

THESIS

AN INVESTIGATION OF MINDFULNESS, ADOLESCENT PSYCHOPATHOLOGY AND
REGULATORY EMOTIONAL SELF-EFFICACY

Submitted by

Reagan L. Miller

Department of Human Development and Family Studies

In partial fulfillment of the requirements

For the Degree of Master of Science

Colorado State University

Fort Collins, Colorado

Spring 2021

Master's Committee:

Advisor: Rachel Lucas-Thompson

Co-Advisor: J. Douglas Coatsworth

Mark Prince

Copyright by Reagan Miller 2021

All Rights Reserved

ABSTRACT

AN INVESTIGATION OF MINDFULNESS, ADOLESCENT PSYCHOPATHOLOGY AND REGULATORY EMOTIONAL SELF-EFFICACY

A robust body of literature suggests that mindfulness benefits mental health and psychological well-being, but the majority of this research has only been conducted among adults; also, mechanisms that link these two concepts are not fully understood. Mindfulness is theoretically expected to reduce psychopathology through more effective emotion regulation and, as a result, greater beliefs about one's ability to regulate their own emotions; therefore, regulatory emotional self-efficacy (RESE) is a likely mediator of this relationship. In order to comprehensively understand the relationship between the variables, however, two theoretical models were tested; RESE was first tested as a mediator and secondarily tested as a predictor of mindfulness. Among a sample of 149 adolescents (14-21 years old), bias-corrected bootstrapped estimates revealed that RESE was not found to be a mediator in the relationship between mindfulness and adolescent psychopathology. RESE was, however, a better predictor of mindfulness and subsequent reductions in adolescent psychopathology. These results suggest that mindfulness and RESE work together to reduce adolescent psychopathology and that adolescents may need to have effective management of their emotions before being able to practice mindfulness. Going forward, the investigation of additional mediators, as well as multiple facets of mindfulness among a more diverse and longitudinal sample, warrants further investigation.

TABLE OF CONTENTS

ABSTRACT *ii*

Literature Review *1*

 The Importance of Adolescence 2

 Mindfulness and Adjustment 3

 Better Understanding the Relationship between Mindfulness and Adolescent Psychopathology
 5

 Previously Investigated Mediators 5

 Regulatory Emotional Self-Efficacy (RESE): A Likely Mediator 6

 The Role of Regulatory Emotion-Self-Efficacy in Psychopathology 7

 Mindfulness and the Adaptive Development of Regulatory Emotional-Self-Efficacy 7

 A Competing Model 8

 Current Study 9

Method *11*

 Participants 11

 Procedures 11

 Measures 12

 Mindfulness. 12

 Regulatory emotional self-efficacy (RESE). 12

 Internalizing and externalizing. 12

Data Analytic Plan *13*

Results *14*

 Bivariate Correlations 14

 RESE as a mediator 14

 Competing Model 14

Discussion *16*

References *25*

Literature Review

Mindfulness, a principle that has philosophical and theoretical roots in Eastern practices and Buddhist traditions, refers to paying attention in the present moment with nonjudgmental awareness (Kabat-Zinn, 1994). Empirical evidence suggests that mindfulness is related to a variety of psychological outcomes as those with higher levels of mindfulness have been found to display greater attention to emotions and lower levels of psychopathology (Brown & Ryan, 2003). Although mindfulness is thought to positively benefit psychological well-being, the majority of this research has only been conducted among adult populations; in addition, mechanisms that underlie this relationship are not fully understood (Brown & Ryan, 2003). Previous research suggests that an individual's beliefs about whether or not they are capable of regulating their emotions, otherwise known as regulatory emotional self-efficacy (RESE), contributes to a more positive life orientation and success across a variety of psychological domains (Caprara, Alessandri, & Barbaranelli, 2010). With increases in mindfulness, enhanced levels of attention and awareness may contribute to increased confidence in one's beliefs that they can effectively regulate their emotions, improvements which have been linked to better psychological adjustment (Bandura, Caprara, Barbaranelli, Gerbino, & Pastorelli, 2003; Caprara, Gerbino, Paciello, Di Giunta, & Pastorelli, 2010). However, given theoretical arguments that advanced cognitive capacities do not develop until late adolescence, an alternative possibility is that RESE may underlie and also contribute to increases in mindfulness; as an individual develops confidence in RESE beliefs, they may also be more capable of being attentive and non-judgmentally aware. Both possible theoretical pathways were tested in the current study.

The Importance of Adolescence

Adolescence is a developmental time period of increased risk for psychopathology, as the age-of-onset of many psychiatric disorders falls during this stage of development (Fairchild, 2011; Kessler et al., 2010). Mental illness that occurs during adolescence predicts adult psychopathology (Lancefield, Raudino, Downs, & Laurens, 2016) and both internalizing and externalizing symptoms are equally detrimental and highly comorbid (Willner, Gatzke-Kopp, & Bray, 2016). Internalizing (or emotional) disorders are characterized by negative affectivity, anxious-misery, and fear (Goldberg, Krueger, Andrews, & Hobbs, 2009; Regier, Kuhl, & Kupfer, 2013). They include depressive, anxiety, obsessive-compulsive, trauma and stressor-related, eating, and dissociative disorders. Externalizing disorders are characterized by high levels of disinhibition, hyperactivity, impulsivity, and aggression (Krueger & South, 2009). They include disruptive, impulse control, conduct, substance-related, and addictive disorders. Internalizing and externalizing disorders that occur during adolescence are also both associated with difficulties with emotion regulation (Aldao, Nolen-Hoeksema, & Schweizer, 2010; McLaughlin, Hatzenbuehler, Mennin, & Nolen-Hoeksema, 2011; Silk, Steinberg, & Morris, 2003) as well as RESE (Bandura et al., 2003; Caprara, Gerbino, et al., 2010; Muris, 2002). Although several interventions exist to combat these adjustment disorders (Das et al., 2016; Houck et al., 2016), adolescents are still experiencing alarming rates of psychopathology. There have also been noted increases in specific disorders such as depression (Twenge, Joiner, Rogers, & Martin, 2018), traumatic diseases, eating disorders, self-harm, as well as antisocial and delinquent behavior (Seiffge-Krenke, 2017). Due to the rise in these adjustment disorders and the long-term consequences of adolescent psychopathology, it is essential to investigate underlying mechanisms in order to help scientists and clinicians understand these symptoms. Adolescence is

not only a high-risk time period for developing internalizing and externalizing disorders, but it is also an opportune occasion to explore mechanisms and processes that impact the development of this psychopathology.

Mindfulness and Adjustment

An individual's attention to and awareness of events and experiences, otherwise known as mindfulness, may underlie adolescent internalizing and externalizing behaviors. There is a robust and consistent association between mindfulness and indicators of psychopathology (Brown & Ryan, 2003; Fix & Fix, 2013; Heppner et al., 2008; Jimenez, Niles, & Park, 2010; Kuyken et al., 2013), likely because the ability to remain in the present moment provides mechanisms for cognitive and behavioral flexibility, which may allow for more adaptive psychological responding (Pepping, Duvenage, Cronin, & Lyons, 2016). More specifically, greater mindfulness has been found to predict decreases in internalizing symptoms like rumination and anxiety (Brown & Ryan, 2003; Jimenez et al., 2010). By paying attention to the present moment, individuals are more capable of recognizing the events that are actually occurring within their own lives rather than ruminating on the past or worrying about the future. Additionally, nonjudgmental awareness, another important aspect of mindfulness, assists with the reappraisal of emotions and experiences. For example, when emotions are experienced, mindfulness can assist individuals to recognize the emotions that are occurring without assigning any valence to it. The observation of emotions and events without negative or positive reactions then allows for more controlled and regulated responses, which is a fundamental feature used in cognitive therapy to interrupt the cycle of rumination (Broderick, 2005).

Mindfulness interventions have also been found to be effective at reducing internalizing symptoms. Within a population of 33 at-risk adolescents, Bluth and colleagues (2016) found that

a mindfulness intervention for adolescents called Learning to BREATHE (L2B) helped to reduce symptoms of anxiety and depression. Other adolescent mindfulness interventions have also been found to produce similar reductions in depression (Kuyken et al., 2013) and anxiety (Sibinga et al., 2013). There is mounting empirical evidence that suggests that mindfulness facilitates a more accepting and non-judgmental stance towards present moment experiences and emotions, which assists with reducing symptoms of internalizing disorders.

Mindfulness has also been found to contribute to reductions in aggression and deviant behavior (externalizing symptoms) through similar behavioral and cognitive strategies (Fix & Fix, 2013; Heppner et al., 2008). Individuals with externalizing disorders tend to experience heightened aggression and difficulties with attentional, emotional, and behavioral control (Bögels, Hoogstad, van Dun, de Schutter, & Restifo, 2008). Increased present moment focus and nonjudgmental awareness not only provides strategies to increase one's sustained attention and control, which may disrupt the escalation of anger or disruptive behavior, but it also provides an opportunity to clearly recognize consequences of behaviors (Linehan, 1993). These strategies are similar to cognitive strategies taught during cognitive therapy, one effective treatment for aggression, used to produce behavioral change (Fix & Fix, 2013). Increases in attention and awareness and decreases in impulsivity are facilitated by increases in dispositional mindfulness. With more awareness and less impulsivity, individuals are, therefore, thought to experience fewer externalizing symptoms.

Similar evidence comes from experimental research on mindfulness interventions for adolescents with externalizing disorders. Bögels and colleagues (2008) found that mindfulness training effectively improved attention, awareness, and impulsivity as well as externalizing symptoms among 14 adolescents with externalizing disorders. Fung and colleagues (2016) also

noted significant reductions in parent-reported externalizing symptoms after a mindfulness intervention among 19 Latino-American and Asian-American adolescents with elevated mood symptoms. Overall, there is emerging evidence that both higher levels of dispositional mindfulness and increased mindfulness through interventions help to reduce externalizing disorders by providing cognitive strategies for behavioral change.

Better Understanding the Relationship between Mindfulness and Adolescent

Psychopathology

As reviewed, there is consistent evidence that an individual's ability to remain attentive and aware during every day experiences is associated with reductions in psychopathology. However, little is known about how these two concepts are related among adolescent populations especially in terms of mechanisms or mediators. As the field of intervention and prevention science moves towards more process-oriented research, it is essential to understand mechanisms and causal pathways. By understanding how and why specific constructs are related, scientists and researchers will be more capable of understanding the intricacies of human behavior broadly and adolescent psychopathology specifically.

Previously Investigated Mediators

Based off of the empirical evidence that suggests that mindfulness contributes to more effective emotion regulation (Keng, Smoski, & Robins, 2011) and higher levels of self-efficacy (Cusens, Duggan, Thorne, & Burch, 2010; Sanaei, Hossini, & Jamshidifar, 2014; Wells et al., 2014), which both then assist with lessening internalizing and externalizing symptoms among adults (Aldao et al., 2010; Bandura, Caprara, Barbaranelli, Pastorelli, & Regalia, 2001; Caprara, Gerbino, et al., 2010), self-efficacy and emotion regulation are mechanisms that may explain the relationship between mindfulness and psychopathology. In support of this notion, Pepping and

colleagues (2016) found that among 113 adolescents attending an Anglican high school, expressive suppression, an emotion regulation strategy, partially mediated the relationship between mindfulness and depression, whereas it fully mediated the relationship between mindfulness and anxiety. Additionally, Alleva et al. (2014) found that ruminative brooding, defined as repetitive thoughts and comparisons of one's current circumstances to some unachieved goal or standard (Treyner, Gonzalez, & Nolen-Hoeksema, 2003), both partially and fully mediated the association between different elements of mindfulness and adolescent depression. Although these two studies provide valuable information about potential mediators, studies investigating mechanisms underlying the relationship between mindfulness and adolescent internalizing and externalizing disorders remain limited. Therefore, additional research is needed to inform our understanding of adolescent psychopathology.

Regulatory Emotional Self-Efficacy (RESE): A Likely Mediator

Regulatory emotional self-efficacy (RESE) is a likely mechanism in the relationship between mindfulness and adolescent psychopathology. RESE is conceptualized as one's self-efficacy in emotion regulation. Its components consist of one's perceived self-efficacy in managing both negative and positive affect (Bandura et al., 2003). *Self-efficacy in managing negative affect* is defined as beliefs about one's capability to mitigate negative emotional states (i.e., anger, frustration, and irritation) in response to adversity and to avoid becoming overwhelmed by such emotions (Caprara et al., 2008). Conversely, *self-efficacy in expressing positive affect* is defined as beliefs in one's capability to experience and express positive emotions (i.e., joy, enthusiasm, and pride; Caprara et al., 2008). In comparison to emotion regulation, which is the "process by which individuals influence which emotions they have, when they have them, and how they experience and express these emotions" (Gross, 1998, p.

275), RESE is thought to sustain these regulatory processes and contribute to management and expression of positive and negative emotions. Although emotion regulation is undoubtedly important in understanding psychopathology (Aldao et al., 2010; McLaughlin et al., 2011; Silk et al., 2003) and has been shown to be associated with mindfulness (Pepping et al., 2016), the investigation of RESE as a mediator may provide unique information about an individual's beliefs which lead to affective and behavioral performance across different scenarios and during times of stress and adversity.

The Role of Regulatory Emotion-Self-Efficacy in Psychopathology

As confidence in one's regulatory emotional self-efficacy beliefs increases, management of both positive and negative emotions also theoretically increases (Bandura, 1977; Bandura et al., 2003). Without the effective management of emotions, individuals may experience difficulties calming down, reducing negative emotions, and worrying about the future, which are common features of internalizing disorders like anxiety and depression. The lack of affect regulation also contributes to externalizing disorders as individuals may experience heightened aggression, a lack of attention, and difficulties with impulse control. Not surprisingly, then, one's self-efficacy beliefs about managing positive and negative emotions or RESE is related to adolescent anxiety (Muris, 2002), depression, and deviant behavior (Bandura et al., 2003; Caprara, Gerbino, et al., 2010). With more self-efficacy and adaptive emotion regulation, individuals are more capable of experiencing a positive sense of well-being signified by less depression and antisocial behavior (Bandura et al., 2001). Confidence in one's regulatory emotional self-efficacy beliefs, therefore, translates into reductions in symptoms of internalizing and externalizing disorders.

Mindfulness and the Adaptive Development of Regulatory Emotional-Self-Efficacy

Regulatory emotional self-efficacy beliefs are thought to develop by reflecting on the experiences of others and one's self (Caprara, Gerbino, et al., 2010). This process of reflection may be further facilitated by mindfulness. According to Caprara and colleagues (2010), when individuals witness the outcomes of events, they internalize messages from the events, which helps to develop either a decreased or an increased sense of self-efficacy based on the results. In terms of mindfulness, more accurate reflections and appraisals of experiences can occur through more attention and nonjudgmental awareness. By witnessing events in a more attentive and nonjudgmental manner, individuals may be more capable of connecting event outcomes to external factors rather than placing the responsibility internally. Without these internal attributions, there may be more room to develop a sense of confidence in one's regulatory emotional self-efficacy. Mindfulness interventions have also been shown to increase several different types of self-efficacy (Britton, Bootzin, Cousins, & Hasler, 2013; Cusens, Duggan, Thorne, & Burch, 2010; Sanaei, Hossini, & Jamshidifar, 2014; Wells et al., 2014) as well as emotion regulation (Pepping et al., 2016). Overall, increased attention and nonjudgmental awareness of reflective processes may facilitate more self-efficacy and regulatory abilities, which could then lead to more adaptive psychological functioning. Although this relationship is conceptually sound, it has not been previously investigated.

A Competing Model

Due to the novelty of conceptualizing RESE as a mediator in the relationship between mindfulness and adolescent psychopathology, the alternate relationship between mindfulness and RESE must also be considered. As an individual develops increased RESE, there may also be an increased capacity for attention and non-judgmental awareness, which may then lead to reductions in psychopathology. Advanced cognitive abilities such as emotion regulation and

executive functioning do not typically develop until late adolescence and even into adulthood (Keating, 2004) and as adolescents develop, the ability to utilize abstract and multidimensional thinking also develops (Steinberg, 2005). Therefore, greater RESE may be an indicator of more advanced cognitive capacities that underlie mindfulness, and in that way may precede mindfulness. Furthermore, individuals that have more RESE may be more capable of utilizing attention and non-judgmental awareness in comparison to those who are low in RESE, which could ultimately lead to reductions in internalizing and externalizing symptoms. In other words, RESE may be a better predictor of mindfulness than vice versa; therefore, both pathways were explored.

Current Study

The exploration of mechanisms in the relationship between mindfulness and internalizing and externalizing disorders is essential in order to improve our understanding of adolescent psychopathology. Research suggests that mindfulness is associated with internalizing (Brown & Ryan, 2003; Jimenez et al., 2010) and externalizing disorders (Fix & Fix, 2013; Heppner et al., 2008) and RESE may help to explain the relationship between these two elements. Based on the preceding literature review, it is hypothesized that 1) there is an association of mindfulness with both internalizing and externalizing behaviors, and 2) that RESE mediates this relationship (Figure 1). In other words, mindfulness likely contributes to increases in RESE beliefs as greater amounts of attention and awareness are thought to facilitate an increased sense of confidence in one's belief about affect regulation, otherwise known as RESE. Previous research also suggests that low RESE is associated with more anxiety, depression and antisocial behavior (Bandura et al., 2003; Caprara, Gerbino, et al., 2010); therefore, individuals with a greater RESE are expected to experience less internalizing and externalizing symptoms. Within the current study,

the alternate relationship was also explored due to the novelty of investigating RESE as a mediator. As adolescents develop advanced cognitive capacities such as regulatory abilities, the capacity for non-judgmental attention and awareness may also increase. In other words, RESE may help to explain and underlie mindfulness; as RESE increases, mindfulness may also increase, which may ultimately contribute to reductions in psychopathology (Figure 2). In order to more fully understand the relationship between mindfulness, RESE, and adolescent psychopathology, two mediational models will be tested within the current study. As the first study to investigate the relationship between mindfulness, RESE and adolescent psychopathology, the knowledge gained will help to fill an important gap in the literature and inform further our understanding of adolescent psychopathology.

Method

Participants

Participants within this cross-sectional study were 150 adolescents (14-21 years old, $M_{age} = 17.86$, $SD = 2.14$; 59% female) that participated in a larger study investigating family relationships, stress and adjustment. One participant was dropped because s/he was missing data on all key constructs. Sixty-three percent of participants ($n = 95$) were college students who were recruited from undergraduate psychology and human development classes at Colorado State University. Thirty-five percent of participants ($n = 53$) were adolescents recruited from the community using a variety of techniques (flyers and advertisements in local school papers, Facebook ads, and booths at community fairs). Of those that reported their ethnicities (1% did not), 71% were non-Hispanic Caucasian, 7% were Hispanic, 3% were Asian or Pacific Islander, 2% were African American, and 1% were American Indian; 15% had other or multiple ethnicities. Yearly family income ranged from less than \$35,000 to greater than \$150,000 ($Median = \$124,999$, $SD = \$36,480.93$). Most mothers (37%) and fathers (31%) had a four-year college degree, while the remaining parents had varying degrees of education (mothers: 27% had a graduate degree, 12% had completed some college but no degree, 10% had a two-year college degree, 5% had a high school diploma, 3% had less than a high school degree; fathers: 35% had a graduate degree, 12% had completed some college but no degree, 7% had a two-year college degree, 7% had a high school diploma and 3% had less than a high school degree).

Procedures

College students and parents of adolescents younger than 18 years old provided informed consent, and youth from the community provided informed assent. For the procedures relevant to this study, participants answered questionnaires using Audio Computer Assisted Self Interview (ACASI) Software during two separate visits to the laboratory, which were one week apart.

Measures

Mindfulness. Adolescents completed the Mindful Attention and Awareness Scale-Adolescents (MAAS-A; Brown & Ryan, 2003; Brown, West, Loverich, & Biegel, 2011) to measure dispositional mindfulness. The MAAS-A includes 15 questions (Cronbach's $\alpha = .79$) that are measured using a scale from 1(not at all) - 6(very much). It is a reliable and valid measure of trait mindfulness (Brown & Ryan, 2003; Brown, West, Loverich, & Biegel, 2011) that has been used to examine the role that mindfulness plays in psychological well-being (Brown & Ryan, 2003; MacKillop & Anderson, 2007). Higher scores indicate greater levels of mindfulness, with relevant items being reverse scored.

Regulatory emotional self-efficacy (RESE). Adolescents completed the Regulatory Emotional Self-efficacy Scale (Bandura et al., 2003), which is a well-validated measure of regulatory emotional self-efficacy (Caprara et al., 2008). It consists of 12 questions (Cronbach's $\alpha = .84$) that measure one's self-efficacy in emotion regulation using a scale from 1-5; 1 indicating "not very well" and 5 indicating "very well." Adolescents were asked to indicate how well they were good at things like "Express[ing] joy when good things happen to you" or "Avoid[ing] getting upset when others keep giving you a hard time." Higher scores indicate greater levels of RESE.

Internalizing and externalizing. Adolescents reported their internalizing and externalizing symptoms using the Youth Self Report (YSR), a well-validated and reliable measure of adolescent behavior problems (Achenbach & Edelbrock, 1987, 1991). The YSR is a commonly used measure of adjustment and consists of 112 questions. Adolescents were asked to answer questions about how they would describe themselves using a scale from 0-2, 0 indicating "not at all" and 2 indicating "very often or often true." Internalizing is measured in questions about anxiety/depression, withdrawal/ depression, and somatic complaints (i.e., "I cry a lot" and "I feel lonely"). Externalizing is captured in questions about attention problems, delinquency, and aggression (i.e., "I argue a lot" and "I destroy my own things"). Internalizing (Cronbach's $\alpha = .87$) and externalizing (Cronbach's $\alpha = .81$) subscales were calculated separately with higher scores indicating greater internalizing and externalizing symptoms.

Data Analytic Plan

All variables were tested for normality and correlations were first examined to test bivariate associations. A path analysis was then conducted to test the hypothesis that internalizing and externalizing symptoms are predicted by mindfulness indirectly via regulatory emotional self-efficacy (RESE; Figure 1). The alternate pathway where RESE predicts internalizing and externalizing symptoms indirectly via mindfulness was considered last (Figure 2). Age and sex were considered as covariates within all models. All analyses were conducted using Mplus 7.4 (Muthén & Muthén, 1998-2012).

In order to evaluate the strength of the indirect effect, asymmetrical confidence intervals (ACIs) were used assessed to account for issues with non-normal distributions that occur as a result of the product of two regression slopes. More specifically, ACIs provide the true distribution of the product of coefficients; ACIs that do not contain zero are considered to be statistically significant. Bias-corrected bootstrapped estimates (Efron & Tibshirani, 1994), one type of ACI, were examined based on 1,000 bootstrapped samples, which provides a powerful test of mediation (Fritz & MacKinnon, 2007). Statistical significance was determined by 95% bias-corrected bootstrapped confidence intervals that do not contain zero.

Overall fit was evaluated by using the model fit criteria recommended by Hu and Bentler (1999). These recommendations include comparative fit index (CFI) > .95 Tucker–Lewis Index (TLI) > .95, root mean square error of approximation (RMSEA) < .06, and standardized root mean square residual (SRMR) < .08. Additionally, Chi-Square test of model fit was evaluated with a non-significant test indicating an appropriate fit of the model to the data.

Results

Bivariate Correlations

There were significant and positive associations between RESE and mindfulness, whereas RESE and mindfulness were significantly and negatively associated with internalizing and externalizing. Additionally, internalizing and externalizing were positively and significantly correlated. Of the potential covariates, sex was the only variable that was significantly correlated with key variables such as RESE. Females reported significantly lower levels of RESE in comparison to males, which is consistent with past evidence which found that females typically report less self-efficacy in managing negative emotions when compared to males (Alessandri, Vecchione, & Caprara, 2015). Age was not correlated with any other variables.

RESE as a mediator

The path analysis that tested the hypothesis that internalizing and externalizing symptoms are predicted by mindfulness indirectly via RESE (Figure 1) revealed that there was a saturated model with poor model fit. The paths from mindfulness to internalizing and externalizing were then constrained to determine the strength of the indirect effect, but model fit did not improve. Poor model fit suggests that the model is not properly specified, and the results of this model were not further interpreted. These results suggest that RESE is not an appropriate mediator in the relationship between mindfulness and adolescent psychopathology.

Competing Model

The path analysis that tested the hypothesis that internalizing and externalizing symptoms are predicted by RESE indirectly via mindfulness (Figure 2) revealed that there was excellent model fit. The Chi-Square test of model fit was not significant ($\chi^2(1) = .35, p = .56$). Overall fit indices were all within excellent range (CFI = 1.00, TFI = 1.05, RMSEA = .00 [.00, .18], SRMR = .01). RESE was a significant predictor of internalizing ($b = -6.09, SE = 1.17, p < .0001$) and

externalizing ($b = -1.72$, $SE = .86$, $p = .047$). RESE was also a significant predictor of mindfulness ($b = .45$, $SE = .07$, $p < .0001$). In turn, mindfulness significantly predicted both internalizing ($b = -3.14$, $SE = .91$, $p < .01$) and externalizing ($b = -4.84$, $SE = .97$, $p < .0001$) symptoms. Examination of the bias-corrected bootstrapped confidence intervals revealed that the specific indirect effect of mindfulness on RESE and internalizing (-1.42 , $[-2.49, -.55]$) was statistically significant. The specific indirect effect of mindfulness on RESE and externalizing symptoms (-2.19 , $[-3.52, -1.19]$) was also statistically significant. These results suggest that RESE is a better predictor of mindfulness than vice versa, and that mindfulness partially mediates the relationship between RESE and internalizing and RESE and externalizing (Figure 3).

Discussion

The goal of the current study was to examine the relationship between mindfulness, RESE, and adolescent psychopathology. As part of a larger movement to understand the mechanisms behind mindfulness (Shapiro, Carlson, Astin, & Freedman, 2006), these results help us to understand how mindfulness and RESE contribute to reductions in adolescent psychopathology. Previous research suggests that emotion regulation is essential in understanding both mindfulness and psychopathology (Farb, Anderson, & Segal, 2012; Hayes & Feldman, 2004), but the majority of this research has been conducted with adults. In an effort to extend this body of literature among adolescents, increased attention and nonjudgmental awareness were expected to facilitate more RESE and ultimately reductions in adjustment disorders. However, results supported a competing model in which greater RESE contributed to increases in mindfulness and subsequent reductions in internalizing and externalizing symptoms. These results provide the first evidence of such a relationship and help to elucidate how mindfulness and RESE work together to reduce adolescent psychopathology.

Results that RESE is a cross-sectional predictor of mindfulness and ultimately lower levels of internalizing and externalizing symptoms suggest that there may be possible underlying developmental processes that are essential to consider when investigating this relationship. On average, the adolescent brain is not fully developed until the age of 25; until then, rapid improvements are being made in the prefrontal context, which coordinates cognition and action, as well as increases in connectivity and communication across the whole brain (Steinberg & Lerner, 2004). As a result of these changes in brain development across this developmental period, there are corresponding developmental changes in cognitive abilities. Advanced cognitive abilities such as executive functioning are not completely developed until early

adulthood; therefore, as adolescents age, they continue to show improvements in processing, reasoning, metacognition and the coordination of affect and cognition (Steinberg, 2005). Although speculative, RESE may reflect more advanced cognitive development due to its reliance on one's self-efficacy beliefs in their abilities and its relation to metacognition, the "executive process that monitors and controls one's cognitive processes" (Moore, Chang, & Smith, 2006, p. 125). Similar to the development of consciousness in adolescence, where the development of the prefrontal cortex facilitates the refinement of self-conscious control over one's actions, an adolescent's increased ability to first consciously recognize their abilities to regulate emotions and then develop confidence in these beliefs (i.e., increased RESE) may demonstrate that RESE is an advanced cognitive skill. As a result, increases and improvements in RESE (perhaps reflections of the development of conscious awareness and metacognition) may then give rise to mindfulness. Additionally, RESE is related to the management/regulation of emotion (Bandura, 1977; Bandura et al., 2003), which is one of the largest developments that occurs during adolescence (Steinberg, 2005). Greater RESE may, therefore, reflect cognitive abilities that are relevant to the development of regulation and ultimately underlie mindfulness. Furthermore, as one becomes more confident in their RESE beliefs, they may also be more able to process experiential and emotional events in a more attentive and non-judgmental manner. As supported by prior research (Brown & Ryan, 2003; Fix & Fix, 2013; Heppner et al., 2008; Jimenez et al., 2010; Kuyken et al., 2013), attention and non-judgmental awareness then contributes to reductions in internalizing and externalizing symptoms (Brown & Ryan, 2003). Going forward, it will be essential to further investigate underlying developmental processes in the relationship between RESE, mindfulness and adolescent psychopathology using brain imaging and longitudinal studies.

Our results did not provide support for RESE as a mediator in the relationship between mindfulness and adolescent psychopathology. There are several possible explanations as to why RESE was not a significant mediator. First, self-efficacy beliefs in emotion regulation may not be the proper underlying mechanism in the relationship between mindfulness and psychopathology, but rather *actual* emotion regulation may more adequately explain the association between these constructs. Prior research suggests that attention and awareness help to improve regulation (Keng et al., 2011) and that regulation is central to improving internalizing and externalizing symptoms (Aldao et al., 2010; McLaughlin et al., 2011; Silk et al., 2003). Although RESE is theoretically related to the management of positive and negative emotions (Bandura, 1977; Bandura et al., 2003), the measurement of RESE in relation to ER has not been previously tested. It is possible that a measurement of ER may more accurately help us to understand the relationship between mindfulness and internalizing and externalizing. Second, decentering, the ability to observe emotions and cognitions as transitory mental experiences that do not require particular behavioral responses (Sauer & Baer, 2010), may be more appropriate as a mediator between the relationship between mindfulness and adolescent psychology. Present moment attention and non-judgmental awareness may help individuals with difficulties calming down and reducing negative affect (i.e., internalizing symptoms) as well as aggression and impulsivity (i.e. externalizing symptoms) through the process of decentering. By simply recognizing emotions and experiences as events that are occurring without a particular meaning or valence, psychopathology may decrease. Because it is still extremely important to understand mechanisms that underlie the relationship between mindfulness and psychopathology, particularly for advancing process-oriented research; mechanisms of emotion regulation and decentering should be considered moving forward.

Results of this study do, however, have potentially meaningful implications for interventions as there was a strong inverse relationship between RESE and adolescent psychopathology. Individuals with more RESE exhibited significantly less internalizing and externalizing symptoms and the strength of direct effect of RESE on internalizing was greater than three times the strength of the effect of RESE on externalizing. Greater RESE has been consistently associated with less anxiety, depression and deviant behavior (Alessandri et al., 2015; Bandura et al., 2003) and these findings support these consistent associations and also highlight that RESE may be particularly related to internalizing (or emotional) disorders. As one develops greater self-efficacy in emotion regulation, they may be less likely to develop internalizing symptoms such as negative affectivity, anxious-misery, fear and rumination. Furthermore, these results also suggest that interventions for adolescents may benefit from focusing on improvements in RESE when reducing adolescent psychopathology; specifically, internalizing disorders (i.e., anxiety, depression and stress-related disorders). These findings, however, were not formally tested hypotheses and comparisons between RESE and internalizing and RESE and externalizing warrants further investigation.

Although this study contributes meaningful and novel information about the relationship between mindfulness, RESE and adolescent adjustment, using asymmetrical confidence intervals, it was not without its limitations. First, due to the cross-sectional nature of the study, ambiguous temporal precedence posed a threat to internal validity. The true understanding of cause-effect could be misinterpreted; therefore, causal relationships cannot be assessed here. Instead, information about atemporal mediation or the sequential relationship among the variables can only be provided. However, atemporal mediation helps to distinguish between the predictor and the mediator relationship from the predictor-outcome relationship, which provides

information before casual claims (Winer et al., 2016). Second, the MAAS was used to measure mindfulness, which only captures information about the facets of attention and awareness. There has been an ongoing debate about the best ways to operationalize mindfulness (Brown & Ryan, 2004) and in the future, measurements that include additional facets of mindfulness such as acceptance, observing, describing, non-judgment and non-reactivity warrant further investigation. Furthermore, it is possible that the facet of non-judgement may provide a more comprehensive picture of how mindfulness is related to RESE and adolescent psychopathology. As an individual becomes more attentive and non-judgmental towards events or emotions that they are experiencing, they may be more capable of regulating emotions and developing self-efficacy beliefs in this emotion regulation, which could result in less adolescent psychopathology. Third, the results of the study may not be generalizable across more diverse populations as the majority of the population identified as being non-Hispanic Caucasian. Future studies should investigate the relationship between mindfulness, adolescent psychopathology and RESE among more racially and ethnically diverse samples. Lastly, RESE was not supported as a mediator; therefore, the true mechanism behind why mindfulness helps to reduce adolescent psychopathology remains unclear. Although information was provided about how RESE predicts mindfulness, additional investigations of alternative mechanisms are required. Going forward, it will be important to investigate alternative mechanisms as well as multiple facets of mindfulness among a more diverse sample in a longitudinal manner, so our understanding of mindfulness and adolescent psychopathology can be improved.

In conclusion, RESE is a cross-sectional predictor, rather than a mediator, of mindfulness and subsequent reductions in adolescent psychopathology. The novel investigation of this relationship adds to a body of literature, which suggests that there are robust and consistent

associations between mindfulness and adjustment disorders by providing information about how mindfulness and RESE work together to reduce adolescent psychopathology. Greater RESE may be an indicator of more advanced cognitive capacities that underlie mindfulness, and in that way may precede mindfulness. Future research on additional mediators as well as multiple facets of mindfulness among a more diverse and longitudinal sample will be important to provide more process-oriented and generalizable information about causal relationships between mindfulness and adolescent psychopathology.

Table 1

Descriptive Statistics and Bivariate Correlations

Variable	<i>M</i> (<i>SD</i>)	1.	2.	3.	4.	5.	6.	7.
1. RESE ^a	3.60 (.71)	—						
2. Mindfulness	3.96 (.64)	.47 ***	—					
3. Internalizing	13.22(8.52)	-.63 ***	-.47 ***	—				
4. Externalizing	16.48 (7.45)	-.31 ***	-.48 ***	.53 ***	—			
5. Age	17.86 (2.14)	-.03	.02	.01	-.04	—		
	<i>% (N)</i>							
6. Sex ^b	59 (89)	-.26 **	-.08	.16	-.13	-.05	—	
7. Ethnicity ^c	71 (107)	.11	.11	-.001	-.01	-.03	-.11	—

Note. * $p < .05$, ** $p < .01$, *** $p < .001$; ^aRegulatory Emotional Self-Efficacy, ^b 0:Male; 1:Female; ^c 0: Non-Caucasian, 1: Caucasian

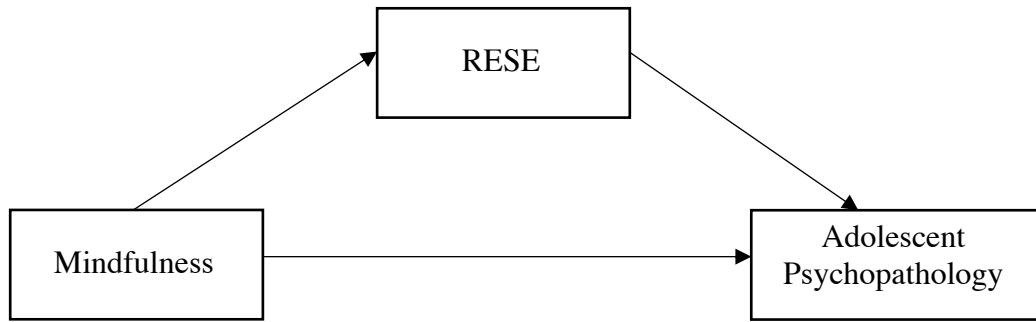


Figure 1: Mindfulness predicting adolescent psychopathology indirectly through regulatory emotional self-efficacy (RESE)

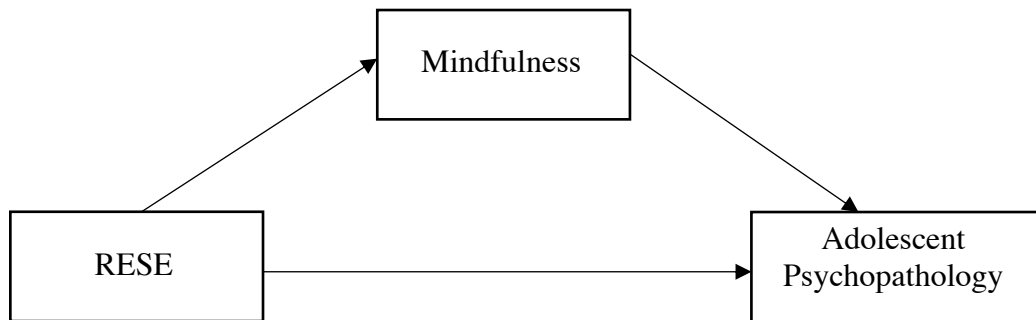


Figure 2: Regulatory emotional self-efficacy (RESE) predicting adolescent psychopathology indirectly through mindfulness

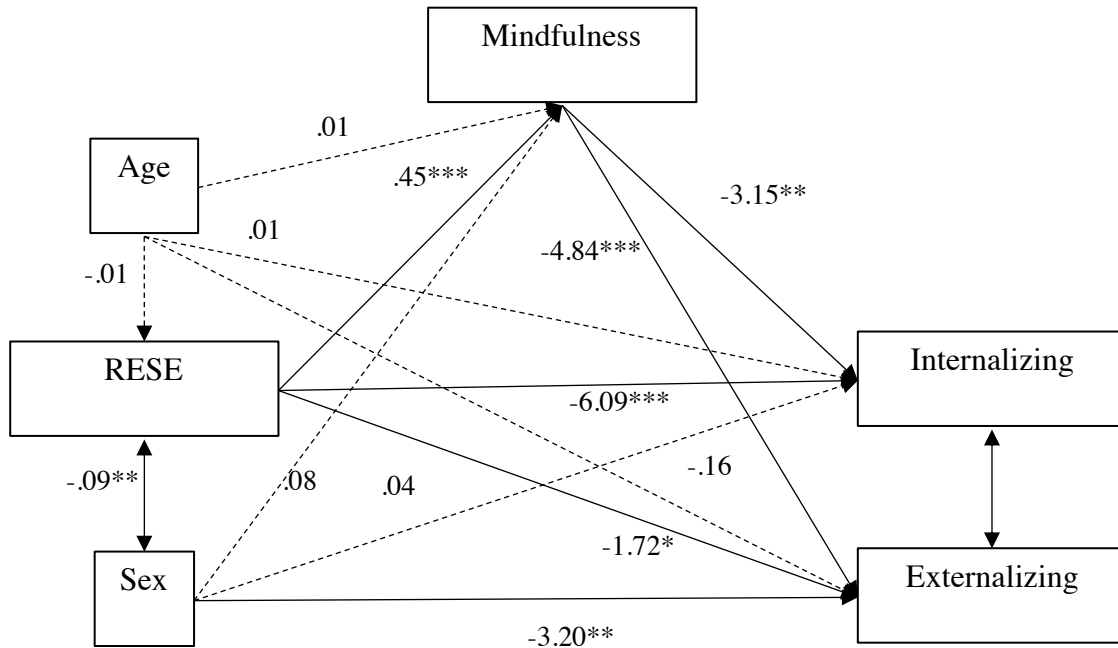


Figure 3: Regulatory emotional self-efficacy (RESE) predicting adolescent psychopathology indirectly through mindfulness with age and sex as control variables; * $p < .05$, ** $p < .01$, *** $p < .0001$; dotted lines indicate non-significant relationships, while solid lines indicate significant relationships; values represent unstandardized coefficients.

References

- Achenbach, T. M., & Edelbrock, C. (1987). Manual for the youth self-report and profile. *Burlington, VT: University of Vermont, Department of Psychiatry.*
- Achenbach, T. M., & Edelbrock, C. (1991). Manual for the child behavior checklist (4–18) and 1991 Profile, Burlington, VT: University of Vermont, Department of Psychiatry, 1991. *Google Scholar.*
- Aldao, A., Nolen-Hoeksema, S., & Schweizer, S. (2010). Emotion-regulation strategies across psychopathology: A meta-analytic review. *Clinical Psychology Review, 30*(2), 217–237.
- Alessandri, G., Vecchione, M., & Caprara, G. V. (2015). Assessment of regulatory emotional self-efficacy beliefs: A review of the status of the art and some suggestions to move the field forward. *Journal of Psychoeducational Assessment, 33*(1), 24–32.
- Alleva, J., Roelofs, J., Voncken, M., Meevissen, Y., & Alberts, H. (2014). On the relation between mindfulness and depressive symptoms: Rumination as a possible mediator. *Mindfulness, 5*(1), 72–79.
- Bandura, A. (1977). Self-efficacy: toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191.
- Bandura, A., Caprara, G. V., Barbaranelli, C., Gerbino, M., & Pastorelli, C. (2003). Role of affective self-regulatory efficacy in diverse spheres of psychosocial functioning. *Child Development, 74*, 769–782.
- Bandura, A., Caprara, G. V., Barbaranelli, C., Pastorelli, C., & Regalia, C. (2001). Sociocognitive self-regulatory mechanisms governing transgressive behavior. *Journal of Personality and Social Psychology, 80*(1), 125.

- Bluth, K., Campo, R. A., Pruteanu-Malinici, S., Reams, A., Mullarkey, M., & Broderick, P. C. (2016). A school-based mindfulness pilot study for ethnically diverse at-risk adolescents. *Mindfulness*, 7(1), 90–104.
- Bögels, S., Hoogstad, B., van Dun, L., de Schutter, S., & Restifo, K. (2008). Mindfulness training for adolescents with externalizing disorders and their parents. *Behavioural and Cognitive Psychotherapy*, 36(2), 193–209. <https://doi.org/10.1017/S1352465808004190>
- Britton, W. B., Bootzin, R. R., Cousins, J. C., & Hasler, B. P. (2013). The contribution of mindfulness practice to a multicomponent behavioral sleep intervention following substance abuse treatment in adolescents: a treatment development study. In *Mindfulness-Related Treatments and Addiction Recovery* (pp. 92–103). Routledge.
- Broderick, P. C. (2005). Mindfulness and coping with dysphoric mood: Contrasts with rumination and distraction. *Cognitive Therapy and Research*, 29(5), 501–510.
- Brown, K. W., & Ryan, R. M. (2003). The Benefits of Being Present: Mindfulness and Its Role in Psychological Well-Being. *Journal of Personality and Social Psychology*, 84(4), 822–848. <https://doi.org/10.1037/0022-3514.84.4.822>
- Brown, K. W., & Ryan, R. M. (2004). Perils and promise in defining and measuring mindfulness: Observations from experience. *Clinical Psychology: Science and Practice*, 11(3), 242–248.
- Brown, K. W., West, A. M., Loverich, T. M., & Biegel, G. M. (2011). Assessing adolescent mindfulness: Validation of an Adapted Mindful Attention Awareness Scale in adolescent normative and psychiatric populations. *Psychological Assessment*, 23(4), 1023.
- Caprara, G. V., Alessandri, G., & Barbaranelli, C. (2010). Optimal Functioning: Contribution of

Self-Efficacy Beliefs to Positive Orientation. *Psychotherapy and Psychosomatics*.

<https://doi.org/10.1159/000319532>

Caprara, G. V., Di Giunta, L., Eisenberg, N., Gerbino, M., Pastorelli, C., & Tramontano, C. (2008). Assessing regulatory emotional self-efficacy in three countries. *Psychological Assessment, 20*(3), 227.

Caprara, G. V., Gerbino, M., Paciello, M., Di Giunta, L., & Pastorelli, C. (2010). Counteracting depression and delinquency in late adolescence. *European Psychologist*.

Cusens, B., Duggan, G. B., Thorne, K., & Burch, V. (2010). Evaluation of the breathworks mindfulness-based pain management programme: effects on well-being and multiple measures of mindfulness. *Clinical Psychology & Psychotherapy: An International Journal of Theory & Practice, 17*(1), 63–78.

Das, J. K., Salam, R. A., Lassi, Z. S., Khan, M. N., Mahmood, W., Patel, V., & Bhutta, Z. A. (2016). Interventions for adolescent mental health: an overview of systematic reviews. *Journal of Adolescent Health, 59*(4), S49–S60.

Efron, B., & Tibshirani, R. J. (1994). *An introduction to the bootstrap*. CRC press.

Fairchild, G. (2011). The developmental psychopathology of motivation in adolescence. *Developmental Cognitive Neuroscience*. <https://doi.org/10.1016/j.dcn.2011.07.009>

Farb, N. A. S., Anderson, A. K., & Segal, Z. V. (2012). The mindful brain and emotion regulation in mood disorders. *The Canadian Journal of Psychiatry, 57*(2), 70–77.

Fix, R. L., & Fix, S. T. (2013). The effects of mindfulness-based treatments for aggression: A critical review. *Aggression and Violent Behavior, 18*(2), 219–227.

- Fritz, M. S., & MacKinnon, D. P. (2007). Required sample size to detect the mediated effect. *Psychological Science, 18*(3), 233–239.
- Fung, J., Guo, S., Jin, J., Bear, L., & Lau, A. (2016). A pilot randomized trial evaluating a school-based mindfulness intervention for ethnic minority youth. *Mindfulness, 7*(4), 819–828.
- Goldberg, D. P., Krueger, R. F., Andrews, G., & Hobbs, M. J. (2009). Emotional disorders: Cluster 4 of the proposed meta-structure for DSM-V and ICD-11: Paper 5 of 7 of the thematic section: 'A proposal for a meta-structure for DSM-V and ICD-11.' *Psychological Medicine, 39*(12), 2043–2059.
- Gross, J. J. (1998). The emerging field of emotion regulation: An integrative review. *Review of General Psychology*. <https://doi.org/10.1037/1089-2680.2.3.271>
- Hayes, A. M., & Feldman, G. (2004). Clarifying the construct of mindfulness in the context of emotion regulation and the process of change in therapy. *Clinical Psychology: Science and Practice, 11*(3), 255–262.
- Heppner, W. L., Kernis, M. H., Lakey, C. E., Campbell, W. K., Goldman, B. M., Davis, P. J., & Cascio, E. V. (2008). Mindfulness as a means of reducing aggressive behavior: Dispositional and situational evidence. *Aggressive Behavior: Official Journal of the International Society for Research on Aggression, 34*(5), 486–496.
- Houck, C. D., Hadley, W., Barker, D., Brown, L. K., Hancock, E., & Almy, B. (2016). An emotion regulation intervention to reduce risk behaviors among at-risk early adolescents. *Prevention Science, 17*(1), 71–82.
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis:

Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1–55.

Jimenez, S. S., Niles, B. L., & Park, C. L. (2010). A mindfulness model of affect regulation and depressive symptoms: Positive emotions, mood regulation expectancies, and self-acceptance as regulatory mechanisms. *Personality and Individual Differences*, 49(6), 645–650.

Kabat-Zinn, J. (1994). *Wherever you go, there you are: Mindfulness meditation in everyday life*. New York, USA: Hyperion.

Keating, D. P. (2004). Cognitive and brain development.

Keng, S.-L., Smoski, M. J., & Robins, C. J. (2011). Effects of mindfulness on psychological health: A review of empirical studies. *Clinical Psychology Review*, 31(6), 1041–1056.

Kessler, R. C., McLaughlin, K. A., Green, J. G., Gruber, M. J., Sampson, N. A., Zaslavsky, A. M., ... Williams, D. R. (2010). Childhood adversities and adult psychopathology in the WHO world mental health surveys. *British Journal of Psychiatry*.
<https://doi.org/10.1192/bjp.bp.110.080499>

Krueger, R. F., & South, S. C. (2009). Externalizing disorders: Cluster 5 of the proposed meta-structure for DSM-V and ICD-11: Paper 6 of 7 of the thematic section: 'A proposal for a meta-structure for DSM-V and ICD-11.' *Psychological Medicine*, 39(12), 2061–2070.

Kuyken, W., Weare, K., Ukoumunne, O. C., Vicary, R., Motton, N., Burnett, R., ... Huppert, F. (2013). Effectiveness of the mindfulness in schools programme: non-randomised controlled feasibility study. *The British Journal of Psychiatry*, 203(2), 126–131.

- Lancefield, K. S., Raudino, A., Downs, J. M., & Laurens, K. R. (2016). Trajectories of childhood internalizing and externalizing psychopathology and psychotic-like experiences in adolescence: A prospective population-based cohort study. *Development and Psychopathology*, 28(2), 527–536. <https://doi.org/10.1017/S0954579415001108>
- Linehan, M. (1993). *Skills training manual for treating borderline personality disorder* (Vol. 29). Guilford Press New York.
- MacKillop, J., & Anderson, E. J. (2007). Further psychometric validation of the mindful attention awareness scale (MAAS). *Journal of Psychopathology and Behavioral Assessment*, 29(4), 289–293.
- McLaughlin, K. A., Hatzenbuehler, M. L., Mennin, D. S., & Nolen-Hoeksema, S. (2011). Emotion dysregulation and adolescent psychopathology: A prospective study. *Behaviour Research and Therapy*, 49(9), 544–554.
- Moore, T. T., Chang, J. C.-J., & Smith, D. K. (2006). Clarifying the role of self-efficacy and metacognition as predictors of performance: Construct development and test. *ACM SIGMIS Database: The DATABASE for Advances in Information Systems*, 37(2–3), 125–132.
- Muris, P. (2002). Relationships between self-efficacy and symptoms of anxiety disorders and depression in a normal adolescent sample. *Personality and Individual Differences*, 32(2), 337–348.
- Pepping, C. A., Duvenage, M., Cronin, T. J., & Lyons, A. (2016). Adolescent mindfulness and psychopathology: The role of emotion regulation. *Personality and Individual Differences*, 99, 302–307. <https://doi.org/10.1016/j.paid.2016.04.089>
- Regier, D. A., Kuhl, E. A., & Kupfer, D. J. (2013). The DSM-5: Classification and criteria

- changes. *World Psychiatry*, *12*(2), 92–98.
- Sanaei, H., Hossini, S. A., & Jamshidifar, Z. (2014). Effectiveness of mindfulness training on self-efficacy of patients infected by breast cancer. *Procedia-Social and Behavioral Sciences*, *159*, 426–429.
- Sauer, S., & Baer, R. A. (2010). Mindfulness and decentering as mechanisms of change in mindfulness-and acceptance-based interventions. *Assessing Mindfulness and Acceptance Processes in Clients: Illuminating the Theory and Practice of Change*, 25–50.
- Seiffge-Krenke, I. (2017). Does adolescents' psychopathology change in times of change? *Journal of Adolescence*, *61*, 107.
- Shapiro, S. L., Carlson, L. E., Astin, J. A., & Freedman, B. (2006). Mechanisms of mindfulness. *Journal of Clinical Psychology*, *62*(3), 373–386. <https://doi.org/10.1002/jclp.20237>
- Sibinga, E. M. S., Perry-Parrish, C., Chung, S., Johnson, S. B., Smith, M., & Ellen, J. M. (2013). School-based mindfulness instruction for urban male youth: a small randomized controlled trial. *Preventive Medicine*, *57*(6), 799–801.
- Silk, J. S., Steinberg, L., & Morris, A. S. (2003). Adolescents' emotion regulation in daily life: Links to depressive symptoms and problem behavior. *Child Development*, *74*(6), 1869–1880.
- Steinberg, L. (2005). Cognitive and affective development in adolescence. *Trends in Cognitive Sciences*, *9*(2), 69–74.
- Steinberg, L., & Lerner, R. M. (2004). Handbook of adolescent psychology. *Hoboken, New Jersey. John Wiley & Sons.*

- Treynor, W., Gonzalez, R., & Nolen-Hoeksema, S. (2003). Rumination reconsidered: A psychometric analysis. *Cognitive Therapy and Research*, 27(3), 247–259.
- Twenge, J. M., Joiner, T. E., Rogers, M. L., & Martin, G. N. (2018). Increases in depressive symptoms, suicide-related outcomes, and suicide rates among US adolescents after 2010 and links to increased new media screen time. *Clinical Psychological Science*, 6(1), 3–17.
- Wells, R. E., Burch, R., Paulsen, R. H., Wayne, P. M., Houle, T. T., & Loder, E. (2014). Meditation for migraines: a pilot randomized controlled trial. *Headache: The Journal of Head and Face Pain*, 54(9), 1484–1495.
- Willner, C. J., Gatzke-Kopp, L. M., & Bray, B. C. (2016). The Dynamics of Internalizing and Externalizing Comorbidity Across the Early School Years. *Development and Psychopathology*, 28(4 Pt 1), 1033–1052. <https://doi.org/10.1017/S0954579416000687>
- Winer, E. S., Cervone, D., Bryant, J., McKinney, C., Liu, R. T., & Nadorff, M. R. (2016). Distinguishing mediational models and analyses in clinical psychology: Atemporal associations do not imply causation. *Journal of Clinical Psychology*, 72(9), 947–955.