

TRAIT MINDFULNESS AND ADOLESCENT DEPRESSION: EMOTIONAL AWARENESS
AND
EMOTION REGULATION AS MEDIATORS

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ABSTRACT

William S. Futch: Trait Mindfulness and Adolescent Depression: Emotional Awareness and Emotion Regulation as Mediators
(Under the direction of Mark R. Klinger)

In adults, trait mindfulness has been linked to lower rates of depression. However, there is little evidence for this relationship in adolescents. The goal of this study was to examine whether trait mindfulness was related to adolescent depression and what the underlying mechanisms of this relation might be, specifically looking at emotional awareness and emotion regulation. Mindfulness, depression, emotional awareness, and emotion regulation measures were completed by adolescent males. The results showed a robust, negative relationship between trait mindfulness and adolescent depression that was not explained by emotion regulation or emotional awareness. Trait mindfulness moderated the relationship between cognitive reappraisal and depression. These results suggest that trait mindfulness could be important in preventing depression in adolescent males. Future research should focus more fully on measuring trait mindfulness and its relations with other constructs, as well as reproducing this study with multiple time points and females.

To Riley W. Hill for being my runnin' mate and life-long colleague.

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LIST OF ABBREVIATIONS

CAMM	Child and adolescent mindfulness measure
CR	Cognitive reappraisal
ERQ-CA	Emotion regulation questionnaire for children and adolescents
ES	Expressive suppression
LEAS-C	Levels of emotional awareness scale for children
MDD	Major depressive disorder
SMFQ	Short mood and feelings questionnaire

CHAPTER 1: LITERATURE REVIEW

Rates of depression rise dramatically during adolescence, and moderate depressive symptoms have been linked to difficulties in other life domains such as academic and peer functioning (Hankin & Abramson, 2001). Further, research has demonstrated that adolescent depression often worsens between the ages of 15 and 18, suggesting that middle adolescence may be a period of increased vulnerability for depression (Hankin & Abramson, 2001). These unfortunate realities have motivated a search for protective factors and treatments that can mitigate adolescent depression. Trait mindfulness and interventions aimed at increasing trait mindfulness may provide a solution. It is well-documented in adult populations that trait mindfulness is negatively related to depression and that mindfulness-based interventions ameliorate depression (Khoury, Sharma, Rush, & Fournier, 2015; Strauss, Cavanagh, Oliver, & Pettman, 2014; Chiesa & Serretti, 2011). Some research has suggested this effect holds for adolescents as well (Zoogman, Goldberg, Hoyt, & Miller, 2014). However, there is much less literature on trait mindfulness and adolescent depression, and even less research that unpacks the mechanisms by which trait mindfulness may ameliorate depression in adolescents. The purpose of this paper, therefore, is to investigate the underlying mechanisms of how trait mindfulness may mitigate depression in adolescents.

1.2: Depression in Adolescence

Depression is primarily characterized by negative affect and/or anhedonia that are reinforced by unhealthy tendencies to ruminate excessively on negative thoughts, as well as by a variety of other symptoms such as significant changes in weight or sleep (American Psychiatric Association, 2013). Although only 1% of youth are seen for Major Depressive Disorder (MDD) in outpatient clinics each year, rates of depression increase substantially from ages 13 to 17, and 12-month prevalence rates have been reported between 8.2% and 11% (Avenevoli et al, 2015). There are significant gender differences in depression, with adolescent females being twice as likely to be depressed relative to males from age 12.5 through late adolescence (Peterson et al., 1993; Hankin et al., 2015).

So why might depression emerge in adolescence? Adolescence is a key developmental period characterized by remarkable cognitive, psychosocial, and physiological changes that render the developing individual susceptible to perturbations (Susman & Dorn, 2009). For instance, metacognition and abstract thinking mature during adolescence as the structure and function of the brain continue to develop (Keating, 2004; Giedd, 2008). This increasing capacity for abstraction is implicated in the development of self-concept throughout adolescence, as self-concept is an abstract representation of one's identity (Bernstein, 1980). Early adolescents have nascent self-concepts that are vulnerable to impending psychosocial trials such as the importance of peer approval and the individuation from their families. Inability to find peer acceptance, as well as conflicts with family members over important value differences can exacerbate any pre-existing vulnerabilities to psychopathology (Bernstein, 1980; Clark et al., 1998).

Although there are a variety of models with explanations for the emergence of psychopathology, the Cognitive-Vulnerability Transactional Stress Model offers a

comprehensive interdisciplinary lens that focuses on the interaction between nature and nurture. Essentially, this theory posits that, in the face of negative events, individuals with certain cognitive vulnerabilities are at increased risk for developing psychopathology including depression (Hankin & Abramson, 2001). For example, the hopelessness theory of depression and Beck's (1970) cognitive triad hold that persons who display global, stable attributions of negative events are more likely to become hopeless, and then depressed (Abramson, Metalsky, & Alloy, 1989). Specifically, Beck's cognitive triad emphasizes the harmful positive feedback loop between negative appraisals of the self, the world, and the future. Essentially, these three components encourage biases toward failure, loss, and devaluation. By extension, negative appraisals of the world have the capacity to distort an individual's self-perception or outlook on the future. For example, an individual who has a negative self-concept may develop a bias toward devaluation of the world as well, such that they find less enjoyment in activities they once found invigorating. Further, individuals with ruminative response styles think repetitively and passively about negative events and are more likely to develop depressive disorders (Nolen-Hoeksema, 2000; Abela & Hankin, 2011; Hankin, 2008).

It is important to understand the developmental trajectory for adolescent depression so that preventative measures can be taken; depression in adolescence predicts poorer academic and psychosocial functioning, and increased substance abuse, bipolar disorder, and suicide (Quiroga, Janosz, Bisset, & Morin, 2013; Hammen, 2012; Birmaher et al., 1996). Given the aforementioned depressive feedback loop, it is not surprising that early onset depressive disorders predict a myriad of unfavorable outcomes. Many treatments target the cognitive vulnerabilities that typify depression; however, some research implicates poor emotion regulation in the early onset of depression, so perhaps treatments that target this capacity would

be effective supplements or alternatives to traditional treatments (Yap, Allen, & Sheeber, 2007; Cooper, Shaver, & Collins, 1998).

1.3: Depression in Adolescent Males

Given that female adolescents are twice as likely as their male counterparts to become depressed, why should we still be concerned with understanding depression in male adolescents? One interesting theory to consider is the gender paradox theory, which suggests that, in disorders with asymmetrical gender prevalence, cases tend to be more severe for the group with the lower prevalence rates (Loeber & Keenan, 1994; Diamantopoulou, Verhulst, & Van der Ende, 2011). Accordingly, the fact that there is a lower prevalence of MDD in males could be precisely the reason for concern about the potential severity of male cases. In fact, there is evidence that both previous and ongoing symptoms of depression in males are related to greater functional impairment, especially interpersonally (Derdikman-Eiron, Indredavik, Bakken, Bratberg, Hjemdal, & Colton, 2012). Further, even though adolescent females have higher rates of depression, chronicity has been demonstrated to be equivalent across genders (Salk, Petersen, Abramson, & Hyde, 2016).

Males also fare worse on many individual aspects of depression. For one, males demonstrate higher externalizing symptoms, perhaps posing a greater risk for interpersonal and social consequences (Diamantopoulou, Verhulst, & Van der Ende, 2011). Additionally, males are more distractible while depressed than females, which could speak to a role of mindfulness in improving attentional capacity (Gomez-Baya, Mendoza, Paino, Sanchez, & Romero, 2017). Last, depression in adolescent males is associated with greater marijuana and cigarette use, whereas this is not the case for females (Crane, Langenecker, & Mermelstein, 2015).

1.4: Mindfulness

Broadly speaking, mindfulness can be understood as a nonjudgmental, intentional, compassionate awareness of experience as it unfolds from moment to moment (Kabat-Zinn, 2003). Research literature distinguishes between three main ways to talk about mindfulness: 1) mindfulness as a state, wherein an individual can be in a mindful state at any moment in time, 2) mindfulness as a trait, wherein individuals higher in trait mindfulness have an increased capacity or tendency to be in a mindful state, and 3) mindfulness-based interventions (MBIs), which are attempts to ameliorate undesirable conditions like chronic pain or anxiety by facilitating mindfulness. More succinctly, MBIs attempt to both foster mindfulness in the moment and increase each individual's trait mindfulness such that they can maintain mindful states more in their everyday lives.

Mindfulness-based interventions (MBIs) have been demonstrated to have numerous physical benefits for stress, fatigue, chronic pain, insomnia, heart disease, cancer, type 2 diabetes, and psoriasis (Khoury, Sharma, Rush, & Fournier, 2015). These interventions include mindfulness-based stress reduction (MBSR), mindfulness-based cognitive therapy (MBCT), and acceptance and commitment therapy (ACT) among others. Additionally, MBIs have been shown to be effective in treating depression and anxiety (Khoury, Sharma, Rush, & Fournier, 2015; Strauss, Cavanagh, Oliver, & Pettman, 2014; Chiesa & Serretti, 2011).

Trait mindfulness has been associated with a variety of health benefits, both physical and psychological (Mun, Okun, & Karoly, 2014; Jordan, Wang, Donatoni, Weier, 2014; Paul, Stanton, Greeson, Smoski, & Wang, 2013; Kiken & Shook, 2012; Brown-Iannuzzi, Adair, Payne, Richman, Fredrickson, 2014; Hill & Updegraff, 2012; Lyvers, Makin, Toms, Thorberg, Samios, 2014). For example, trait mindfulness can buffer pain-related impairments, such that individuals

with higher trait mindfulness are less impaired with equivalent pain severity (Mun, Okun, & Karoly, 2014). Individuals with higher trait mindfulness also display less impulsive eating, reduced calorie consumption, and attitudinal preferences for healthier foods (Jordan, Wang, Donatoni, Weier, 2014). In terms of psychological benefits, trait mindfulness has been shown to reduce depression vulnerability by buffering against trait rumination and negative bias, important cognitive vulnerabilities to depression (Paul, Stanton, Greeson, Smoski, & Wang, 2013; Kiken & Shook, 2012). Additionally, in populations that are at risk of being victimized by prejudice, trait mindfulness has been shown to weaken the relationship between perceived discrimination and depressive symptoms (Brown-Iannuzzi, Adair, Payne, Richman, Fredrickson, 2014). Finally, higher levels of trait mindfulness have been demonstrated to be related to greater emotional awareness, emotion regulation, and emotion differentiation, and lower emotional reactivity and emotion dysregulation (Hill & Updegraff, 2012; Lyvers, Makin, Toms, Thorberg, Samios, 2014).

There is a paucity of literature on adolescent gender differences in mindfulness. However, male adolescents report more passivity, avoidance, and suppression than female adolescents, whereas females report more social support seeking and dysfunctional rumination (Zimmerman & Iwanski, 2014). Accordingly, it's possible that males struggle more than females to cultivate awareness of their current thoughts and feelings, and could therefore be lower in trait mindfulness than females.

1.5: Mindfulness and Adolescent Depression

Substantially less literature exists on mindfulness and adolescent depression, but there is support for similar results as adult populations (Zoogman, Goldberg, Hoyt, & Miller, 2014; Bluth, Gaylord, Campo, Mullarkey & Hobbes, 2016; Tan & Martin, 2016; Pepping, Duvenage, Cronin, & Lyons, 2016). In adolescents, trait mindfulness was related to decreased anxiety,

depression, perceived stress, and increased life satisfaction (Bluth, Gaylord, Campo, Mullarkey & Hobbes, 2016; Tan & Martin, 2016; Pepping, Duvenage, Cronin, & Lyons, 2016), and was positively related to psychological, physical, and environmental quality of life dimensions and negatively related to rumination (Chambers et al., 2015). Trait mindfulness has also been shown to be negatively related to cognitive inflexibility and positively related to self-esteem and resiliency in healthy adolescents (Tan & Martin, 2016); however, some research shows that interventions seem to be more effective for treating clinical populations and psychopathological symptoms (Zoogman, Goldberg, Hoyt, & Miller, 2014).

MBIs have been successful for children with ADHD, depression, anxiety, and learning disorders (Zenner, Herrnleben-Kurz, & Walach, 2014). There is evidence that mindfulness and self-compassion can be effectively trained, resulting in relatively persistent increases in emotional well-being and positive affect, and reduction of depressive symptoms, impulsivity, ruminative thinking, perceived stress, and negative affect (Deplus, Billieux, Scharff, & Philippot, 2016; Galla, 2016). One intervention was shown to be effective for ethnically diverse at-risk adolescents in a school setting, where the intervention gained credibility and effectiveness with the students over time (Bluth et al., 2016). Conversely, another in-school intervention did not result in significant improvements on outcome measures, including anxiety, depression, weight/shape concerns, and well-being, although the program was highly accepted by students (Johnson, Burke, Brinkman, & Wade, 2016). These outcomes could be attributed to the fact that MBIs increase attention and learning in children and adolescents, again implicating executive function and emotion regulation as underlying mechanisms (Zenner, Herrnleben-Kurz, & Walach, 2014).

1.6: Mechanisms of Mindfulness: Emotional Awareness and Emotion Regulation

Despite being distinct constructs, emotion regulation and emotional awareness are entangled and reciprocally supportive constructs and are closely related to mindfulness. In order to regulate emotions it is necessary to be aware of them. However, if one is incapable of regulating already strong emotions, it becomes increasingly difficult to develop emotional awareness. Research suggests that trait mindfulness is negatively associated with maladaptive emotion regulation strategies such as attempting to suppress or control emotions (Pepping, Duvenage, Cronin, & Lyons, 2016) and that trait mindfulness contributes uniquely to emotion regulation capacity (Chambers et al., 2015). Similarly, trait mindfulness is negatively associated with cognitive inflexibility, which includes experiential avoidance and cognitive fusion (Tan & Martin, 2016). Both experiential avoidance and cognitive fusion can decrease present-moment awareness, and, paradoxically, may strengthen the very emotions the individual attempts to suppress or avoid (Hayes, Luoma, Bond, Masuda, & Lillis, 2006). In understanding that experiential avoidance (an aspect of cognitive inflexibility and emotional awareness) is akin to emotional suppression (a type of maladaptive emotion regulation) it becomes apparent that emotion regulation and emotional awareness are interrelated and potential mechanisms of mindfulness. Fortunately, there is also evidence that adolescent emotion regulation can be improved through mindfulness-based intervention (Deplus, Billieux, Scharff, & Philippot, 2016).

1.7: The Present Study

In order to investigate the mechanisms that link trait mindfulness and depression in adolescence, I will conduct a study within the larger context of Dr. Mitchell Prinstein's Project ACHIEVE. On the whole, Project ACHIEVE investigates the mechanisms of adolescent peer influence in relation to prosocial behaviors and health-risk behaviors. I will collect self-report

data from participants on trait mindfulness, depression, emotional awareness, and emotion regulation, and I will examine the relationships between those constructs. My hypotheses are as follows:

1. There will be a main effect of trait mindfulness on depression, such that mindfulness and depression will be negatively related.
2. Emotional awareness and emotion regulation will be positively related to trait mindfulness.
3. Emotional awareness and emotion regulation will be negatively related to depression.
4. Emotional awareness will mediate the relationship between trait mindfulness and depression, such that controlling for emotional awareness will reduce the relationship between mindfulness and depression.
5. Emotion regulation will mediate the relationship between trait mindfulness and depression, such that controlling for emotion regulation will reduce the relationship between mindfulness and depression.

CHAPTER 2: METHOD

2.1: Participants

Participants were male students in Grade 10 from three lower-middle class, ethnically heterogeneous, public rural high schools in the state of North Carolina (N = 103). Students in self-contained special education classes were not included in this study. We mailed a letter of consent to each adolescent's family, which was followed by a series of reminders and additional letters distributed by school and research personnel. Response forms included an option for parents to grant or deny consent, and adolescents were encouraged to return the signed response forms regardless of their parents' decisions. Numerous adolescent-, teacher-, and school-based incentives were used to ensure the return of these consent forms. Incentives included a \$5 gift card for returning the consent form, whether they granted or denied consent. Adolescent assent was requested at the start of data collection, following written and verbal descriptions of the study procedures.

2.2: Measures

The Short Mood and Feelings Questionnaire (SMFQ; Angold et al., 1995). The SMFQ is a 13-item self-report measure for core depressive symptomatology in children and adolescents from ages 6 to 17. Items are scored on a three point scale (*0=not true; 1=sometimes true; 2=true*). A total score of 12 or higher may indicate pathological levels of depression. It has successfully discriminated between clinical and pediatric-control populations (Angold et al., 1995). The measure showed adequate reliability (coefficient alpha = 0.85). The SMFQ also

correlated moderately highly with the Child Depression Inventory (CDI) ($r = .67$; Angold et al., 1995). The SMFQ is included as Appendix A.

The Child and Adolescent Mindfulness Measure (CAMM; Greco et al., 2011). The CAMM is a 10 item self-report measure for adolescent trait mindfulness. It uses a 5 point scale ($0 = \textit{Never true}$; $4 = \textit{Always true}$), and all items are reverse-scored. The scale has been validated with youth over 9 years old and has adequate internal consistency (coefficient alpha = .80; Greco et al., 2011). Scores on the CAMM were shown to be positively correlated with quality of life, academic competence, and social skills and negatively correlated with somatic complaints, internalizing symptoms, externalizing behavior problems, thought suppression, and psychological inflexibility. Unlike adult mindfulness measures which usually delineate several distinct mindful capacities (nonjudging, acting with awareness, observing, describing, etc.), the CAMM loads on a single factor. The CAMM is included as Appendix B.

The Emotion Regulation Questionnaire for Children and Adolescents (ERQ-CA; Gullone & Taffe, 2012). The ERQ-CA is adapted from the original Emotion Regulation Questionnaire, and like the original includes 10 self-report items that measure two different emotion regulation strategies— expressive suppression (ES) and cognitive reappraisal (CR). ES can be understood as the act of inhibiting ongoing emotional expression and CR can be understood as the act of redefining a situation such that its emotional impact is changed (Gullone & Taffe, 2012). Unlike the original ERQ, ERQ-CA responses are on a 5 point scale ($1 = \textit{Strongly disagree}$; $5 = \textit{Strongly agree}$). The ERQ-CA has sound internal consistency ($\alpha = .83$) (Gullone & Taffe, 2012). Males were shown to be significantly higher in expressive suppression. Given that ES scores were positively correlated with scores on the Child Depression Inventory (CDI), and neuroticism on the Five Factor Model (FFM) of personality this may suggest that males

experience less positive affect and are worse at mood repair. Further CR scores were negatively correlated with CDI scores and neuroticism on the FFM, and positively correlated with extraversion on the FFM (Gullone & Taffe, 2012). The ES and CR subscales were included as two relatively independent measures of emotion regulation in this study. The ERQ-CA is included as Appendix C.

The Levels of Emotional Awareness Scale for Children (LEAS-C; Bajgar et al., 2005). The LEAS-C is a 12-item self-report measure that requires children to generate descriptive responses to individual hypothetical emotional experiences across different scenarios. Each scenario is designed to measure emotional awareness of (1) self and (2) other as operationalized by the questions (1) “How would you feel?” and (2) “How would the other person feel?” (Bajgar et al., 2005). This measures individual differences in the ability to monitor emotional states as demonstrated by varying levels of complexity in somatic response, action response, discrete emotions, and blended emotions. Responses are scored on the basis of the structural complexity across these domains, not on the appropriateness of the response. There is a five level criteria of emotional complexity including the following categories (from most basic to most sophisticated): (1) emotion as somatic features or directly stated lack of emotional response, (2) emotion as action or a general state not indicative of a discrete emotion, (3) specific unidimensional emotions; both levels (4) and (5) demonstrate that emotions are more nuanced and demonstrate greater awareness. A score of 0 is assigned to any missing responses or responses that rely on cognitive language rather than emotion language. Each of the 12 items receives three scores: (I) self-awareness, (II) other-awareness, and (III) total awareness, which is taken to be the higher of (I) or (II), or, if both (I) and (II) are scored as a 4 and self and other responses are adequately differentiated, then total awareness is scored as a 5. With respect to the

scale development, inter-rater reliability using Pearson's correlation was $r = .93$ for LEAS-C-self scores, $r = .86$ for LEAS-C-other scores, and $r = .89$ for LEAS-C-total scores (Bajgar et al., 2005). Internal consistency using Cronbach's alpha was $\alpha = .71$ for LEAS-C-self scores, $\alpha = .64$ for LEAS-C-other scores, and $\alpha = .66$ for LEAS-C-total scores. Females reported significantly higher scores for LEAS-C-self, LEAS-C-other, and LEAS-C-total, indicating that males may have lower emotional awareness. These effects remained even after controlling for vocabulary and verbal productivity, suggesting that gender differences in emotional awareness were independent of language. The LEAS-C is included as Appendix D.

In the present study, four of twelve LEAS-C scenarios were included. With 103 participants, four scenarios per participant, and three scores (self, other, and total) per scenario, there were a total of 1,236 scores. Two raters established agreement over the first 60 scores (5 participants). Inter-rater reliability was then established with respect to a sample of 20 randomly selected participants (240 scores). Given the formulaic nature of calculating total scores (see above), total scores were excluded from the inter-rater reliability calculations such to avoid counting the same error twice: if "self" or "other" scores differed between raters, then "total" score was very likely to differ as well, with no additional error accounting for the difference. Although this would not always be true, the high probability of the problem motivated me to exclude "total" scores from the inter-rater reliability calculation. Consequently, inter-rater reliability was based on a total of 160 scores that were graded by both raters. Raters agreed on 134 of 160 scores, establishing inter-rater reliability at 83.75% agreement. Provided this statistic and the fact that there were five possible scores for "self" and "other" metrics (0-4) Cohen's Kappa was calculated at .7965, indicating a near-perfect level of agreement between raters.

2.3: Procedure

Assessment occurred in the fall of Grade 10. Data was collected using computerized surveys. Researchers arrived at the schools and set up laptop computers. Students, having already assented, were retrieved from their classes at the beginning of the period by research personnel. Classes lasted approximately 1 hour and 30 minutes, so students had that amount of time to complete the various surveys. The surveys included the following measures in chronological order: demographics, SMFQ, an alexithymia questionnaire (Alex-C), LEAS-C, emotional expressiveness questionnaire (EEQ-C), mood list, ERQ-CA, emotional reactivity scale (ERS), and the CAMM. There were approximately 20 measures after the CAMM (the last measure of relevance for this study), ranging from measures of health risk behaviors, to measures of non-suicidal self-injury.

2.4: Data Analysis

This research tested whether emotional awareness and emotion regulation mediate the relationship between trait mindfulness and depression. In order to test my hypotheses I conducted linear regression analyses in line with the principles established by Baron and Kenny's (1986) mediation analysis model, and used Preacher and Hayes' (2004) bootstrapping method to formally test for mediation. Regression analyses first tested the relationship between trait mindfulness and adolescent depression, because if they were not related, there would have been no relationship to mediate. Next, the relationships between the predictor (trait mindfulness) and the potential mediators (emotional awareness and emotion regulation) were tested. This was followed by examining the relationship between the potential mediators and adolescent depression. Finally, the relationship between trait mindfulness and depression was examined with each potential mediator included in the model.

CHAPTER 3: RESULTS

3.1: Descriptive Statistics

In order to provide information on the general composition of the sample, descriptive statistics were calculated. The mean for the SMFQ was 4.46 out of a 26 possible points, with scores ranging from 0 to 25. On this scale, 0 represents the lowest possible depression score and 26 represents the highest. According to the norms for the SMFQ (Angold et al., 1995), the threshold for pathological depression is a SMFQ total score of 12 or higher. Therefore with roughly 8% of participants scoring 12 or higher, this sample had a relatively low level of depression, although some individuals were high in depressive symptomology. The standard deviation for the SMFQ was 4.94. The mean for the CAMM was 27.15 out of 40 possible points, indicating on average a moderately high level of mindfulness in the study's sample. However, there was also a wide range in scores with the lowest score being a 3 and the highest score being a 40. The ERQ-CA was separated into three variables: Expressive Suppression (ES), Cognitive Reappraisal (CR), and Total Emotion Regulation (T). Relative to their respective maxima, CR had the highest mean and ES had the greatest variability (see Table 1). In the scale development study, the mean ES and CR scores for males were 10.89 and 21.62 respectively (Gullone & Taffe, 2012). Accordingly, the present sample means were slightly higher in ES (11.64) and slightly lower in CR (19.44) than the means in the scale development sample, though, overall, means were relatively consistent with the normed means. The LEAS-C was separated into three variables as well: Self score (S), Other score (O), and Total score (T). Relative to their respective maxima, Self score had the highest mean (8.07) and Other score had the biggest standard

deviation (3.31). No participants reached the maxima for any of the three emotional awareness scores. These means are presented in Table 1.

3.2: Correlations

In order to examine the relationships between trait mindfulness, adolescent depression, and the potential mediators, first order correlations were computed. First the relationship between trait mindfulness and depression was examined. As hypothesized, trait mindfulness was strongly negatively correlated with adolescent depression [$r(103) = -.62, p < .001$]. This relationship is considered a large correlation and indicates that individuals with higher CAMM scores had substantially lower scores on the SMFQ. This finding is important for two main reasons. First, it is important within the context of this study because it establishes that there is a relationship between mindfulness and depression that can potentially be mediated by emotion regulation and emotional awareness. Second, on a broader level it suggests that trait mindfulness may protect against depression in adolescent males. Next, the relation between trait mindfulness and emotion regulation was examined. Trait mindfulness was significantly related to expressive suppression ($r = -.38; p < .001$) and, to a lesser extent, cognitive reappraisal ($r = -.22; p = .024$); the former effect size is considered medium to large, whereas the latter is considered small to medium. However, both cases suggest that, contrary to the hypotheses, greater trait mindfulness actually corresponded to less expressive suppression and cognitive reappraisal. Finally, the relationship between emotion regulation and depression was examined. Depression was significantly related to expressive suppression ($r = +.36; p < .001$), but not to cognitive reappraisal ($r = -.10; p = .29$). Given that the relationship between cognitive reappraisal and depression was nonsignificant, cognitive reappraisal could not be a mediator of the relationship

between trait mindfulness and depression because it does not satisfy the a priori criteria for mediation. Therefore, it will not be statistically tested in the following analyses.

Surprisingly, none of the emotional awareness scores were significantly correlated with adolescent depression or trait mindfulness (see Table 2). Trait mindfulness had very small, nonsignificant relationships with Self ($r = -.05; p = .64$), Other ($r = .03; p = .80$), and Total ($r = -.10; p = .33$) scores. Depression had small, nonsignificant relations with Self ($r = .03; p = .77$), Other ($r = -.01; p = .95$), and Total ($r = .03; p = .75$) scores as well. Consequently, further analyses did not include the emotional awareness variables because they were not reasonable candidates for mediation.

3.3: Regression and Mediation Analyses

Linear regression analyses were conducted to further examine relations among variables. These analyses are important because they test the relation between variables when additional variables are statistically controlled. These regression analyses were only conducted for the ERQ-S and CAMM because none of the other potential mediating variables were significantly related to the SMFQ. For the first regression analysis, the ERQ-S was entered first as a predictor of SMFQ and then CAMM was added as a predictor. The ERQ-S explained significant variance [$R^2 \text{ Change} = .13, F \text{ Change}(1, 101) = 15.34, p < .001$]. When CAMM was added to the model, it also explained substantial variance [$R^2 \text{ Change} = .28, F \text{ Change}(1, 100) = 46.43, p < .001$] demonstrating that CAMM had a powerful direct effect on depression. When the order of variable entry was switched, CAMM significantly affect SMFQ scores [$R^2 \text{ Change} = .39, F \text{ Change}(1, 101) = 64.24, p < .001$]. However, ERQ-S did not explain significant additional variance [$R^2 \text{ Change} = .02, F \text{ Change}(1, 100) = 3.10, p = .08$]. In other words, much of the variance that ERQ-S accounts for overlaps with that accounted for by CAMM, whereas CAMM

additionally accounts for much more. Therefore there is only a very small portion of variance that ERQ-S accounts for when CAMM is already controlled. The portion of ERQ-S variance subsumed by CAMM confounds the relationship between ERQ-S and SMFQ unless CAMM is accounted for (see Figure 1). The fact that the indirect pathway (trait mindfulness on depression through expressive suppression) is significantly reduced when accounting for the direct pathway (trait mindfulness on depression) suggests that mediation may not be present.

Even though it is relatively small portion of variance compared to the amount of variance accounted for by mindfulness when expressive suppression was controlled, there was a small amount of marginally significant additional variance in depression accounted for by expressive suppression when mindfulness was controlled, and therefore mediation was possible. To test this, I used Preacher and Hayes' (2004) bootstrapping method of mediation analysis. This analysis provides effect sizes and confidence intervals for the total path (both mindfulness and ES on depression simultaneously), the direct path (mindfulness on depression with ES accounted for), and the indirect path (mindfulness through ES on depression with the direct path accounted for). If the interval between the lower limit of the confidence interval (LLCI) and the upper limit of the confidence interval (ULCI) does not include 0, then the effect is significant. Although the total path (total effect = $-.35$; LLCI = $-.43$; ULCI = $-.26$) and direct path (direct effect = $-.32$; LLCI = $-.41$; ULCI = $-.22$) were significant and thus corroborated the results of the regression analyses, the indirect path was not significant (indirect effect = $-.03$; LLCI = $-.09$; ULCI = 0.01). Therefore, there was no significant evidence that ES mediated the relationship between trait mindfulness and depression.

3.4: Moderation

Having answered my main research questions, I conducted exploratory analyses to look for interesting trends outside of my main hypotheses. I used a general linear model to test for any interactions between trait mindfulness and the emotion regulation and awareness variables. One of these interactions was significant, with the interaction of mindfulness and cognitive reappraisal significantly affecting depression [$F(1,99) = 7.62; p = .007$]. To better understand this interaction I split the continuous mindfulness variable into high and low groups so that I could visualize how the relationship between cognitive reappraisal and depression differs between the high trait mindfulness and low trait mindfulness groups. This is presented in Figure 2. As can be seen, in the high trait mindfulness group, there was a very weak, nonsignificant relationship between cognitive reappraisal and depression ($r = .20; p = .15$), but in the low mindfulness group that relationship was stronger ($r = .32; p = .02$). This pattern shows that cognitive reappraisal was only related to depression when individuals are less mindful. None of the other interactions with awareness or regulations variables approached significance (all p 's $> .08$)

CHAPTER 4: DISCUSSION

In this study I found a strong negative relationship between trait mindfulness and depression as hypothesized. However, contrary to my hypotheses, trait mindfulness and emotion regulation were negatively related, the expressive suppression subscale of emotion regulation was positively related to depression, the cognitive reappraisal subscale of emotion regulation was not related to depression, and none of the emotional awareness scales were significantly related to either trait mindfulness or depression. Additionally, I did not find evidence of mediation for either emotion regulation (including ES and CR) or emotional awareness, but there was evidence that trait mindfulness moderated the relationship between cognitive reappraisal and depression.

4.2: Mediation Interpretation

My regression and mediation analyses produced the picture that the direct pathway between trait mindfulness and depression accounts for the vast majority of the strong relationship between trait mindfulness and depression. There may be some variance accounted for by the indirect pathway through expressive suppression, but it was not a significant amount when controlling for the effect of mindfulness. I did not find any significant mediating effects of emotional awareness, but it is possible that this reflects a problem with measurement rather than the lack of a valid mediating relationship. Nonetheless, the question remains: if neither emotion regulation nor emotional awareness is a mechanism by which trait mindfulness affects depression, then what is the mechanism by which trait mindfulness and depression are related? There are at least three possibilities.

The first possibility is that the relationship is mediated by constructs other than emotion regulation and emotional awareness. One answer might be psychological flexibility, which is defined as the ability to fully contact the present moment and the thoughts and feelings it contains without needless defense, and, depending upon what the situation affords, persisting or changing in behavior in the pursuit of goals and values (Hayes et al., 2006). For readers unfamiliar with psychological flexibility, it shares many functional characteristics with resilience, but may have some important differences. First, resilience tends to be defined in relation to some form of traumatic history (Ong, Bergeman, Bisconti, & Wallace, 2006). On the other hand, psychological flexibility extends generally to mental health instead of acutely to mental illness (Hayes et al., 2006; Harris, 2006). Second, resilience is based on the time an individual requires to return to their homeostatic stress baselines, whereas individuals can be more or less psychologically flexible irrespective of their present stress (Ong, Bergeman, Bisconti, & Wallace, 2006; Hayes et al., 2006; Harris, 2006)

Psychological flexibility may also have important differences with emotional awareness and emotion regulation. Unlike emotional awareness and emotion regulation, which may indicate types of non-mindful awareness, psychological flexibility necessarily includes mindful awareness. To further explain, it is possible that measures of emotional awareness and emotion regulation are tapping into some aspects of experiential fusion insofar as it is possible for someone to be acutely aware of their emotional state (“I’m depressed.”), while also ruminating on that fact (“Being depressed sucks.”) or over-identifying with the depressive experience. Psychological flexibility avoids these potential pitfalls and thus may be a possible candidate for mediation.

Another potential mediator could be self-compassion, which is closely entangled with mindfulness. Self-compassion, initially defined by Neff (2003) in the clinical literature, is being in touch with one's own suffering and caring to alleviate that suffering with kindness. Self-compassion consists of three interrelated components: self-kindness, offering understanding to oneself instead of criticism; common humanity, the sensibility that all people are connected through fundamental commonalities; and mindfulness, a balanced awareness of experience (Neff, 2003). Despite mindfulness constituting a portion of self-compassion, they have been demonstrated to be distinct constructs (Baer, Lykins, & Peters, 2012; Van Dam, Sheppard, Forsyth, Earleywine, 2010). Importantly, there is preliminary evidence that self-compassion mediates the effects of mindfulness training on depressive symptoms (Baer, Lykins, & Peters, 2012). Last, studies have shown that self-compassion was correlated with greater emotional wellbeing and decreased physiological stress response in adolescents (Bluth et al., 2015; Bluth, Campo, Futch, & Gaylord, 2016). This all suggests self-compassion is an important target for future research investigating the link between mindfulness and depression.

The second possibility is that trait mindfulness simply directly affects depression. If this is the case, there would be no third-party, explanatory mediators to discover. Instead, further investigation would focus on examining what aspects of trait mindfulness underlie this relationship. As will be further discussed, trait mindfulness is a very complex construct, so it could prove difficult to pinpoint what about it may produce the strong negative relation with adolescent depression.

The third possibility, further discussed in the limitations, could be that depression actually causes changes in mindfulness. There is a large literature that shows that depression affects attention, both in terms of its function and its content (Platt, Waters, Schulte-Koerne,

Engelmann, & Salemink, 2017). We know that one possible feature of depression is difficulty with concentration, a failure of the functioning of attention. If attention is intact but the contents of attention are affected, there may still be increased rumination and cognitive distortions. Concentration difficulties, rumination, and cognitive distortions may all decrease trait mindfulness because trait mindfulness is intimately linked to attention.

4.3: Moderation Interpretation

The evidence for a significant interaction between trait mindfulness and cognitive reframing on depression was an unexpected finding from this study, so we must be careful in the interpretation of it. Nevertheless, it is a compelling, interesting finding. Seemingly, cognitive reappraisal becomes nearly irrelevant to depression in the high mindfulness group but is important for those with low mindfulness. Why might that be the case? It's possible that the question of how to reappraise unpleasant emotions only becomes important when there is a fundamental lack of mindfulness or experiential acceptance.

For instance, if someone is accepting of their occasional depressive thoughts, it might be the case that cognitive reappraisal is unhelpful or unnecessary. After all, where might a desire to change one's state come from if not from some level of unacceptance? In a purely mindful state (such as meditation), an individual would simply notice the unpleasant thought. If they then desired to reappraise that thought in order to have a less negative experience, they would simply notice that desire as well but not engage in actual reappraisal. In some sense, reappraisal only becomes tenable the moment a purely mindful state is broken. Otherwise, the individual would simply continue noticing rather than reappraising. The problem only becomes more nuanced and complex as we investigate the possibility of mindfully acting on one's desires. I do think this is possible, but at the relevant level of analysis it should be noted that mindfulness may end where

reappraisal begins. Therefore, reappraisal may only affect those individuals who are rarely mindful.

This notion challenges some aspects of our current treatment paradigms, namely the primacy of depression symptom reduction and cognitive behavioral therapies. To elaborate on this, it is necessary to understand that there is a distinction between psychotherapies that prevent the development of or relapse of syndrome episodes (Teasdale et al., 2000) versus psychotherapies targeting present syndrome episodes. Yet another distinction is between psychotherapies that target symptoms (both preventative and episodic) versus psychotherapies that target the relationship with symptoms (the realm of third wave behavioral therapies; Hayes, 2004). One example of the former is Cognitive Behavioral Therapy (CBT), wherein treatment centers on addressing distorted, automatic thoughts such to alleviate their consequences; this essentially involves reappraisal. An example of the latter is Acceptance Commitment Therapy (ACT), which instead focuses on defusing from unpleasant experiences in order to make space for engaging values; this essentially involves mindfulness.

While it is of course desirable to reduce symptoms of mental illness, there are clear benefits of considering symptom reduction as a welcomed side effect of treatment instead of its main purpose. If we over-emphasize symptom reduction, then clients may learn to shut down or give up when their symptoms exacerbate, or they might try, likely unsuccessfully, to make their symptoms go away (Harris, 2006). Indeed, there is much evidence that attempting to suppress thoughts actually intensifies them (Wegner, Schneider, Carter, & White, 1987; Wenzlaff & Wegner, 2000). Instead, it may be more helpful to emphasize living meaningfully by moving toward values. This requires a fundamental change in case conceptualization, whereby it is clients' behaviors, not their internal states, that we should look to for assessing improvements in

mental health. This is not to say that cognitive behavioral therapies are ineffective or that symptom reduction is not valuable for its own sake, but rather to point out that mindfulness and psychological flexibility may offer a more fundamental protective factor or first line of defense against mental illness that can be effectively supplemented by cognitive behavioral skills.

4.4: Measurement

Trait mindfulness. There are two main measurement problems in the study. First, the more conceptual and global issue of operationalizing trait mindfulness will be addressed. Granted that, like all traits, trait mindfulness describes a tendency to behave in a certain way (mindfully), understanding state mindfulness provides a deeper context for understanding trait mindfulness. After all, it would be inconsistent for someone high in trait mindfulness to never be in a mindful state. In this respect, it proves difficult to provide a phenomenological definition of state mindfulness that is more precise than the aforementioned definitions which indicate something like a meta-observational state wherein one simply notices the qualities of experience as a particular way of relating to experience—intentionally and nonjudgmentally. Definition by way of functional brain networks or brain activity is possible and useful, but not when we are looking for an explanation at the level of behavior and psychology. If mindfulness is to be some kind of meta-awareness, then there is no surprise that measures like the CAMM have difficulty isolating the measurement of mindfulness from the measurement of subsidiary types of awareness and their related constructs like emotion regulation and emotional awareness. Indeed, if we understand emotion regulation as anything approximating an attempt to change one's emotional state or expression, then it likely implies a degree of unacceptance. Therefore, we can expect instances of emotion regulation to occur in moments where one is less mindful, and

further, as we found in this study, trait emotion regulation to be negatively correlated with trait mindfulness. Similarly, emotional awareness could be subsumed by trait mindfulness as well.

A more specific analysis of the CAMM regarding emotion regulation and emotional awareness can clarify these operationalization problems with direct relevance to the present study. Take, for example, items 1 (“I get upset with myself for having feelings that don’t make sense”), 3 (“I keep myself busy so I don’t notice my thoughts and feelings”), and 10 (“I stop myself from having feelings that I don’t like”; Appendix A). It is easy to imagine how these items overlap highly with cognitive reappraisal and emotional awareness. Although cognitive reappraisal aims to reappraise thoughts in a healthier way, one potential, unintended side effect is that individuals may be harsh on themselves for having thoughts that “don’t make sense”. This, in some sense, would be missing the point because that very attitude could be examined as an irrational one, but nonetheless the potential mindfulness-reappraisal overlap is clear. Similarly, it is hard to think of how these items would not also measure emotional awareness because each of them contains reference to an explicit emotional experience.

Emotional awareness. Second, the lack of any significant results with the LEAS-C measures could be a result of the fact that only 4 of 12 scenarios were included in the present study. Although, in their user manual, the scale developers warned against the potential problems that could result from exporting particular scenarios instead of including their entire scale, this Project ACHIEVE study included many measures, and time was limited due to the fact that students were only available for one class period. Therefore, the number of LEAS-C scenarios was trimmed from 12 to 4. It is possible that, had we used the full scale, there may have been different results for emotional awareness. In other words, it is possible that emotional awareness

mediates the relationship between trait mindfulness and adolescent depression, and better measurement of emotional awareness is necessary to test this.

Limitations

The concurrent design of the study poses significant limitations on the interpretation of the results. First, I am unable to make any causal claims about the relationships between the variables, and I cannot determine the direction of effects. For instance, it could, in fact, be depression that influences trait mindfulness (or really any combination of variables). Thus, much of my interpretation is based in temporal, theoretical assumptions. In all likelihood I think there is reciprocal feedback between trait mindfulness and depression instead of the relationship being one-directional, but this, too, is purely theoretical as it could not be tested within the present design.

There are also limits to the generalizability of the results given the fact that the study tested only adolescent males. It is possible that adolescent females are significantly different in trait mindfulness, depression, emotion regulation, or emotional awareness (quantitatively and/or qualitatively), and thus the relationships between these constructs, including the potential for mediation, may be different. This includes but is certainly not limited to the aforementioned differences in externalizing symptoms, distractibility, rumination, avoidance, and suppression (Diamantopoulou, Verhulst, & Van der Ende, 2011; Gomez-Baya, Mendoza, Paino, Sanchez, & Romero, 2017; Zimmerman & Iwanski, 2014).

4.5: Future Directions

The results from this study lead to several exciting possibilities for future research. One way to follow up this study would be to mitigate the aforementioned limitations by using the full LEAS-C, a larger sample that includes both males and females, and to assess that sample at multiple time points. This would allow researchers to better understand the relationship between trait mindfulness and depression by enabling causal, directional claims with respect to a more diverse population. On a larger scale, the problem of understanding mindfulness as a measurable trait remains. Given that there was no evidence of mediation in this study, what could explain the relationship between trait mindfulness and depression? The answer seems to be tied to the pragmatic contingencies of measuring mindfulness. If trait mindfulness measures tend to overlap with other relevant constructs, it becomes very difficult to draw boundaries between them, and thus to isolate the effects of one versus another. Future research needs to focus more fully on trait mindfulness and how it relates to a number of other constructs.

Additionally, the moderation effect of trait mindfulness on the relationship between cognitive reappraisal and depression raises many questions about the psychotherapeutic treatment hierarchy. If mindfulness can significantly reduce the relationship between cognitive reappraisal and depression, then should it be the case that third wave behavioral interventions are favored in acute treatment settings? Even though there is more support for cognitive-behavioral paradigms than for third wave behavioral paradigms in treating adolescent depression, this could be a result of the fact that third wave treatments are younger or the fact that empirical status is typically based on symptom reduction. It could well be the case that there is less symptom reduction with third wave treatments, especially initially, but this may be because their aims are to facilitate a more effective relationship with symptoms instead of to reduce them (i.e.,

psychological flexibility). This may represent a different way to understand the role of mindfulness interventions in clinical treatments—not to alleviate symptoms but to improve psychological flexibility and help individuals live meaningful lives by relating to their symptoms, and, in fact, their entire inner experience effectively. Because the relationship between trait mindfulness and depression was so strong in this study, it is possible that changing trait mindfulness may be an extremely effective treatment for adolescent depression. It is very important that future research examines this in comparative effectiveness studies.

Table 1: Descriptive Statistics

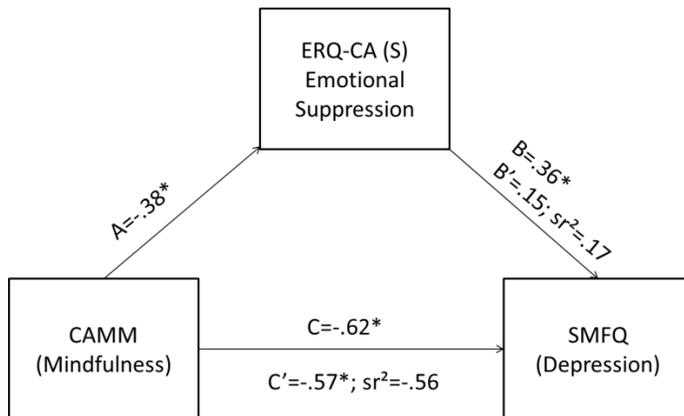
	ERQ ES	ERQ CR	ERQ T	LEAS S	LEAS O	LEAS T
Min-Max score recorded	4-20	6-30	10-49	0-15	0-14	0-17
Mean	11.64	19.44	31.08	8.07	7.44	9.77
Std Dev	3.28	4.63	6.40	2.98	3.31	3.01

Table 2: First Order Correlations

	SMFQ	CAMM	ERQ (ES)	ERQ (CR)	ERQ (T)	LE (S)	LE (O)	LE (T)
SMFQ	1							
CAMM	-.62**	1						
ERQ (ES)	.36**	-.38**	1					
ERQ (CR)	-.10	-.22*	.29**	1				
ERQ (T)	.11	-.36**	.72**	.87**	1			
LEAS (S)	.03	-.05	.08	.07	.09	1		
LEAS (O)	-.01	.03	.14	.08	.12	.47**	1	
LEAS (T)	.03	-.10	.12	.09	.13	.75**	.77**	1

Note: ** $p < .01$; * $p < .05$

Figure 1: Hierarchical Linear Regression

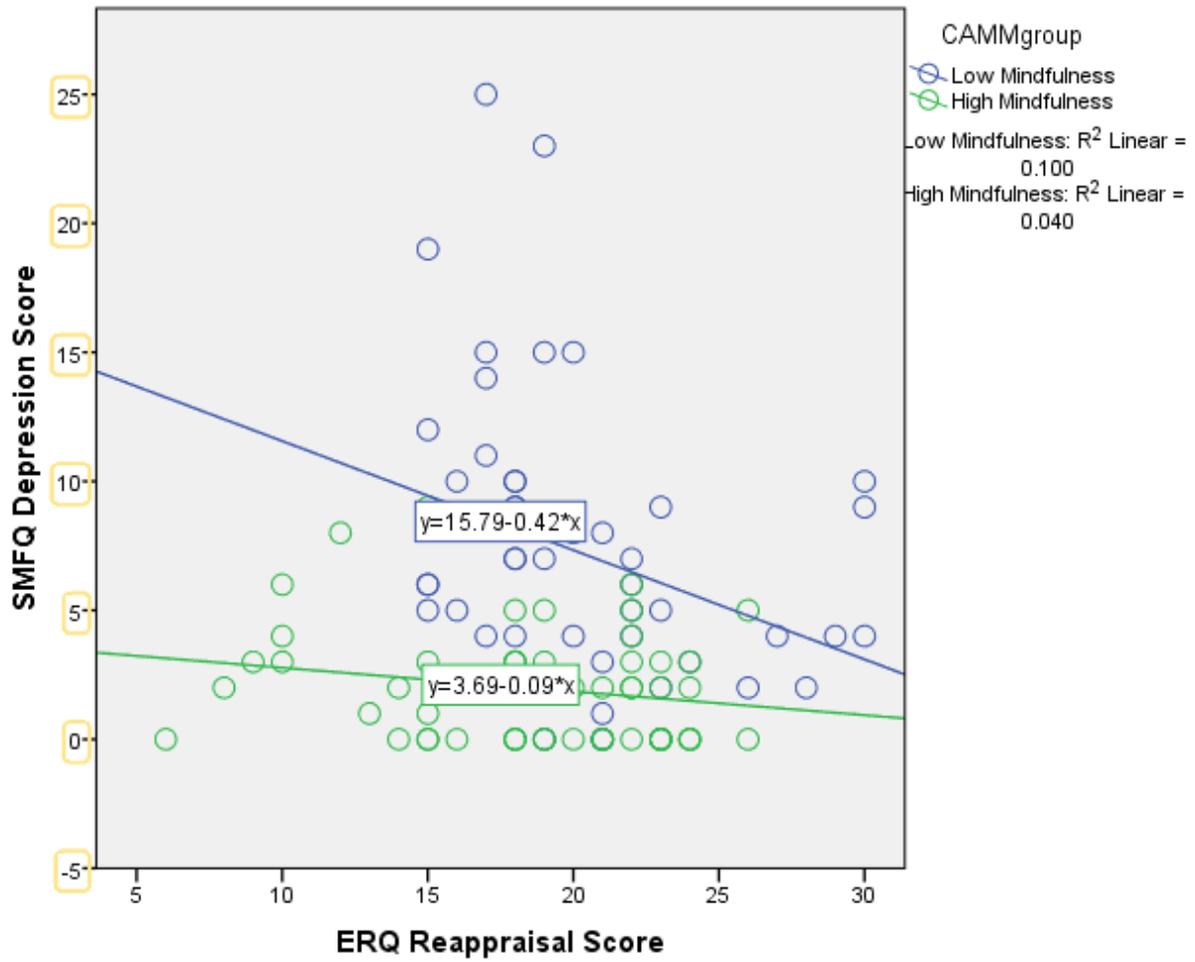


Note: In figures 1 and 2 coefficients are standardized and sr^2 = squared semi-partial correlation

* = significance

' = multiple predictors model

Figure 2: Mindfulness as a Moderator of Cognitive Reappraisal and Depression



APPENDIX A: SMFQ

Child Self-Report

MOOD AND FEELINGS QUESTIONNAIRE: Short Version

This form is about how you might have been feeling or acting **recently**.

For each question, please check (✓) how you have been feeling or acting *in the past two weeks*.

If a sentence was not true about you, check NOT TRUE.

If a sentence was only sometimes true, check SOMETIMES.

If a sentence was true about you most of the time, check TRUE.

Score the MFQ as follows:

NOT TRUE = 0

SOMETIMES = 1

TRUE = 2

To code, please use a checkmark (✓) for each statement.	NOT TRUE	SOME TIMES	TRUE
1. I felt miserable or unhappy.			
2. I didn't enjoy anything at all.			
3. I felt so tired I just sat around and did nothing.			
4. I was very restless.			
5. I felt I was no good anymore.			
6. I cried a lot.			
7. I found it hard to think properly or concentrate.			
8. I hated myself.			
9. I was a bad person.			
10. I felt lonely.			
11. I thought nobody really loved me.			
12. I thought I could never be as good as other kids.			
13. I did everything wrong.			

APPENDIX B: CAMM

Child and Adolescent Mindfulness Measure (CAMM; Greco, Baer, & Smith, 2010)

We want to know more about what you think, how you feel, and what you do. **Read** each sentence. Then, circle the number that tells **how often** each sentence is true for you.

	Never True	Rarely True	Sometimes True	Often True	Always True
1. I get upset with myself for having feelings that don't make sense.	0	1	2	3	4
2. At school, I walk from class to class without noticing what I'm doing.	0	1	2	3	4
3. I keep myself busy so I don't notice my thoughts or feelings.	0	1	2	3	4
4. I tell myself that I shouldn't feel the way I'm feeling.	0	1	2	3	4
5. I push away thoughts that I don't like.	0	1	2	3	4
6. It's hard for me to pay attention to only one thing at a time.	0	1	2	3	4
7. I get upset with myself for having certain thoughts.	0	1	2	3	4
8. I think about things that have happened in the past instead of thinking about things that are happening right now.	0	1	2	3	4
9. I think that some of my feelings are bad and that I shouldn't have them.	0	1	2	3	4
10. I stop myself from having feelings that I don't like.	0	1	2	3	4

APPENDIX C: ERQ-CA

ERQ-CA

The 10 questions below 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 ----- 2 ----- 3 ----- 4 ----- 5
Strongly Disagree Disagree Half and half Agree Strongly Agree

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

APPENDIX D: LEAS-C

LEAS-C

Below, several different situations are described. Each situation involves two people – yourself and another person. Please describe how you would feel in these situations. Please describe how you think the other person would feel. You must use the word “feel” in your answers. It doesn’t matter if the words are spelled incorrectly. There is no right or wrong answer. Just try to write several sentences about how you and the other person would feel.

1. You are running in an important race with a friend you have trained with for some time. As you get close to the finish line you twist your ankle, fall to the ground and can’t continue. Your friend goes on to win the race.

How would you feel?

How would your friend feel?

2. Someone who has said nasty things about you in the past comes up to you and says something really nice.

How would you feel?

How would the other person feel?

3. The dentist tells you that you have some problems with your teeth that need to be fixed immediately. The dentist makes an appointment for you to come back the next day.

How would you feel?

How would the dentist feel?

4. Your teacher tells you that your work is not acceptable and must improve.

How would you feel?

How would your teacher feel?

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