	26.90
BIRD	156	180	300	300	300	300	300	300	133	93

Table 1 – Continued

Participant	132			146	121
Measure	A1	A2	A3	A1	A1
DERS	143	92	74	116	126
Ohio – PS	66	34	9	35	44
Ohio – F	26	53	49	49	49
Ohio – H	16	9	X	13	17
HRQOL	28	20	5	15	29
AFQY – 8	20	10	0	17	13
BADS – SF	15	24	38	21	21
BART – Y	32.90	49.53	--	15.44	35.43
BIRD	97	197	--	44	300

( $M = 43.75$ ,  $SD = 9.71$ ;  $n = 8$ ) when compared to the averages for the two clinical samples reported by Ogles and colleagues (2001). Responses from the current sample on the Ohio Scales – Hopefulness ( $M = 15$ ,  $SD = 3.30$ ;  $n = 8$ ) indicated that the current sample experienced less hopefulness than the two clinical samples reported in the original psychometric study (Ogles et al., 2001). Similarly, participants' responses on the HRQOL demonstrated an average of 20.63 days per month of impairment for mental health related reasons (range: 10 - 30,  $SD = 7.52$ ;  $n = 8$ ). This data corroborates that the current sample was experiencing significant daily life impairment.

In terms of the process measures, the current sample endorsed higher than average levels of avoidance and cognitive fusion on the AFQY-8 ( $M = 19.63$ ,  $SD = 5.63$ ;  $n = 8$ ). This mean is 1.5 standard deviations higher than the normative mean in the psychometric study of a non-clinical sample of girls ( $M = 9.19$ ,  $SD = 6.41$ ) and boys ( $M = 7.62$ ,  $SD = 6.20$ ) reported by Greco, Lambert, and Baer (2008). In addition, participants in the current sample demonstrated levels of behavioral activation on the BADS-SF ( $M = 22.25$ ,  $SD = 7.27$ ;  $n = 8$ ) similar to the averages for a depressed adolescent sample ( $M = 21.19$ ,  $SD = 6.73$ ; Petts, Foster, Douleh, & Gaynor, 2016).

In terms of behavioral inhibition, as measured by the BIS subscale of the BIS/BAS, the current sample scores ( $M = 21.75$ ,  $SD = 3.99$ ;  $n = 8$ ) demonstrated higher levels of inhibition when compared to the means of an adolescent community sample (Cooper, Gomez, & Aucote, 2007). In the BAS Drive subscale, the current sample average ( $M = 10.25$ ,  $SD = 3.20$ ;  $n = 8$ ) demonstrated similar values as the community adolescent sample ( $M = 9.61$ ,  $SD = 2.62$ ; Cooper Gomez, & Aucote, 2007). Similarly, the results of the BAS subscales: Fun Seeking ( $M = 12.38$ ;  $SD = 1.30$ ;  $n = 8$ ) and Reward

Responsiveness ( $M = 16.63$ ;  $SD = 2.92$ ;  $n = 8$ ), suggest the current sample demonstrated similar averages as those found in Cooper and colleagues' (2007) psychometric study for each respective subscale ( $M = 11.33$ ,  $SD = 2.30$ ;  $M = 15.50$ ,  $SD = 2.91$ ). Thus, the current sample demonstrated higher levels of behavioral inhibition but average levels of drive, fun seeking, and reward responsiveness according to the BIS/BAS.

The group level average was also calculated for the two behavioral analogue tasks. The pre-treatment BART-Y scores yielded a mean of 29.84 ( $SD = 14.31$ ,  $n = 8$ ), which was lower than the average levels of risk-taking propensity reported by Lejuez and colleagues (2007) psychometric study with a community sample of inner city African-American youth ( $M = 35.1$ ,  $SD = 14.8$ ). Results on the BIRD demonstrated a mean of 203.75 seconds ( $SD = 107.74$ ;  $n = 8$ ) of persistence to the task (of possible 300 seconds) at pre-treatment. High distress tolerance was categorized as those individuals who persisted through the full 5 minutes of the task, while those who quit the task before the 5 minutes were categorized as low distress tolerance, based on Daughters and colleagues' criteria. At the pre-treatment assessment, 50% ( $n = 4$ ) of the sample demonstrated high distress tolerance and 50% ( $n = 4$ ) demonstrated low distress tolerance.

### **Study Dropout**

Two of the eight enrolled participants were considered study dropouts. Participant 146 was a 16-year-old Native American female who completed a pre-treatment assessment, baseline session, and attended three ACT sessions. At the third ACT session, the participant disclosed alleged physical abuse in the home. As a mandated reporter, the study therapist made a report to Child Protective Services and informed the participant's mother about the report made. At this time the participant's mother withdrew consent for

study participation. Participant 121 was a 16-year-old female who identified with multiple ethnicities (Native American, Hispanic and Caucasian). She attended the pre-treatment assessment, baseline session, and one ACT session. She stopped attending the last month of the school year and, thus, the study therapist was no longer able to meet with her to continue with the ACT sessions. Thus, the remaining group and individual analyses include only the six participants for whom there was both pre- and post-treatment data.

### **Group Outcomes**

At the group level, paired-samples *t* tests were used to examine whether there were significant differences in the main outcome and process measures from pre- to post-treatment. Analyses demonstrated that there was a significant mean difference between pre-treatment DERS ( $M = 133.33$ ,  $SD = 15.51$ ) to post-treatment DERS scores ( $M = 103.67$ ,  $SD = 25.14$ ),  $t(5) = 2.63$ ,  $p = .05$ . Likewise, there was a significant mean difference from pre-treatment ( $M = 42$ ,  $SD = 10.83$ ) to post-treatment ( $M = 55$ ,  $SD = 14.21$ ) scores on the Ohio Scales – Functioning,  $t(5) = -2.53$ ,  $p = .05$ .

There were no significant mean differences on the other outcome measures, including the Ohio Scales – Problem Severity from pre-treatment ( $M = 46.17$ ,  $SD = 11.87$ ) to post-treatment ( $M = 29.17$ ,  $SD = 16.52$ ),  $t(5) = 2.04$ ,  $p = .10$ ; the Ohio Scales – Hopefulness from pre-treatment ( $M = 15$ ,  $SD = 3.69$ ) to post-treatment ( $M = 10.50$ ,  $SD = 4.04$ ),  $t(5) = 2.02$ ,  $p = .10$ ; the Ohio Scales – Satisfaction from pre-treatment ( $M = 12.20$ ,  $SD = 6.26$ ) to post-treatment ( $M = 9.20$ ,  $SD = 5.26$ ),  $t(4) = 2.30$ ,  $p = .08$ ; or on the HRQOL reports from pre-treatment ( $M = 20.17$ ,  $SD = 7.65$ ) to post-treatment ( $M = 11.17$ ,  $SD = 6.52$ ),  $t(5) = 1.94$ ,  $p = .11$ . On the process measures, there were no significant mean

differences on the AFQY-8 from pre-treatment ( $M = 21.17$ ,  $SD = 5.60$ ) to post-treatment ( $M = 14.50$ ,  $SD = 5.72$ ),  $t(5) = 2.08$ ,  $p = .09$  or the BADS-SF pre-treatment ( $M = 22.67$ ,  $SD = 8.55$ ) to post-treatment ( $M = 28.67$ ,  $SD = 7.66$ ),  $t(5) = -2.01$ ,  $p = .10$ .

There were no significant mean differences on the BART-Y from pre-treatment ( $M = 31.30$ ,  $SD = 15.37$ ) to post-treatment ( $M = 32.87$ ,  $SD = 17.37$ ),  $t(5) = -.44$ ,  $p = .68$ . An exact McNemar's test was used to examine significant differences from pre- to post-treatment on the BIRD, in terms of its categorical measure (low distress tolerance vs. high distress tolerance). The results showed that there was no statistically significant difference in the proportion of participants that demonstrated low distress tolerance or high distress tolerance from pre- to post-treatment,  $p = 1.00$ . All six participants remained in the same category at pre- and post treatment (50%,  $n = 3$  were low distress tolerance and 50%,  $n = 3$  in high distress tolerance). The specific number of seconds of persistence on the BIRD from pre-treatment ( $M = 214.33$ ,  $SD = 95.71$ ) to post-treatment ( $M = 228.33$ ,  $SD = 86.07$ ) did not statistically differ either,  $t(5) = -.73$ ,  $p = .50$ .

### **Reliable Change Index Calculations**

The Reliable Change Index (RCI) criterion (Jacobson & Truax, 1991) was used to calculate whether individual participants demonstrated change (i.e., a reliable improvement or worsening) that is unlikely due to measurement error based on the available psychometric properties of the relevant measure. The RCI is calculated by using a measure of internal consistency from the psychometric study of the measure along with the standard deviation of the measure obtained from the study sample at the first assessment point. However, due to the small sample size in the current study, the standard deviations from the published psychometric studies for each measure were used

to calculate the RCI for the measures. An RCI was calculated for each of the outcome and process measures for the study, with the exception of the HRQOL due to a lack of normative data for the scale.

The DERS RCI was calculated using the standard deviation (30.92) and Cronbach's alpha (.93) values from an adolescent community sample (Weinberg & Klonsky, 2009). This yielded an RCI of 17.01. Sixty-seven percent ( $n = 4$ ) of the sample demonstrated a reliable change on the DERS from pre- to post-treatment. The Ohio Scales – Problem Severity RCI was calculated using the standard deviation (23.2) and Cronbach's alpha (.93) values from the more conservative of two clinical community youth samples reported by Ogles and colleagues (2001). This yielded an RCI of 22.68. Fifty percent ( $n = 3$ ) of the sample demonstrated a reliable change on the Problem Severity scale from pre- to post-treatment. The three participants who demonstrated a reliable change in problem severity also demonstrated reliable change on the DERS. On the Ohio Scales – Functioning, the standard deviation (15.78) and Cronbach's alpha (.91) reported by Ogles and colleagues (2001) from the same sample were used to yield a RCI of 13.12. Fifty percent ( $n = 3$ ) of the sample demonstrated a reliable change on the Ohio Scales–Functioning. Lastly, on the Ohio Scales – Hopefulness, the standard deviation (4.99) and Cronbach's alpha (0.75) from Ogles and colleagues (2001) study yielded a RCI of 6.92. Fifty percent ( $n = 3$ ) of the sample demonstrated a reliable change on Hopefulness. The participants who demonstrated a reliable change on the Functioning and Hopefulness scales also demonstrated the reliable change in DERS and Ohio Scales–Problem Severity.

For the process measures, the AFQY-8 standard deviation (6.41) and Cronbach's alpha (.83) obtained from a community sample of child and adolescent girls (Greco, Lambert & Baer, 2008), yielded a RCI of 7.33. The standard deviation for the sample of girls was used instead of the sample of boys reported in the same study, as it provided a more conservative RCI. Fifty percent ( $n = 3$ ) of the sample demonstrated a reliable improvement on the AFQY-8. Lastly, for the BADS-SF process measure, the standard deviation (6.73) and Cronbach's alpha (.75) from a depressed adolescent sample (Petts, Foster, Douleh, & Gaynor, 2016) was used to calculate the RCI, yielding 9.33. Fifty percent ( $n = 3$ ) of the sample demonstrated a reliable change on the BADS-SF from pre- to post-treatment. The participants who demonstrated this reliable change were the same participants who demonstrated a reliable change on the previously described measures.

### **Individual Analyses**

Individual analyses were conducted for all participants. First the repeated data points from the primary outcome measure (DERS and the adjusted scores obtained from the repeated DERS-A/B) were analyzed to determine baseline nonoverlap and trend. These analyses were completed utilizing Nonoverlap of All Pairs (NAP) and Tau-U calculations. NAP provides a measure of the nonoverlap between the baseline and treatment phases within a single-subject design (Parker & Vannest, 2009). Tau-U combines the non-overlap between the phases while taking into account trend occurring in the baseline phase (Parker, Vannest, Davis, & Sauber, 2010). Given the directional predictions, when individual level Tau-U analyses yielded  $p$ -values  $< .10$ , the results were considered statistically significant at the individual level. Second, RCI calculations for each main outcome and process measure were used to determine reliable change (i.e.



improvement or worsening) from A1 to A2 for all participants and, when A3 data was available, reliable change from A2 to A3. Lastly, an overall weighted NAP and Tau-U effect size for the combined six participants in the sample was calculated.

**Participant 101.** Participant 101 was a 14-year old female who identified as African-American. She was in 9<sup>th</sup> grade and lived with her biological mother and two siblings. She reported an MSSSS score of 4. She had a family history of depression, bipolar disorder, suicide, and psychiatric hospitalizations. Participant 101 attended all six of the available ACT sessions and at post-treatment reported a treatment satisfaction score (on the Ohio Scales – Satisfaction) of 4, which indicated *extremely satisfied*, based on Ogles and colleagues (2001).

The Tau-U analysis comparing the repeated DERS measures collected across baseline and treatment phases, correcting for baseline trend, was significant ( $\text{Tau} = -.72$ ,  $Z = -1.68$ ,  $p = .09$ ) given our directional prediction (see Table 2 for participant NAP and Tau-U values). In terms of reliable change, changes on the DERS from A1 (140) to A2 (74) suggested a reliable improvement in emotion regulation. Likewise, the decrease in her scores on the Ohio Scales – Problem Severity from A1 (51) to A2 (8) suggested a reliable change, with less severity of problems. Similarly, the change from A1 (50) to A2 (75) on the Functioning scale of the same measure indicated a reliable improvement in general functioning and the changes in Hopefulness from A1 (17) to A2 (7) indicated more hopefulness about self and future. As previously mentioned, the HRQOL measure does not have normative data, thus a RCI for this measure was unobtainable. However,

Table 2

*DEERS Repeated Measures Raw Data, NAP, and Tau-U Results*

Participant	A1	BL	ACT1	ACT2	ACT3	ACT4	ACT5	ACT6	A2	A3
101	140	145	155.37	144	159.16	128.84	108	90.95	74	X
108	136	140	161.05	138.32	151.58	X	X	X	139	X
144	104	102	94.74	100.42	102.32	102.32	X	X	85	X
150	147	143	140.21	138.32	134.53	132.63	132.63	126.95	105	X
124	130	141	142.11	136.42	136.42	138.32	140.21	145.89	127	X
132	143	141	155.37	142.11	134.53	144	132.63	113.68	92	74

Table 2 – Continued

Participant	<i>NAP</i>	<i>Z</i>	<i>p</i>	<i>Tau</i>	<i>Z</i>	<i>p</i>
101	.22	-1.29	0.20	-0.72	-1.68	0.09*
108	.44	-0.22	0.83	-0.44	-0.87	0.30
144	.42	-0.35	0.72	0.08	0.17	0.86
150	0	-2.32	0.02	-0.08	-1.94	0.05*
124	.39	-0.52	0.61	--0.39	-0.90	0.36
132	.17	-1.55	0.12	-0.72	-1.68	0.09*

\*Significant at the .10 level

observation of this participants HRQOL demonstrated a change from a reported 20 (A1) to 6 (A2) days of the past 30 days in which mental health was “not good.”

In addition, in terms of avoidance and fusion, as measured by AFQY-8, scores from A1 (27) to A2 (9), indicated a reliable decrease of avoidance and fusion of difficult thoughts and emotions. Lastly, she demonstrated a reliable increase in behavioral activation, as measured by the BADS-SF from A1 (28) to A2 (41). Thus, Participant 101 demonstrated reliable improvements on all of the outcome and process measures.

**Participant 108.** Participant 108 was a 16-year old female who identified as African-American and was in 9<sup>th</sup> grade. She reported an MSSSS score of 5. At enrollment in the study, she reported she had recently experienced a miscarried pregnancy. In addition, she had significant school attendance issues where sessions were held and, as a result, only attended three of the six available ACT sessions. Her post-treatment Ohio Scales – Satisfaction score was 8, indicating moderate satisfaction with treatment (based on Ogles and colleagues, 2001).

Analyses examining the nonoverlap of all pairs between the baseline and treatment phase on the DERS were non-significant for both NAP and Tau-U analyses (see Table 2). A comparison of DERS scores between A1 (136) and A2 (139) showed no change in emotion dysregulation. Similarly, the Problem Severity and Functioning scales of the Ohio Scales for this participant moved in the non-therapeutic direction. The Problem Severity scale went from 44 (A1) to 50 (A2) and the Functioning scale from 51 to 40. However, the Hopefulness scale moved in the therapeutic direction 14 (A1) to 9 (A2), but none of these changes met criteria for a reliable worsening based on RCI calculations. Further, the participant’s responses on the HRQOL indicated an increased

number of days in the month where mental health was “not good,” going from 10 days (A1) to 15 days (A2).

A similar pattern was observed in the process measures. She demonstrated minimal change on the AFQY-8 from A1 (23) to A2 (25) and on the BADS-SF from A1 (27) to A2 (26), suggesting no notable change in avoidance and fusion or activation levels. That is, neither of the changes on the measures met criteria for a reliable worsening. Thus, data for Participant 108 across Assessment 1 and three sessions of ACT indicate no reliable improvements or worsening on any of the outcome or process measures.

**Participant 144.** Participant 144 was a 16-year old female who identified as African-American. She was in 11<sup>th</sup> grade and lived with her older sister (aged 25, legal guardian) and no other children in the home. She reported an MSSSS score of 6. She had an immediate family history of anxiety, drug abuse, and felony conviction. Participant 144 attended four of the six available ACT sessions. Her Ohio Scales – Satisfaction score was 7, indicating moderate satisfaction with treatment (based on Ogles et al., 2001).

The DERS calculation of nonoverlap of all pairs between the baseline and treatment phase was non-significant both when baseline trend was not (NAP) and was (Tau-U) controlled for (see Table 2). The DERS changes from A1 (104) to A2 (85) demonstrated a reliable improvement in emotion regulation skills. However, her changes on the remaining outcome and process measures indicated an absence of reliable changes.

Changes on the Ohio Scales–Problem Severity were minimal from A1 (30) to A2 (29). The Ohio Scales–Functioning demonstrated an improvement from A1 (52) to A2 (63), while the Ohio Scales – Hopefulness changed in the non-therapeutic direction from

A1 (8) to A2 (12), though neither met the criterion to be considered a reliable change. In terms of days in which mental health was “not good,” her responses on the HRQOL had minimal change, going from 15 days (A1) to 14 days (A2). Similarly, the process measures showed no or minimal change. The AFQY-8 score remained the same from A1 to A2 (13) and the BADS-SF score minimally decreased from from A1 (35) to A2 (33), but this was not a reliable worsening. Thus, the reliable change calculations for Participant 144 indicated a reliable improvement only on the DERS. No reliable worsening was found on any measures for which a RCI was calculated.

**Participant 150.** Participant 150 was an 18-year old female who identified as African-American. She was in 12<sup>th</sup> grade and lived with her biological parents and one younger brother. She reported an MSSSS score of 4. Participant 150 attended all six ACT sessions. Her Ohio Scale – Satisfaction score was 18, indicating moderate dissatisfaction with treatment (based on Ogles et al., 2001).

The measure of nonoverlap of all pairs for the DERS was statistically significant for both NAP and Tau-U calculations ( $\text{Tau} = -.08$ ,  $Z = -1.94$ ,  $p = .05$ ) given our directional prediction (see Table 2). The DERS RCI calculations demonstrated a reliable improvement in emotion regulation from A1 (147) to A2 (105). On the Ohio Scales, the Problem Severity score changes from A1 (42) to A2 (12) demonstrated a reliable improvement, indicating lower reported severity of problems. Likewise, the Ohio Scales–Functioning indicated a reliable improvement in general functioning from A1 (40) to A2 (58) and a reliable improvement in Hopefulness from A1 (17) to A2 (8). Although there is no RCI calculation for the HRQOL, this participant’s responses on the number of days

in the last 30 days in which her mental health was “not good” decreased from 30 (A1) to 2 (A2), indicating decreased daily life impairment.

Similarly, Participant 150’s changes on the AFQY-8 from A1 (27) to A2 (15) indicated a reliable improvement; that is, decreased avoidance and fusion. Lastly, the BADS-SF changes from A1 (14) to A2 (29) suggested a reliable increase in behavioral activation. Thus, Participant 150’s scores on outcome and process measures indicated a reliable improvement on all outcome and process measures.

**Participant 124.** Participant 124 was a 14-year old female who identified as Caucasian. She was in 9<sup>th</sup> grade and lived with her biological mother and had regular contact with her biological father. She reported an MSSSS score of 3.5. Participant 124 attended all six available ACT sessions. Her treatment satisfaction score (based on the Ohio Scales – Satisfaction) was 8, indicating moderate treatment satisfaction.

The NAP and Tau-U calculations for the DERS were non-significant (see Table 2). Her changes on the DERS from A1 to A2 (130 to 127) did not meet the criteria to be considered a reliable change. In addition, her Ohio Scales scores on the Problem Severity from A1 (44) to A2 (42) indicated a two-point decrease in severity that did not meet reliable change. Her scores on the other Ohio Scales remained the same on both the Functioning scale from A1 to A2 (33) and on the Hopefulness scale (18). On the HRQOL, the number of days in which mental health was “not good” demonstrated a change from 18 (A1) to 10 (A2) days. In addition, her AFQY-8 score demonstrated a similar pattern from A1 (17) to A2 (15) indicating a two-point decrease in avoidance and fusion that did not meet criteria for a reliable improvement. Lastly, the change on the BADS-SF from A1 (17) to A2 (19) indicated a 2-point increase in activation levels, but

was not sufficient to be considered a reliable improvement. Thus, Participant 124 did not have a reliable improvement or reliable worsening on any of the outcome or process measures.

**Participant 132.** Participant 132 was a 17-year old female who identified as African-American. She was in 12<sup>th</sup> grade and lived with her biological mother and one sibling. She reported an MSSSS score of 6. She had a family history of depression, anxiety, hyperactivity, drug abuse, and felony conviction. Participant 132 attended all six available ACT sessions and completed the one-month follow-up (A3) assessment. Her overall treatment satisfaction score, based on the Ohio Scales – Satisfaction, was 9, indicating moderate satisfaction.

The DERS comparison of baseline and treatment nonoverlap of all pairs (NAP) and comparison controlling for baseline trend (Tau-U) were significant ( $\text{Tau} = -.72$ ,  $Z = -1.68$ ,  $p = .09$ ) given our directional prediction (see Table 2). Analyses examining reliable changes on the outcome and process measures indicated that Participant 132 met reliable improvement on all measures. On the DERS, A1 to A2 changes (143 to 92) indicated a reliable improvement in emotion regulation. Likewise, post-ACT (A2) to the one-month follow-up (A3) changes (92 to 74) also indicated a reliable improvement in emotion regulation. The Ohio Scales also demonstrated reliable improvements on the Problem Severity from A1 (66) to A2 (34) and from A2 (34) to A3 (9), which indicated that Participant 132 continued to experience decreased severity of problems following receipt of ACT. On the Ohio Scales–Functioning, changes from A1 (26) to A2 (53) indicated reliable improvement in general functioning. From A2 (53) to A3 (49), she demonstrated a slight decrease in functioning but this did not meet criteria for a reliable worsening. She



also demonstrated a reliable improvement in Hopefulness from A1 (16) to A2 (9). On the HRQOL, at A1 she reported that in 28 of the previous 30 days she experienced mental health that was “not good” and at A2 this was reported as 20 days. Her days of mental health impairment decreased from 20 to 5 when examining A2 to A3 changes. Taken together, Participant 132 demonstrated improvement in quality of life and functioning.

On the AFQY-8, she had a 10-point decrease from A1 (20) to A2 (10). This decrease held when comparing A2 (10) to A3 (0). This suggested improvement in lower levels of avoidance and fusion of difficult thoughts and emotions at the end of the six-sessions of ACT and continued improvement in the following month. She also demonstrated a 9-point increase in activation on the BADS-SF when examining A1 to A2 changes, which was at the RCI needed (9.33) to be deemed a reliable improvement. When examining A2 (24) to A3 (38) changes on the BADS-SF, Participant 132 demonstrated a reliable increase in behavioral activation. Thus, Participant 132 had a reliable improvement on all measures that had an available RCI, with the BADS-SF being slower to increase.

### **Group Weighted NAP and Tau-U**

Taking all six participants DERS data across the two phases, the overall weighted effect for NAP was non-significant ( $Tau = 0.27$ ,  $Z = 1.45$ ,  $p = 0.15$ ), while the weighted effect for Tau-U after correcting for positive baseline trend was statistically significant ( $Tau = -0.51$ ,  $Z = -2.80$ ,  $p < .01$ ).

### **Exploratory Analyses of Behavioral Analogue Tasks**

Exploratory Pearson product-moment correlation coefficients were calculated to determine whether the BART-Y and BIRD demonstrated significant associations with

measures of related constructs utilized in the study. For each of the behavioral analogue tasks, correlations were broken down into associations amongst pre-treatment scores on the measures believed to be related to that construct and separately for the post-treatment scores on the measures. For example, correlations for the BART-Y were calculated for the following scores: DERS total score, DERS-Impulse subscale score, BAS-Drive, BAS-Fun Seeking, and BAS-Reward Responsiveness. This was done for the pre-treatment scores on those measures and separately for the post-treatment scores of the same measures. Likewise, for the BIRD correlation coefficients, associations were examined with the following scores: DERS total score, DERS-Goal subscale, and BIS subscale of the BIS/BAS measure.

For the BART-Y, the DERS-Impulse subscale score was chosen as past research has found a correlation between the BART-Y and self-reported engagement in impulsive behaviors in some studies but not others (Collado, MacPherson, Kurdziel, Rosenberg, & Lejuez, 2014; Lejuez et al., 2007). The BAS subscales of the BIS/BAS have been described as measures of behavior that can be rapid and motivated by the experience of pleasure (Cooper, Gomez, & Aucote, 2007); thus, all three BAS subscales were utilized in the correlations with the BART-Y, the measure of risk-taking propensity. The correlation coefficients for the BART-Y (see Table 3) for the pre-treatment scores yielded non-significant correlations for most pairs, with the exception of significant correlations between the DERS-Impulse subscale and the BAS-Drive subscale,  $r = .86, p < .01$  and a significant correlation between the DERS-Impulse subscale and the BAS-Reward Responsiveness subscale,  $r = .92, p = .001$ . Associations amongst the post-treatment BART-Y score and the same measures at post-treatment yielded significant

correlations between the DERS-Impulse subscale and the BART-Y,  $r = -0.92$ ,  $p < .01$  and between the DERS-Impulse subscale and the BAS-Reward Responsiveness subscale,  $r = -0.82$ ,  $p = .04$ .

Table 3

*Summary of Correlations for BART-Y, DERS Total Score, DERS-Impulse, BAS-Drive, BAS-Fun Seeking, and BAS-Reward Responsiveness*

Measure	1	2	3	4	5
Pre-treatment					
1. BART-Y	—				
2. DERS	.52	—			
3. DERS-I	.54	.32	—		
4. BAS-D	.40	.23	.86**	—	
5. BAS-FS	.56	.15	.54	.46	—
6. BAS-RR	.60	.30	.92**	.82*	.31
Post-treatment					
1. BART-Y	—				
2. DERS	-.59	—			
3. DERS-I	-.92*	.80	—		
4. BAS-D	.06	-.07	.11	—	
5. BAS-FS	.67	.07	-.37	.30	—
6. BAS-RR	.70	-.76	-.82**	-.07	-.02

*Note.* Pre-treatment correlations contained the pre-treatment sample ( $n = 8$ ) and post-treatment correlations contained only the participants who completed post-treatment assessments ( $n = 6$ ).

\* Correlation significant at the 0.01 level

\*\* Correlation significant at the 0.05 level

Analyses for the correlation between the BIRD, DERS total score, DERS-Goals subscale, and the BIS yielded one statistically significant correlation within the pre-

treatment scores. The DERS total score was significantly correlated with the BIS subscale,  $r = .72, p < .05$ . There were no significant correlations found for the post-treatment scores of the BIRD and the same measures outlined above (see Table 4).

Table 4

*Summary of Correlations for BIRD, DERS Total Score, DERS-Goals, and BIS Subscale*

Measure	1	2	3
Pre-treatment			
1. BIRD	—		
2. DERS	.15	—	
3. DERS-G	.09	.21	—
4. BIS	.34	.72*	.02
Post-treatment			
1. BIRD	—		
2. DERS	-.26	—	
3. DERS-G	-.27	.43	—
4. BIS	-.16	.31	-.36

*Note.* Pre-treatment correlations contained the pre-treatment sample ( $n = 8$ ) and post-treatment correlations contained only the participants who completed post-treatment assessments ( $n = 6$ ).

\* Correlation significant at the 0.05 level

### Summary of Main Findings

Based on directional predictions, such that baseline corrected scores of  $p < .10$  would be considered to represent a significant effect of treatment, the time series DERS data for 3 of the six participants (50%) showed significant change. Notably, all three of these participants (101, 150, and 132) received all six sessions. These three participants also demonstrated reliable improvements across the main outcome measures (DERS,

Ohio Scales: Problem Severity, Functioning, and Hopefulness). On the process measures, the same three participants demonstrated reliable improvements in avoidance and fusion (AFQY-8) and behavioral activation (based on the BADS-SF). Only one of the four participants (Participant 124) who completed all six ACT sessions did not demonstrate any reliable improvements or worsening on any of the outcome or process measures. Two of the six participants did not receive the full six sessions of ACT. One participant (144) received four sessions and demonstrated a reliable improvement on the DERS, but did not demonstrate reliable improvement or worsening on any of the remaining outcome or the process measures. Another participant (108) received only three ACT sessions and did not demonstrate a reliable improvement or worsening on any of the measures.

## DISCUSSION

The study was an exploratory open-trial, utilizing a single-subject A/B design, examining the efficacy of a six-session protocol of ACT for adolescents experiencing difficulties with emotion regulation. It was hypothesized that participants who participated in the ACT intervention would report improvements in emotion regulation skills after receiving the intervention. Further, the study aimed to address previously reported limitations of ACT studies and general treatment outcome research, by including measures of quality of life and general daily functioning, along with standard self-reports, and behavioral analogue measures of constructs related to emotion regulation (i.e., risk-taking propensity and distress tolerance).

The results of the study demonstrated varying levels of response on the main outcome and process measures. The data suggested that of the four participants (out of six analyzed) who received all six ACT sessions, 75% demonstrated reliable

improvement in emotion regulation skills. In addition, the participants who demonstrated statistically significant and reliable improvement in emotion regulation also demonstrated improvements in general functioning and movement on the two process measures: decreased avoidance and fusion of difficult thoughts and emotions, along with increased levels of behavioral activation. Thus, those who improved on emotion regulation skills also moved in the direction of important areas targeted within the ACT model.

As the first study to examine ACT with adolescents experiencing difficulties in skills related to emotion regulation, the findings from this study demonstrate initial promise. In line with advances in the mental health field, one aim of this study was to apply ACT to a transdiagnostic construct rather than a diagnostic label. While preliminary, the results from this study align with previous suggestions that ACT is a fitting intervention to target transdiagnostic constructs in treatment (Swain, Hancock, Dixon, & Bowman, 2015), including the currently examined construct of emotion regulation.

The findings of the study also align with recent reviews suggesting that ACT can be successfully applied with youth (Swain, Hancock, Dixon, & Bowman, 2015). Further, Halliburton and Cooper (2015) outlined several ways that ACT can be adapted to more successfully meet the needs of adolescents in treatment. The ACT protocol developed for this study included several of those strategies outlined, including the emphasis on experiential exercises, and personalizing treatment strategies to individualized goals (Halliburton & Cooper, 2015). In addition, Halliburton and Cooper's review suggested that most ACT youth studies have been based off of homogeneous samples and that the inclusion of more diverse samples is necessary in studies examining the application of

ACT for youth. The current study contributes to the literature in this area, as most participants enrolled were of non-majority ethnic background. Thus, the structure and areas of emphasis of the treatment protocol developed for this study, coupled with the promising results obtained in a diverse sample, support the utility of ACT for adolescents.

The current study also addressed another important suggestion posited by researchers. Some have said that because the ACT model of treatment focuses on helping individuals engage in their life based on valued life areas, as opposed to focusing on eliminating or reducing emotional symptoms, that ACT studies aim to incorporate measures of daily life functioning and quality of life (Swain, Hancock, Dixon, & Bowman, 2015). In their systematic review, Swain and colleagues (2015) concluded that few studies have examined ACT's efficacy in improving quality of life in addition to clinical outcomes in youth. This study incorporated measures of general life problems, functioning, and quality of life (through the HRQOL and Ohio Scales – Problem Severity and Functioning) and, therefore, provides some initial data in this important area previously lacking in studies of ACT with adolescents.

Previous research has also documented the importance of incorporating measures that do not rely solely on self-report questionnaires (Lejuez, Aklon, Zvolensky, & Pedulla, 2003). The inclusion of the two behavioral analogue measures assessing constructs related to emotion regulation using the BART-Y, the measure of risk-taking propensity, and the BIRD, the measure of distress tolerance, addresses this limitation of previous research. The small data set allowed for only exploratory correlation analyses for the BART-Y and BIRD. The similarity between the BART-Y and BIRD mean scores from

pre-treatment to post-treatment was unexpected, as we predicted potential movement after receiving the ACT intervention. However, one possible explanation for this is that the sample in this study demonstrated lower BART-Y scores compared to the community norm sample to begin with. Stated differently, because the participants in this study demonstrated lower levels of risk-taking propensity prior to beginning treatment, there was little movement or decrease that could have occurred. Further, there may be a difference in risk-taking propensity based on presentation of more externalizing behavioral presentations versus internalizing behavioral presentations; perhaps the current sample presented with more internalizing symptoms. However, no data collected in the study could answer questions related to this speculation. While the BIRD did not yield notable findings, the inclusion of the BIRD in this study is important, as distress tolerance has been related both to the construct of emotion regulation and to the goal of ACT. Kashdan and Rottenberg (2010) noted that the goal of ACT, increasing psychological flexibility, requires an ability to tolerate distressing emotions and thoughts. They stated that an inability to do so may lead to difficulties in adapting behavior to what is best suited for the situation and may lead individuals to engage in automatic rather than goal-directed behavior. Thus, the inclusion of the BIRD in this study allowed for an exploratory analysis of its relation to the construct of emotion regulation.

One important limitation of the study is the small sample analyzed. Only eight participants enrolled with two dropping out of the study and six completing the study. Of the six participants who completed pre- and post-treatment assessments, only four participated in all six-sessions of ACT. This limits the generalizability of the findings in



this study and, thus, the results can only be interpreted as preliminary. The small size of the sample can be interpreted in several ways.

The primary identifiable factor related to receipt of sessions was problems related to school attendance. One of the participants who dropped out of the study and the two who completed less than the full six-sessions of ACT had significant school attendance issues that interfered with meetings with the study therapist, which occurred at school. Perhaps some of the participants referred to the study would have benefitted from referral to other services that would assist with the areas that served as barriers to school attendance prior to participation in the study.

In addition, only one participant completed the one-month follow-up (Assessment 3) which limited the ability to examine maintenance of progress beyond the post-treatment assessment for the group of participants. The difficulty in reaching participants to complete the Assessment 3 could be explained partially by the timing of the year, with one-month follow up assessments falling in the summer after the school year was over. Nonetheless, the lack of follow-up data for the remaining participants is a limitation of the current preliminary results.

Another interesting consideration is that researchers have suggested that ACT may be most useful for adolescents who have greater insight and greater ability to think and reason abstractly, since ACT involves the extensive use of metaphors (Halliburton & Cooper, 2015). This study did not include any indicators of adolescents' ability to engage in abstract thinking, but this may be an important consideration when developing screening tools for studies of ACT applications for adolescents. Therefore, ACT may not be a good fit for some adolescents and this may have potentially impacted participants'

engagement in the treatment and/or study. The importance of motivation for treatment has been noted as an important variable to examine in adolescent treatment studies, as this age range can be particularly susceptible to being in treatment due to caregiver or others' request (Halliburton & Cooper, 2015).

Another major limitation of the study is related to issues with measurement. Halliburton and Cooper (2015) stated that many of the authors of the ACT youth studies included in their review noted issues with the reliability and validity of self-report measures as an important limitation of their studies. Some have stated that self-report measures are largely influenced by a person's ability to report accurately and/or their willingness to do so and have described the importance of alternative ways to measure emotion regulation, such as through mood inductions and relevant multidimensional measures (Weiss, Gratz, & Lavendar, 2015). It has also been suggested that normative adolescent cognitive abilities may limit the ability to accurately identify and engage in introspection of the emotion regulation strategies they utilize (Van Beveren & Braet, 2015). Similarly, it has been suggested that self-report measures of emotion regulation may actually be measuring an individual's knowledge of, not ability to use, emotion regulation strategies (Henry, Castellini, Moses, & Scott, 2016). Because the current study utilized a self-report measure of emotion regulation as the primary outcome variable, this is an important methodological limitation.

Related to this issue of measurement, we anticipated that the DERS cut-off score we selected for eligibility in the study would serve as a more inclusive measure; thus, we were surprised that only 8 of the 15 referred students met the minimum score on the DERS to proceed with enrollment into the study. Since the initiation of the current study,

researchers have acknowledged limitations of the DERS (Bardeen, Fergus, Hannah, & Orcutt, 2015). One research team found that one of the subscales of the DERS (Awareness) contained items that did not load well to the overall construct of emotion regulation (Bardeen, Fergus, Hannah, & Orcutt, 2015). They stated that the inclusion of the Awareness subscale items in the total DERS score could potentially cloud important findings. Therefore, they modified all reverse coded items on the DERS, reworded some items, and found support for a modified version of the DERS containing only 29 of the original 36 items on the DERS (Bardeen, Fergus, Hannah, & Orcutt, 2015). It is possible that the limitations of the DERS in its original form may have impacted the results in the current study.

Similarly, at the time of the design and implementation of the study, there was no published short version of the DERS. As a result, we used the original DERS items to develop two split-versions (DERS-A/B) to use as a repeated measure. More recently, Bjureberg and colleagues (2015) developed and validated the DERS-16, which was found to have acceptable psychometric properties. Based on their findings, they described it as an adequate version of the DERS to administer as a repeated measure. The use of a self-developed short version of the DERS with no established psychometric properties could have impacted the baseline trend issues observed in the current data set. The split-versions we used required calculating an adjusted score, so that the 19-item DERS-A and DERS-B could be adjusted to the metric of the full 36-item DERS. The repeated data points for several participants sometimes demonstrated worsening of symptoms when alternating from the A or B version of the DERS, which suggests that our use of this self-split version may have impacted the overall findings in this study.

Future research should continue exploring similar areas examined in this study. It is important to continue researching interventions for adolescent emotion regulation, as it is a construct related to numerous areas of mental health difficulties. In addition, the use of interventions that focus on improving life functioning, as opposed to a focus on symptom reduction, is one that aligns well with the current direction of mental health research. There is much to be learned in terms of adequate approaches to measuring changes in emotion regulation skills, including the importance of developing psychometrically sound self-report and behavioral analogue measures of this transdiagnostic construct.

Although the outlined limitations prevent any concrete conclusions, it is important to note that the results provide preliminary promise. This study was the first to examine the efficacy of ACT in targeting difficulties with emotion regulation in an adolescent sample. In addition, the use of measures of general functioning and quality of life, measures of ACT processes, and behavioral analogue of constructs related to emotion regulation make this a unique study that contributes to areas reported as lacking in the ACT literature. The findings of this study provide initial promise for continued exploration. Future studies should continue exploring the efficacy of ACT with adolescents and applying it to transdiagnostic constructs, while incorporating novel measurements that provide the opportunity for more assessment of variables that tap closer into real-life behavior.

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APPENDIX:

Human Subjects Institutional Review Board (HSIRB)  
Approval Letter

# WESTERN MICHIGAN UNIVERSITY



Human Subjects Institutional Review Board

Date: February 6, 2015

To: Scott Gaynor, Principal Investigator  
Julissa Duenas, Student Investigator for dissertation  
Student Investigators: Monica Barreto, Christopher Briggs, Alison DeLizza  
Carmelita Foster, Lindsey Knott, Justin Moore  
Rachel Petts

From: Daryle Gardner-Bonneau, Ph.D., Vice Chair

Re: HSIRB Project Number 14-11-03

This letter will confirm that your research project titled "Acceptance and Commitment Therapy of Adolescent Emotion Regulation Skills" has been **approved** under the **full** category of review by the Human Subjects Institutional Review Board. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the application.

Please note: This research may **only** be conducted exactly in the form it was approved. You must seek specific board approval for any changes in this project (e.g., ***you must request a post approval change to enroll subjects beyond the number stated in your application under "Number of subjects you want to complete the study."*** Failure to obtain approval for changes will result in a protocol deviation. In addition, if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the HSIRB for consultation.

**Reapproval of the project is required if it extends beyond the termination date stated below.**

The Board wishes you success in the pursuit of your research goals.

**Approval Termination:**

**November 18, 2015**

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