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UNIVERSITY OF CALIFORNIA  
RIVERSIDE

The Effects of a Web-Based Mindfulness Intervention on Youths' Socioemotional,  
Cognitive, and Physiological Adjustment

A Dissertation submitted in partial satisfaction  
of the requirements for the degree of

Doctor of Philosophy

in

Psychology

by

Wu Hsuan Shih

September 2019

Dissertation Committee:

Dr. Elizabeth Davis, Chairperson

Dr. Tuppett Yates

Dr. Kate Sweeny

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2019

The Dissertation of Wu Hsuan Shih is approved:

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Committee Chairperson

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## ABSTRACT OF THE DISSERTATION

The Effects of a Web-Based Mindfulness Intervention on Youths' Socioemotional, Cognitive, and Physiological Adjustment

by

Wu Hsuan Shih

Doctor of Philosophy, Graduate Program in Psychology  
University of California, Riverside, September 2019  
Dr. Elizabeth Davis, Chairperson

Mindfulness meditation (MM) is the process of purposefully regulating attention, bringing awareness to current experiences, and relating to those experiences in an open and accepting way (Semple, Lee, Rosa, & Miller, 2009). MM interventions and related research have primarily been undertaken in adult populations. However, there is increasing interest in applications with youth. MM has also been shown to help control major stress responses systems in the body (e.g., the autonomic nervous system), making it important to consider individual differences in the activity of these systems. Additionally, although the academic world is transitioning to using technology to expand distance education and promote accessibility to broader audiences, most studies of MM interventions have utilized in-person training. Thus, investigation of a web-based intervention for youth is needed to assess its feasibility. The first goal of my dissertation was to investigate the effects of a web-based MM intervention on youths' adjustment across three domains of functioning: socio-emotional, cognitive, and physiological. The second goal was to investigate physiological regulation as an individual difference factor that could moderate the effects.

Sixty-three youth were followed over a span of seven weeks and were randomly assigned to either the control or the experimental condition. The experimental condition participated in weekly online MM sessions, while the control condition participated in a matched online curriculum that omitted MM. Multiple repeated measures Analysis of Variance (ANOVA) models were conducted to investigate differences between conditions. Results yielded mixed findings with regard to youths' compassion for others; in contrast to my hypothesis, youth in the experimental condition did not show clear improvements across time. Results also yielded mixed findings for youths' self-compassion and use of reappraisal depending on their initial physiological regulation. These outcomes also did not evidence clear patterns of change. Taken together, the current study was one of the first to test the feasibility of a web-based MM intervention and to investigate the role of physiological regulation as an individual difference factor that may moderate its effects. Results provided preliminary evidence that interventions delivered via a web-based platform for youth might need additional refinement and evaluation to optimize their success.



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## INTRODUCTION

Science has recently seen an increase in the number of interventions that teach mindfulness skills with the goal of promoting psychological health and well-being. Mindfulness meditation (MM) fosters purposeful regulation of attention to mitigate personal distress, the ability to monitor thoughts and emotions nonjudgmentally, and awareness of emotions without acting on them (Semple, Lee, Rosa, & Miller, 2010). The skills that underlie adaptive self-regulation include focusing attention, dealing with negative emotions, reacting appropriately to challenges, and avoiding engaging in aggressive or impulsive behaviors (Broderick & Jennings, 2012), many of the skills that MM aims to strengthen. As such, there is promise for MM training to confer a wide range of benefits by supporting adaptive self-regulatory skills. These MM interventions and the research surrounding them have primarily been undertaken in adult populations. However, there is increasing interest in applications with children and adolescents.

The ability to appropriately self-regulate stress, emotions, and behaviors is critically important throughout childhood and adolescence (American Psychological Association, 2000). Failure to develop these foundational self-regulatory skills puts youth at risk for academic, emotional, and behavioral problems, including anxiety, depression, eating disorders, substance abuse, and poor academic achievement (e.g., Needham, Crosnoe & Muller, 2004). Research on MM with adults has demonstrated reductions in stress (Miller, Fletcher & Kabat-Zinn, 1995), increased compassion (Shapiro, Schwartz & Bonner, 1998), and improvements in physical health (Davidson et. al., 2003), mental health (Geschwind et al., 2012), attention (Jha, Krompinger & Baime, 2007), sleep

quality (Winbush, Gross & Kreitzer, 2007) and emotion regulation (Arch & Craske, 2006; Ortner, Kilner & Zelazo, 2007). A small number of studies has extended this to adolescents, demonstrating positive effects of MM programs on attention and social competency (Schonert-Reichl & Lawlor, 2010), emotional self-regulation and stress reduction (Mendelson et al., 2010), executive functioning (Flook et al., 2010) and aggression, school achievement, and physical health (Sibinga et al., 2011). Though these findings are promising, assessments of MM research with youth are sparse, and often suffer from notable methodological shortcomings, which limit the conclusions that can be drawn about the effects of MM on adolescents' functioning. These limitations include a lack of scientific rigor (e.g., a lack of appropriate comparison groups), a narrow outcome focus (e.g., examining effects of MM in only a single domain, such as changes in self-reported anxiety), and lack of multiple sources of data (e.g., reliance on questionnaire measures). Thus, rigorously designed multi-method research studies that examine more aspects of adolescents' functioning are needed. The current study was designed to address these limitations.

Because of the specific challenges adolescents face in navigating the new social, emotion, and cognitive expectations of middle school, this population is likely to benefit tremendously from MM training to the extent that it facilitates stress reduction. MM training ought to lead to improvements across multiple domains of functioning that are crucial for positive youth development—socioemotional, cognitive, and physiological—each of which I examined in this study. Thus, the primary goals of this dissertation were to examine the potentially wide-ranging effects of MM training on adolescents' socio-

emotional, cognitive, and physiological functioning over the course of a web-based course, and to set the stage for future implementations of these kinds of programs.

I will first begin by describing the current definitions and theoretical approaches to understanding mindfulness meditation as a construct. The following sections will then review the existing literature that investigates the relation of mindfulness meditation to components from three domains of functioning: (1) socio-emotional – the gradual, integrative process through which youth acquire the capacity to understand, experience, express, and regulate emotions, as well as form and develop healthy relationships with themselves and with others; (2) cognitive – executive functioning abilities that organize, sequence, and regulate behavior; and (3) physiological – autonomic nervous system activity that plays an important role in emotion regulation and adaptive functioning. Each section will begin with a review of developmental background for each domain followed by a summary of existing literature reviewing the effects of mindfulness-based interventions in both adult populations and youth. Finally, areas in the field that need more scientific and empirical attention will be highlighted, and how the current dissertation addressed these gaps will be discussed.

### What is Mindfulness Meditation?

Historically, the concept of mindfulness originated in ancient Buddhist philosophy (Bhikkhu, 2010), and is practiced with the goal to achieve well-being and happiness (Ekman, Davidson, Ricard, & Wallace, 2005). The original term for mindfulness is called *Sati*, a Sanskrit word that has been used to indicate a lucid

awareness of what is happening within the phenomenological field (Bodhi, 2011). It is also sometimes referred to as the “heart” of Buddhist meditation (Kabat-Zinn, 2003). In Western, clinically oriented investigations, *mindfulness* is often defined as nonjudgmental attention to experiences in the present moment (Kabat-Sinn, 1990) and *meditation* as the deliberate training of attention to cultivate this state. Simply put, mindfulness is more than meditation; it is a state of consciousness and awareness, which involves knowingly attending to one’s moment-to-moment experience (Brown & Ryan, 2003). Furthermore, the practice of meditation is one way to scaffold and develop this state or skill of mindfulness (Kabat-Zinn, 2003).

Existing research includes a few theoretical accounts of mindfulness meditation, and several of these accounts build upon the central role that attention plays in this practice (Brown & Ryan, 2003; Carmody et al., 2009; Lutz, Slagter, Dunne, & Davidson, 2008). These perspectives have suggested that mindfulness should be considered to be a particular focus of attention characterized by two distinct features: the first one involving self-regulation of attention towards the immediate present moment, and the second relating to the adoption of an orientation characterized by curiosity, openness, and acceptance. Other accounts have suggested that many mechanisms mediate the positive effects of mindfulness practice. For example, Shapiro, Carlson, Astin, and Freedman (2006) argued that mindfulness embodies three axioms: intention, attention, and attitude. First, your *intentions* set the stage for what is possible and remind you from moment-to-moment of why you are practicing in the first place. Theorists argue that having a personal vision (i.e., an intention) is necessary in order to see growth and change. The



role of intention in meditation practice is exemplified by Shapiro's study (1992), which explored the intentions of meditation practitioners. She found that outcomes correlated with intentions – meditators whose goals were self-regulation and stress management attained self-regulation; meditators whose goals were self-exploration attained self-exploration; and meditators whose goals were self-liberation attained self-liberation. The inclusion of intention (i.e., the reason why one chooses to practice mindfulness) as a factor of mindfulness is important to understanding the process as a whole.

A second fundamental factor of mindfulness is *attention*. In the context of mindfulness practice, paying attention involves observing one's moment-to-moment experiences (both internal and external). There are many different aspects of attentional abilities, including the capacity to attend for long periods of time to one source (i.e., vigilance or sustained attention; Parasuraman, 1998; Posner & Rothbart, 1992), the ability to purposefully shift the focus of attention between objects of mental sets (i.e., switching; Posner, 1980), and the ability to inhibit secondary elaborative processes of thought, feelings, and sensations (i.e., cognitive inhibition; Williams, Matthews, & MacLeod, 1996). The attentional regulation involved in mindfulness would be predicted to result in the enhancement of all three of these skills.

The final fundamental factor is *attitude*. This axiom argues that the attitude one brings to the attention given during mindfulness is important. For example, attention can be carried out in a cold, critical manner, or in an affectionate, compassionate manner, and the attitude in which mindfulness is carried out can alter the state of mindfulness one aims to be in. Additionally, it is important to make the quality of attitude for attention

explicit. It is important for the practitioner to consciously commit to a kind and open attitude (e.g., “May I infuse my awareness with...”). Through intentionally bringing the attitudes of patience and compassion to the attentional practice, one develops the capacity not to continually strive for pleasant experiences, and not to push aversive experiences away.

Another theoretical account by Baer (2003) reviewed other fundamental mechanisms that explain how mindfulness skills lead to behavior change. The first one she describes is *exposure*. Linehan (1993) suggests that prolonged observation of current thoughts and emotions without trying to avoid or escape them can be seen as an example of exposure, which should encourage the extinction of fear responses and avoidance behaviors previously elicited by these stimuli. Thus, the practice of mindfulness may improve individuals’ abilities to tolerate negative emotional states and help them cope more effectively.

Several authors have noted that the practice of mindfulness may lead to *cognitive change*, changes in thoughts and attitudes. Kabat-Zinn (1982, 1990) suggests that nonjudgmental observation of pain and anxiety-related thoughts may lead to the understanding that they are “just thoughts,” rather than reflections of truth or reality, and do not necessitate escape or avoidance behavior. Feeling afraid does not necessarily mean that danger is imminent, and thinking, “I am a failure” does not make it true.

*Self-management* has also been considered as a mechanism, where an individual improves their self-observation from mindfulness training, which subsequently widens

their range of coping skills. For example, Kabat-Zinn (1982) suggests that increased observation and awareness of pain sensations and stress responses as they occur may enable individuals to engage in a variety of coping response, including skills not included in their treatment program. Linehan (1993) also suggests that nonjudgmental self-observation permits recognition of the consequences of behaviors (e.g., irritating one's siblings by borrowing their toys without asking) in place of global judgments about the self (e.g., "I am a bad sibling"). This recognition may lead to more effective behavior change.

The induction of *relaxation* through various meditation strategies has been well documented (Benson, 1975; Orme-Johnson, 1984; Wallace, Benson, & Wilson, 1984). However, the purpose of mindfulness training is not to induce relaxation, but instead to teach non-judgmental observation of current states. Thus, although practice of mindfulness exercises may lead to relaxation, these mechanisms and related outcomes may not be a primary reason for engaging initially.

Finally, the last proposed mechanism is *acceptance*. Acceptance involves experiencing events and situations fully and without defense. Note that many clinicians focus on changing unpleasant symptoms with treating disorders, without recognizing the importance of acceptance. For example, an individual who experiences panic attacks may engage in maladaptive behaviors to prevent future attacks. If they could instead accept that panic attacks will occasionally occur and that they are time-limited, panic attacks would become brief experiences to be tolerated, rather than dangerous experiences to be

avoided. Kabat-Zinn (1990) describes acceptance as one of several foundations of mindfulness practice, and a core mechanism that perpetuates successful mindful states.

The models described above are theoretical accounts describing the fundamentals of mindfulness meditation. Of note, these examples are only listing a few of the many theoretical accounts as to how mindfulness has been integrated into modern Western psychology. Other descriptions exist that describe mindfulness differently. For example, Langer (1989) views mindfulness as a creative cognitive process that unfolds when an individual employs three key qualities: creation of new categories, openness to new information, and awareness of more than one perspective; see Langer & Moldoveanu (2000), Teasdale et al., (1995) for more examples. Although the concept of mindfulness is increasingly becoming part of popular culture, no single “correct” definition of mindfulness has been agreed upon. There is still a need for a consistent theoretical framework surrounding the mindfulness literature, but operationalizing mindfulness has been challenging given the variety of cultural traditions from which the concept originates, the difficulty of measurement, and the difficulty distinguishing it as a scientific construct from everyday common use (see Baer, 2003; Dimidjian and Linehan, 2003; Brown and Ryan, 2004; Gethin, 2011). Nonetheless, these modern definitions of mindfulness are more easily interpretable and in line with current Western psychological theoretical frameworks.

Achieving mindfulness is extremely difficult. Most individuals are usually only in this mindful state for brief periods of time and an untrained mind is easily distracted by ruminative or narrative thought processes. Attention must be refocused many times.

Fortunately, the capacity for sustained moment-to-moment awareness, especially in times of emotional turmoil, is a teachable skill that enables the practitioner to reap many potential benefits, from increased compassion and emotion regulation to better cognitive control. Thus, it is important for clinicians and researchers to implement and investigate various mindfulness interventions and practices to further understand how it works and who it might work for.

#### The Effects of Mindfulness Interventions on Youth's Socio-Emotional Functioning

The domain of socio-emotional functioning has blossomed to encompass a far more diverse array of concepts, theories, and developmental issues than the ones Sroufe (1979) originally proposed decades ago when he first used this label to summarize emergent themes in attachment, emotional development, and psychosocial functioning. Now, socio-emotional functioning very broadly involves the development of youth's experience, expression, and management of emotions, and the ability to establish positive and rewarding relationships with themselves and others (e.g., Denham et al., 2009). The core features of this domain of development include the ability to identify and understand one's own feelings, to accurately interpret and understand the emotional states of others, to regulate strong emotions and their expressions in a constructive manner, to regulate one's own behavior, to develop empathy for others, and to establish and maintain relationships. Socioemotional functioning looks different throughout various stages of development. For example, infants experience, express, and perceive emotions before they fully understand them. During infancy, socioemotional functioning is characterized by their attachment styles with their primary caregivers, and how this dyadic relationship

serves as a mechanism of regulation and the foundation for later relationships (e.g., Bowlby, 2008, Feldman & Klein, 2003). Later in childhood, through learning to recognize, label, manage, and communicate their emotions and to perceive and attempt to understand the emotions of others, children build skills that connect them with family, peers, teachers, and the community (e.g., Denham, Wyatt, Bassett et al., 2009; Eisenberg & Spinrad, 2006). These growing capacities help young children and youth to become competent in negotiating increasingly complex social interactions, to participate effectively in relationships and group activities, and to reap the benefits of social support crucial to healthy human development and functioning (e.g., Isaacs, 2013). As children enter adolescence, they spend an increasing amount of time reflecting on their sense of self and identity and engaging in introspective activities (e.g., writing in journals, posting messages and photos about their lives on social media; Uhls, 2017). Socioemotional adjustment during adolescence is largely characterized by successful identity development and forming a sense of self (e.g., Huitt, 2008). In devising an identity, youth integrate all they know about themselves, their self-conceptions, along with their evaluations of themselves, to construct a self that is coherent and consistent over time (Erikson, 1950).

The bulk of accumulated evidence supports the perspective that youth with positive social and emotional skills are more likely to evidence resilience when confronted with challenges (Greenberg et al., 2003; Masten and Motti-Stefanidi, 2009), and a growing body of literature suggests that mindfulness interventions result in improvements in various areas across socioemotional functioning (e.g., Maynard, Solis,

& Miller, 2015). In the current study, with the focus on important socio-emotional skills that mindfulness meditation specifically aims to target (e.g., self-compassion, compassion for others, emotion regulation), I assessed how participation in a mindfulness intervention would effect changes in these specific areas of socioemotional functioning.

### ***Self-Compassion***

Self-compassion is a construct that is now receiving increasing empirical attention due to its strong link with psychological health and well-being. Self-compassion involves feelings of caring and kindness towards oneself when encountering personal challenges and involves the recognition that one's suffering, failures, and inadequacies are part of the shared human condition (Neff, 2003). It comprises three components and their counterparts: self-kindness vs. self-judgment, a sense of common humanity vs. isolation, and mindfulness vs. over-identification when confronting painful self-relevant thoughts and emotions. Self-kindness refers to the ability to be gentle and understanding with oneself rather than being harshly critical. For example, the tone of language used to acknowledge one's weaknesses can be kind and supportive rather than critical and non-supportive. The sense of common humanity in self-compassion involves recognizing that all humans are flawed, that we all fail occasionally and make mistakes, and that we all experience many life challenges. Self-compassion connects one's own flawed condition to the shared human condition, so that features of the self are viewed from a broad, inclusive perspective. Mindfulness in the context of self-compassion involves being more aware of one's painful experiences in a balanced manner that neither ignores nor ruminates on disliked aspects of oneself or one's life. It is essential to be mindfully aware

of personal suffering to be able to extend compassion towards the self. It is important to pay attention in a grounded way that prevents being distracted by the narrative driving the suffering, a process that Neff (2003) has termed “over-identification.”

Research suggests that individuals who practice self-compassion demonstrate better psychological health than those who lack self-compassion. For example, greater self-compassion has consistently been found to predict lower levels of anxiety and depression (e.g., Germer & Neff, 2013), which may be related to findings linking self-compassion to decreased cortisol, indicative of less stress, and increased heart rate variability, indicative of better self-regulation (Rockliff, Gillbert, McEwan, Lighman, & Glover, 2008). Greater self-compassion is also associated with less rumination, perfectionism, and fear of failure (Neff, 2003; Neff, Hsieh, & Dejitterat, 2005). Individuals who practice self-compassion are less likely to suppress unwanted thoughts and are more willing to acknowledge their negative emotions as valid and important (Leary et al., 2007; Neff, 2003).

Psychologists are becoming increasingly interested in ways to enhance self-compassion, and because self-compassion has theoretical connections to mindfulness, mindfulness interventions are one potential way to enhance self-compassion. Studies examining the impact of mindfulness interventions on self-compassion have provided mixed results, although most findings support improvements in self-compassion. For example, a pilot study by Edwards, Adams Waldo and colleagues (2013) evaluated the impact of a mindfulness curriculum on 20 Latino middle school students who participated in 8-session structured groups. Their results illustrated significant increases in



adolescents' mindfulness and self-compassion scores. Another study with adults by Germer and Neff (2013) evaluated the effectiveness of the mindful self-compassion program, and found larger increases in self-compassion, mindfulness, and wellbeing in those in the experimental group, receiving the workshop, compared to those in the control group. A randomized-controlled trial examining a mindfulness-based program for health professionals demonstrated a significantly higher increase in self-compassion for individuals in the intervention group as compared to individuals in the control group (Shapiro et al., 2005). In a non-randomized, cohort-controlled design, graduate level psychology students reported significant increases in self-compassion after participating in a mindfulness-based intervention. Results showed patterns where increases in mindfulness were found to predict increases in self-compassion (Shapiro et al., 2007).

However, a few studies have failed to find support for mindfulness interventions as an effective way to improve self-compassion. For example, Abercrombie et al., (2007) provided a modified six-week mindfulness program to a group of low-income women of multiethnic origin who demonstrated decreased anxiety after participation, but no significant changes in self-compassion. It is important to note that this study had many limitations, including a small sample size ( $N = 8$ ) and lack of fluency in English for many participants. Mixed findings in this area of research suggest that mindfulness interventions might not all target the same domains of adjustment. Thus, it is important for interventions to empirically assess the specific types of curricula. This will help interventions more effectively and more accurately promote their strengths, and identify and target the appropriate groups that are most likely to reap the benefits. The current

study extended the existing literature surrounding mindfulness and self-compassion by investigating the effects of an easily accessible and more readily available web-based mindfulness intervention on these various components of self-compassion in youth.

### ***Compassion for Others***

Compassion for others is a concept that is present in nearly all cultures and spiritual traditions. Despite the significance and importance of compassion, the definition of compassion is varied (Strauss et al., 2016), with some diverging views about whether compassion is an emotion (Goetz et al., 2010), motivation (Gilbert, 2014) or a multidimensional construct (Jazaieri et al., 2013). Goetz and colleagues (2010) specifically define compassion as the feeling that arises in witnessing another's suffering and that motivates a subsequent desire to help. Compassion for others may be defined as the capacity to feel, and wish to relieve, the suffering of others. Unfortunately, it is not always expressed and in fact, can be suppressed and inhibited (Gilbert et al., 2010). Gilbert and colleagues (2010) argue that some individuals may fail to experience compassion while others may actually experience a fear of compassion. Specifically, one may fear that extending compassion towards others may threaten their own self-interest or the interests of one's identified in-group (Gerhardt, 2010). This is in line with evolutionary perspectives stating that compassion can be an "expensive resource" and therefore must be given appropriately to one's kin rather than to non-kin or those who are unfamiliar, in order to defend one's own self-interests (Gilbert et al., 2010). However, recent research suggests that compassion is a predictor of psychological health and well-being. Compassion has been associated with decreased negative affect and stress

responses, and also with increased positive affect, social connectedness, and kindness toward oneself and others (e.g., Fredrickson et al., 2008; Hutcherson et al., 2008; Lutz et al., 2008; Lutz et al., 2004; Pace et al., 2009). Compassion towards others cultivates altruistic behavior and generosity. In other words, compassion gives rise to a powerful motivation that is focused on others, which naturally results in greater social connectedness.

Most of the empirical work surrounding mindfulness interventions has focused on self-compassion, and there is less current work focusing on compassion for others. However, there are many empirical studies examining the effects of compassion programs on increasing compassion for others. For example, Jazaieri, Thumpton Jinpa, McGonical et al., (2013) implemented a 9-week compassion cultivating training program with a community sample of 100 adults who were randomly assigned to the program or to a control group. Compared to individuals in the control group, those who participated in the program showed significant improvements in compassion for others (along with self-compassion and receiving compassion from others). These results evidence support that compassion can be intentionally cultivated in a purposeful training program for adults. Pace and colleagues (2009, 2010) developed a 6-week compassion meditation program and found that in an undergraduate population, the amount of compassion-focused meditation practice while in the program was related to immune responses (i.e., decreases in interleukin and cortisol production) to a psychosocial stressor.

As reviewed, there is growing evidence of the success of interventions (some with the focus on compassion specifically) on promoting individuals' compassion for others.

However, most of the work has been done with adults, and more work needs to be done investigating the effects of interventions in this focused area with youth. Young children engage in prosocial and empathetic behaviors (e.g., Flook, Goldberg, Pinger, & Davidson, 2015), supporting their abilities to feel compassion and be compassionate towards others. Compassion for others can function as a muscle and exercising these muscles at a young age could benefit youth in the long term (e.g., Singer & Klimecki, 2014). Thus, the current dissertation investigated the efficacy of a mindfulness intervention for youth, that includes specific lessons targeting compassion for others, to assess whether participation in this intervention would result in increased compassion for others.

### ***Emotion Regulation***

Emotion regulation refers to the processes by which we influence which emotions we have, when we have them, and how we express them (e.g., Gross, 1998; 2002). It is frequently important for people to manage their negative emotions appropriately, which involves responding in a socially adaptive and flexible way to stressful or emotional experiences (e.g., Izard et al., 2008). This involves maintaining or modulating one's feelings in the service of personal goals (e.g., staying happy, reducing anxiety), and can include modifying attention, applying strategies, and changing current behaviors (Eisenberg, Fabes, Guthrie, & Reiser, 2000). The experience and expression of emotion can be adjusted to meet situational demands (e.g., hiding one's fear before giving a presentation to avoid public embarrassment). Poorly regulated emotion can interfere with successful adjustment at the behavioral level, reflected in the decisions people make and

the habits they engage in, and at the physiological level, as reflected by dysfunction in the stress response systems.

I adopted the process model of emotion regulation (derived by Gross & Thompson, 2007) to guide my approach towards understanding how participation in a mindfulness intervention might affect an individual's use of emotion regulation strategies. This model delineates when in the emotion-generative process different strategies have their primary impact by distinguishing between antecedent-focused strategies, which modulate emotional response tendencies early in the process, specifically before they give rise to full-fledged responses, and response-focused strategies, which modulate the emotional responses themselves later in the process, once they have arisen.

In the current study, I focus on one antecedent-focused strategy, cognitive reappraisal, and one response-focused strategy, expressive suppression, that differentially influence negative emotional experiences, behavior, and physiological responses (e.g., Gross, 1998). Cognitive reappraisal involves reframing the meaning of an emotion-eliciting situation to modulate emotional responding. It involves re-interpreting appraisals of situations in a way that creates a more adaptive perspective. Frequent use of reappraisal over time leads to enhanced control of emotion, interpersonal functioning, and psychological and physical well-being (Gross & John, 2003; Lieberman et al., 2011). Expressive suppression is a strategy directed toward explicitly not showing others what one is feeling internally by inhibiting behaviors associated with emotional responding (e.g., facial expressions, gestures). Expressive suppression has been associated with

increased stress-related symptoms, negative emotion, depression, anxiety, as well as with decreased positive affect and life satisfaction (e.g., Campbell-Sills et al., 2006; Kashdan et al., 2006; Moore et al., 2008). Studies show that although participants who suppressed showed much less expressive behavior, they experienced as much negative emotion as participants who had just watched a negative emotion-eliciting film (Gross, 1998).

Reappraisal is considered one of the ways in which emotion gets regulated during mindfulness. Garland and colleagues (2011) described mindful emotion regulation as “positive reappraisal,” or the adaptive process through which stressful events are reconstrued as advantageous, meaningful, or benign (e.g., reinterpreting the stressful event as a valuable learning experience). A self-report study illustrated that mindfulness practice leads to increases in positive reappraisal and that these increases mediate an improvement in stress levels (Garland et al., 2011). However, the literature examining mindful emotion regulation is replete with mixed findings. Other researchers argue that mindful emotion regulation is fundamentally disparate from cognitive reappraisal (Kabat-Zinn, Lipwroth, & Burney, 1985). Cognitive reappraisal differs in that thoughts and emotions must be acted upon in some way. Cognitive behavioral therapies that promote cognitive reappraisal can create an enhanced sense that thoughts are merely appraisals rather than facts, and stress the idea that these appraisals can be changed to be more accurate or more psychologically beneficial representations of reality (hence reappraisals). Thus, unpleasant thoughts/appraisals must be acted upon or manipulated in some way to make them more acceptable and less distressing. In contrast, mindfulness ideas argue that all cognitive and emotional phenomena are simply mental events, and do

not need to be acted upon. The ability to simply allow these mental events to come and go is systematically developed, and then, thoughts and behaviors that are likely to lead to supportive and positive outcomes may then be consciously chosen. In other words, thoughts and behaviors that are considered useful are given energy, and those considered unhelpful are “let go” and not identified with, which is a distinct cognitive strategy from reappraisal. In other words, establishing psychological distance from aversive emotions may be part of the reappraisal process (Ochsner & Gross, 2008), but mindfulness differs importantly from such processes in that it considers the labeling or monitoring of experience as an end rather than a way to then control the emotion.

Suppression is a response-focused strategy, meaning it appears relatively late in the emotion-generative process, and primarily modifies the behavioral aspect of the emotion response tendencies. Suppression should thus be effective in decreasing the behavioral expressions of negative emotions, but might also have the unintended side effect of also tamping down the expression of positive emotions. Suppression will not be helpful in reducing the experience of negative emotions, being that this strategy does not directly target negative emotion (just the associated expressions), and thus these negative emotions may continue to linger and accumulate unresolved. There is less work linking mindfulness practices and interventions with suppression. This could be because the facets of mindfulness are fundamentally disparate from the mechanisms of suppression, where the goals of mindfulness are to embrace and accept negative emotions while expressive suppression attempts to downplay the expression of negative emotions.

Jazaieri, McGonigal, Jinpa, Doty and colleagues (2013) examined the effects of a 9-week compassion cultivating training program with 100 adults. Compared to individuals in the waitlist control condition, those in the training program evidenced increased mindfulness, as well as decreased emotional suppression. Mindfulness-based interventions may be beneficial by influencing core avoidance symptoms in a sample of individuals who characteristically employ avoidance strategies (i.e., individuals struggling with post-traumatic stress disorder; Thompson & Waltz, 2011). Avoidance of aversive internal experiences leads to a narrowing of behavioral repertoires, and psychological inflexibility, which has also been described as not being able to be mindful of the present (Follette et al., 2006). Avoidance of internal experiences may manifest as expressive suppression or inhibiting emotion-expressive behavior when emotionally aroused (Gross & Levenson, 1993). For example, a study by Dick, Nilies, Street, Dimartino, & Mitchell (2014) examined whether changes in emotion regulation strategies were associated with post-yoga intervention PTSD symptoms for 38 adult women. Preliminary findings suggest that participation in a yoga intervention reduced expressive suppression (and improved PTSD symptoms). Although this study was done with a small sample of women who suffered from PTSD, it provides initial evidence for how mindfulness meditation-relevant (i.e., yoga) interventions may help reduce expressive suppression. Although some research has begun to study the effects of mindfulness interventions on individuals' use of expressive suppression, more work is still needed. No studies to my knowledge have examined this in a sample of youth. Investigating the effects of a mindfulness intervention on youth's use of expressive suppression is



informative, as adolescence is considered a critical developmental period where youth are expanding their repertoires of emotion regulatory strategies (e.g., Zeman et al., 2006). The current dissertation addressed this gap. I expected to see an increase in use of reappraisal and a decrease in use of suppression for youth in the experimental condition compared to youth in the control condition.

There are other ways to conceptualize and classify emotion regulation processes that are not limited to reappraisal and suppression. For example, Gratz and Roemer (2004) proposed a more integrative operationalization to capture other emotion regulation processes and to extend on the concept that emotion regulation is restricted to the control and down-regulation of negative emotions. Their framework argues that in addition to modulating emotional experience, expression, and arousal, other skills are similarly important for successful emotion regulation: monitoring and differentiating emotional experiences, not avoiding internal experiences, being attuned to goals relative to contextual demands, and controlling urgency and impulsive behaviors. Thus, it would be important to go beyond assessing only emotion regulation strategies and investigate how mindfulness meditation interventions might influence other varying emotion regulation processes.

The work reviewed above illustrates how various areas of socio-emotional development (i.e., self-compassion, compassion for others, and emotion regulation) are important for youth, and how mindfulness interventions have shown promise in facilitating these skills and abilities. However, this work has typically been done with adults, and studies with youth involve only in-person programs that might not be easily

accessible. Thus, my investigation of the effects of an easily assessible online mindfulness curriculum on youth's socioemotional development addressed these logistical difficulties and has the potential to advance knowledge in this area, both in terms of whether delivering a mindfulness curriculum online is an effective medium and in terms of its success on promoting compassion and adaptive emotion regulation abilities.

#### The Effects of Mindfulness Interventions on Youth's Cognitive Functioning

As youths' socio-emotional functioning develops, so does their cognitive functioning. The two domains go hand in hand, with advancements in one leading to advancements in the other. For example, cognitive functioning facilitates the regulation of emotions and behaviors and is related to social and emotional competence in childhood (Kochanska, Coy, & Murray, 2001; Rhoades et al., 2009). As children develop increased cognitive control, they become better at modulating negative emotions--maturation in their cognitive abilities allows them to execute more advanced cognitive emotion regulation strategies. Cognitive functioning broadly entails mental processes that allow individuals to carry out goal-directed behavior, including memory, attention, and other executive functioning skills. Executive functioning (EF) is a core area of development that underlies most behavior from childhood. EF is an umbrella term that incorporates a collection of high-level interrelated, yet independent, processes that play a role in planning, organizing, and executing regulated, goal-directed activity (Garon, Bryson, & Smith, 2008; McCloskey, Perkins, & Van Diviner, 2008; Welsh & Pennington 1988). Processes associated with EF are numerous, but attentional control and inhibitory

control are examples of core executive functions that map onto dimensions of behavioral self-regulation relevant to mindfulness interventions, both of which are assessed in the current study (Anderson, 2002; Blair & Diamond, 2008).

Developmentally, EF emerges in the toddler period with a rapid spurt of development in EF capacities in early childhood years (Diamond, 2002; Welsh, Pennington, & Groisser, 1991), reaching a peak in early adulthood (e.g., Diamond, 2002). The skills and processes associated with EF (e.g., attentional control, response inhibition) follow prolonged and multistage developmental trajectories through childhood and adolescence and show increases in efficiency with age (Blair, 2002; Blakemore & Choudhury, 2006; Davidson, Amso, Anderson, & Diamond, 2006; Riggs, Jahromi, Razza, Dillworth-Bart, & Mueller, 2006; Zhou et al., 2007). Specifically during the onset of early adolescence, activity in the prefrontal regions of the brain increases, indicating maturation (Rubia et al., 2006; Steinberg, 2005), whereas activity in irrelevant brain regions decreases (Durstun et al., 2006), reflecting an overall linear pattern of improved cognitive control and emotion regulation as the prefrontal cortex matures from late childhood to early adulthood (Casey, Jones, & Hare, 2008). Neural development in the prefrontal cortex during the adolescent years has been found to be associated with improved executive control processes such as attention (Anderson, Anderson, Northam, Jacobs, & Catroppa, 2001) and inhibition (Leon-Carrion, Garcia-Orza, & Perez-Santamaria, 2004). Practicing mindfulness has been identified as a promising approach for improving attention and is significant for the development of inhibition in adolescents (Zylowska et al., 2008). Thus, identifying ways to improve attentional and inhibitory

control can be promising for the design of mindfulness intervention programs for adolescents, promoting a positive path in development.

### *Attention*

The attentional control domain includes the capacity to selectively attend to specific stimuli and inhibit prepotent responses, and the ability to focus attention for a prolonged period. Individuals with impairments in this domain are likely to be impulsive, lack self-control, fail to complete tasks, and respond inappropriately. Mindfulness increases attentional abilities by training the mind to focus and sustain attention on one's thoughts and by inhibiting distractions of unwanted and intrusive thoughts (Moore & Malinowski, 2009). Recent research with adults has shown that increased mindful attention awareness can be taught and that mindfulness training can promote increased cognitive capacities in attention, memory, and learning (e.g., Heeren, Van Broeck, & Philippot, 2009; Langer & Moldoveanu, 2000; Moore & Malinowski, 2009). Wenk-Sormaz (2006) found improvements in attentional control among adults who had received as little as three 20-minute sessions of mindfulness training. Another study by Jha, Krompinger, and Baine (2007) showed that adults with no previous mindfulness or meditation experience showed significantly higher voluntary attention control after participating in a mindfulness intervention. In a sample of elementary school children, Napoli, Krech, and Holley (2005) evaluated a 24-month bimonthly mindfulness-based program with one half of students receiving the training and the other half receiving a paralleled control (reading or quiet activities). The mindfulness program improved children's selective attention on performance of a computer task, increased attention and

social skills as reported by teachers, and reduced test anxiety according to children's self-report. Taken together, many studies have begun to provide support for mindfulness interventions as an approach that successfully promotes attention control and focus. This is important, as attention can be biased in response to affective stimuli. Affect biased attention refers to selective attention processes by which sensory stimuli systems are tuned to favor certain categories of affectively salient stimuli before they are encountered. Specifically, attention bias to threat refers to selective autonomic attention to threat-related stimuli (e.g., negative affect). Individuals vary in their attention bias to threat, and many studies have evidenced how strong attention bias to threat is related to poor adjustment (e.g., Bar-Haim et al., 2007; Hommer, Meyer, Stoddard et al., 2014; Mogg & Bradley, 1998; Williams et al., 1996). The current study aims to expand the present understanding of attentional control by investigating specifically how participation in a mindfulness intervention might affect attentional biases.

An attentional bias towards threat refers to differential attentional allocation towards threatening stimuli relative to neutral stimuli (Bar-Haim et al., 2007; MacLeod et al., 1986; Mogg & Bradley, 1998). Because mindfulness practices cultivate capacities for attention (Brown and Ryan, 2003), it is also likely these practices can be beneficial for youth who have an attentional bias towards threat. Pavlov, Korenyok, Reva, and colleagues (2015) examined the effects of long-term meditation practices on attentional biases towards emotional faces in adults. They used eye-tracking to measure gaze while 21 healthy controls and 23 experienced meditators (all males) viewed displays consisting of four facial expressions for 10 seconds. Measures of biases in initial orienting and

maintenance of attention were assessed. Participants who were experienced meditators spent significantly less time viewing angry and fearful faces than their counter control subjects. Additionally, meditators selectively attended to happy faces whereas control subjects showed attentional biases towards both angry and happy faces. Taken together, their results suggest that long-term meditation practice adaptively affects attention, specifically attention biases towards motivationally significant stimuli. Their study is promising in providing initial evidence of how mindfulness interventions can reduce attentional biases to threat in adults. Yet, research with youth is needed to inform whether mindfulness interventions would have the same effect on attention biases in a younger sample. Additionally, because mindfulness meditation interventions are known to increase intentional attention and control of attention (e.g., Chambers, Lo, & Allen, 2008), it would be informative to assess whether mindfulness interventions influence attentional biases.

### ***Inhibitory Control***

Inhibitory control is an executive function, which involves controlling one's attention, behavior, thoughts, and/or emotions to supersede a strong internal predisposition or external attraction (Diamond, 2013). Review of the mindfulness literature with both adults and youth point to the potential of these interventions for improving inhibitory control abilities (e.g., Black et al., 2009; Burke, 2010). For example, Heeren and colleagues (2009) investigated the effects of a mindfulness intervention on cognitive inhibition in adults with no prior mindfulness meditation experience. Results revealed that participants who had received the mindfulness meditation intervention made

significantly fewer errors on cognitive inhibition tasks than their counterparts in the control group. Furthermore, a group of adults and adolescents with attention deficit and hyperactivity disorder (ADHD) who had completed a mindfulness-based intervention showed improvement in self-reported ADHD symptoms and on a computerized attention and inhibitory control task (Zylowska et al., 2008). These findings are important because they link mindfulness with inhibitory control. However, most of the research has been done with adults. Less is known about the effects of mindfulness interventions on processes of executive functions underlying behavioral and emotional regulation (i.e., inhibitory control) in youth. Considering advances in executive functions are precursors of important developmental achievements later in life (e.g., academic success), it is important for researchers to investigate interventions that promote these EF processes in younger populations. Additionally, many executive functioning skills, including inhibitory control, continue to develop into adulthood, so understanding how a mindfulness intervention influences these abilities during childhood and adolescence would provide insight into the effectiveness of mindfulness interventions as one for supporting the development of youths' long-term adjustment.

#### The Effects of Mindfulness Interventions on Youth's Physiological Regulation

Self-regulation in pursuit of personal goals (e.g., staying happy; reducing anxiety) is supported by the body's autonomic nervous system (ANS). The ANS regulates homeostatic functioning. It is comprised of two subsystems: the parasympathetic nervous system (PNS) and the sympathetic nervous system (SNS). The primary function of the PNS is to promote functions related to growth and restorative internal processes (the so-

called “rest and digest” system). On the other hand, the SNS is primarily in charge of increasing metabolic output in response to external challenges (“fight or flight”), so that pupils dilate, heart rate accelerates, intestinal movements are inhibited, and vesical and rectal sphincters are contracted. These biological reactions are designed to help the body respond to threatening stimuli, preparing to protect and defend. These systems work together to help the body regulate emotions and behavior in response to everyday environmental changes. Given the important link between ANS activity and self-regulation of emotions and subsequent behavior, it is important to promote youths’ physiological regulatory abilities. Mindfulness meditation training has already been shown to be a successful method in encouraging adaptive physiological regulation, with research with adults evidencing its success at increasing basal parasympathetic regulatory levels (e.g., Ditto, Eclache, & Goldman, 2006) and eliciting adaptive parasympathetic responses to challenge (e.g., Stellar, Cohen, Oveis, & Keltner, 2015).

### ***Parasympathetic Nervous System (PNS)***

To link the functioning of the ANS to human behavior, Porges (1995) introduced the Polyvagal Theory, which provided a new perspective into the role that neural mechanisms play in regulating bio-behavioral processes. Porges (1986) suggested that the physiological basis for the ability to regulate emotion lies in the functioning of the vagus nerve, responsible for slowing many physiological processes such as heart rate and respiration. The vagus nerve, also described as a “vagal brake,” inhibits sympathetic arousal, and thus brings a relaxed state that facilitates social engagement (Porges, 2007), which is useful when there is no actual or perceived environmental threat. However,



when there is a threat, releasing the vagal brake will allow sympathetic input to the heart, increasing arousal and mobilizing defensive reactions that may be necessary to stimulate “fight or flight” responses to ensure safety. Overall, the vagal system plays an important role in maintaining physiological homeostasis, so that an individual can preserve metabolic resources while in a resting state, but still react to external stressors when needed.

Respiratory sinus arrhythmia (RSA) refers to the periodic fluctuations in heart rate that are characterized by a shortening and lengthening of heart periods in a phase relationship with inspiration and expiration. RSA is determined largely by vagal influences on the heart, and as such provides a noninvasive index of parasympathetic activity (Berntson, Cacioppo, & Quigley, 1993). A growing body of research (described below) supports RSA as a logical marker of emotion regulation and suggests that individual differences in youths’ RSA is associated with their regulatory behaviors (Beauchaine, 2001; Demaree, Robinson, Everhart, & Schmeichel, 2004; Diamond & Hicks, 2005; Thayer & Lane, 2000). Greater parasympathetic dominance while at rest is reflected in relatively higher RSA values and is generally associated with slower heart rate (Porges, 1986). Research shows that higher resting RSA is related to a greater ability to react to environmental stimuli, because this is thought to mark a greater capacity for self-regulation or social engagement (Porges, 1986; Beauchaine, 2001). For example, high resting RSA in infants has been associated with both negative and positive emotional reactivity, whereas in childhood it is associated with better socio-emotional competence (Beauchaine, 2001). Higher basal RSA is positively related to problem

solving abilities, emotion regulation, attention, and social skills (Blandon et al., 2008; Staton et al., 2009).

### *Sympathetic Nervous System (SNS)*

The other branch of the autonomic nervous system is the sympathetic branch. It is important to consider the SNS branch in addition to the PNS branch, because both branches work together to support adaptive responses to the environment (Berntson & Cacioppo, 2007; Berntson, Cacioppo, Quigley, & Fabro, 1994). The PNS provides regulatory resources while the SNS mobilizes adaptive responding. The two branches may covary reciprocally, independently, or non-reciprocally (as evidenced by coactivation or coinhibition; Berntson, Cacioppo, & Quigley, 1991). These multiple modes of autonomic control reflect differential central states and thus including both systems in an investigation has the potential to offer important new information.

Less is known about SNS activity in youth in comparison with the extensive research on the PNS and its role in self-regulation (Hastings, Kahle, & Han, 2014). However, theoretical perspectives such as allostasis, allodynamic regulation, and autonomic space suggest that a thorough understanding of the autonomic correlates of emotion regulation requires examinations of both branches (Berntson & Cacioppo, 2007; Berntson, Cacioppo, Quigley, & Fabro, 1994). SNS activity can be measured in multiple ways, including electrodermal responding and salivary alpha-amylase (sAA), but a technique that offers finer temporal resolution is the use of thoracic impedance cardiography to record pre-ejection period (PEP). PEP is a non-invasive marker of

sympathetic nervous system activity, with shorter intervals indicating a stronger sympathetic response. PEP is defined as the time between the onset of the left ventricular depolarization, measured as the onset of the Q wave from a standard electrocardiogram, and the ejection of blood into the aorta, measured as the onset of the B wave from an impedance cardiograph (Berntson, Lozano, Chen & Cacioppo, 2004). Shorter PEP indicates greater contractility and thus faster blood flow, and reflects greater sympathetic influence (Berntson, Lozano, Chen, & Cacioppo, 2004). Although it is important for mobilizing resources and mounting active responses to threats and challenges, the SNS is costly to activate and maintain in terms of its metabolic demands and wear and tear on organs and tissues (Sapolsky, 2004). Thus, extensive activation of the SNS can have deleterious effects on adjustment (Thayer et al., 2012).

Mindfulness training may alter brain structure and function in a manner that helps to buffer against dysregulated stress reactivity. For example, evidence indicates that mindfulness training and meditation can (1) activate neural structures that regulate the autonomic nervous system in a way that increases opportunities for relaxation (Lazar et al., 2000), (2) reduce perceptions of psychological stress (de Vibe, Bjorndal, Tipton, Hammerstrom, & Kowalski, 2012), (3) boost immune function parameters (Davidson et al., 2003), and (4) attenuate biomarkers of inflammation (Black et al., 2012; Creswell et al., 2012). These are all indicators of a healthy psychobiological profile. Many studies with adults have begun to provide evidence supporting the beneficial effects of mindfulness-based practices on physiological adjustment. For example, Lahrer, Sasaki, and Saito (1999) observed a significant decrease in respiration rate and a significant

increase in heart rate variability associated with respiration (RSA), as well as a general increase in heart rate variability, among meditators while they were practicing. Other studies have found increased parasympathetic and reduced sympathetic nerve activity and increased overall heart rate variability while practicing meditation (Nesvold, Fagerland, Davanger et al., 2012). Delgado, Guerra, Perakakis, Nieves Vera, Reyes del Paso, & Vila (2010) examined psychological and physiological indices of emotional regulation in non-clinical high worriers after a mindfulness-based training program aimed at reducing worry. Thirty-six female university students who scored high in anxiety (on the Penn State Worry Questionnaire) were assigned to one of two intervention groups: (a) mindfulness or (b) progressive muscle relaxation plus self-instruction to postpone worrying to a specific time of the day. Both groups showed equal post-treatment improvement in the clinical and daily self-report measures. However, mindfulness participants reported better emotional meta-cognition (emotional comprehension) and showed improved indices of somatic and automatic regulation (reduced breathing pattern and increased vagal reactivity during evocation of cardiac defense). These findings suggest that mindfulness reduces chronic worry by promoting emotional and physiological regulatory mechanisms contrary to those maintaining chronic worry. Ditto, Eclache, and Goldman (2006) found that in a sample of 32 healthy young adults, participants displayed significantly greater increases in RSA while meditating than while engaging in other relaxing activities. Additionally, a significant decrease in cardiac PEP was observed while participants meditated. Taken together, these findings provide

evidence of how the body's physiological system responds to body scan meditation and other relaxing activities.

Most studies linking mindfulness training to psychobiological measures have focused on adults. There is emerging evidence suggesting similar effects in youth with other stress-response systems. For example, children experiencing traumatic stress or low socioeconomic status show elevations in cortisol and other markers of a dysregulated HPA axis (Cicchetti & Rogosch, 2001; Lupien et al., 2005; Tarullo & Gunnar, 2006), that can then persist into adulthood (Bremner et al., 2003; Tyrka et al., 2008). Thus, equipping children to manage stress early in life through mindfulness training may help them regulate psychobiological stress reactivity. However, very few studies to our knowledge have assessed parasympathetic activity in response to a mindfulness curriculum in youth, and no research exists examining the effects of mindfulness interventions on youths' sympathetic activity as marked by PEP. Very little research has documented any statistically significant changes in youths' PEP responses to tasks. This may be partially due to maturational changes in sympathetic nervous system activity given evidence from studies with both children and adults (4-31 years old) illustrating trends of stronger PEP responses with age (Quas et al., 2012; Quigley & Stifter, 2006). However, failing to observe mean-level physiological changes across a sample does not address whether there are important individual differences in physiological change. For example, Buss, Goldsmith, and Davidson (2005) did not observe significant mean reactivity in PEP, but the magnitude of children's PEP changes was associated with their changes in negative affect in two different tasks. During a stranger approach paradigm, increases in negative

affect were associated with shortening PEP (increasing sympathetic activity). In contrast, decreasing negative affect was associated with lengthening PEP (decreasing sympathetic activity) during a cognitive challenge. Given the clear theoretical and empirical links between SNS activity and the experience and regulation of emotion (e.g., Buss, Goldsmith, & Davidson, 2005), and to complement the predominant approach that uses PNS indices of emotional processes (e.g., Hastings, Kahle, & Han, 2014), I included measures of both parasympathetic and sympathetic nervous system functioning in the current dissertation study.

### ***Individual Differences in Physiological Activity***

Patterns of physiological functioning have not only been linked to developmental outcomes, but have also been found to serve as protective (and risk) factors for individuals. A growing body of research has investigated whether individual differences in ANS functioning predispose youth to be differentially sensitive to their environmental contexts. Most of this research has adopted a diathesis-stress or “dual-risk” perspective, arguing that negative environments have disproportionately negative effects on youth with exaggerated physiological responses to stress (e.g., Boyce & Ellis, 2005). Yet, an alternative perspective has emerged, differential susceptibility (Belsky, Bakermans-Kranenburg, & van Ijzendoorn, 2007; Belsky & Pluess, 2009) positing that the same factors that render youth susceptible to negative environments also render them susceptible to positive environments. Thus, both dual-risk and differential susceptibility perspectives predict that youth with certain patterns of physiological functioning will show disproportionately negative outcomes in negative environment contexts (e.g., El-

Sheikh, Keller, & Erath, 2007; Bubier, Drabick, & Breiner, 2009; El-Sheikh et al., 2009; Katz, 2007), but the differential susceptibility perspective additionally predicts that these youth will show disproportionately positive outcomes in positive environments (Belsky et al., 2007; Belsky & Pluess, 2009). Similarly, according to Boyce and Ellis' (2005; Ellis et al., 2011) biological sensitivity to context hypothesis, stress reactivity is better conceptualized as high biological sensitivity to context. Thus, youth with heightened biological sensitivity to context are viewed not only as more vulnerable to stressful, unsupportive contexts but also as having a greater capacity to benefit from positive environments.

Given that the parasympathetic nervous system serves as the active regulatory branch responsible for aiding in individuals' control of emotions and behaviors (e.g., Porges, 2009, McLaughlin, Sheridan, & Tibu, 2015), there are reasons to view this branch as especially sensitive to environmental contexts. Some research supports high basal RSA as an index of flexibility in responding to environmental input. For example, it appears that youth with high basal RSA adapt better than other youth in some contexts and have better developmental outcomes. Youth with high basal RSA may fare better than youth with low basal RSA in low-risk contexts where their physiological regulatory skills are adequate, but may not differ from youth with low basal RSA in high-risk contexts (e.g., when their ability to adapt is overwhelmed by environmental stress). There are stronger reasons to believe that low basal RSA reflects sensitivity to context. Basal RSA has been negatively related to negative emotional reactivity (Beauchaine, 2001; Kagan & Fox, 2006; Rottenberg, 2007), and temperamental negative reactivity has been

viewed by some as an indicator of susceptibility to the environment (Belsky & Pluess, 2009). Taken together, it is not entirely clear whether youth with low or high basal RSA should be presumed to be more (or less) reactive to the environment. If negative emotional reactivity is a central component of environmental reactivity (Belsky & Pluess, 2009), then one might expect youth with low basal RSA to be more sensitive and reactive to the environment. Regardless, basal RSA has been commonly examined as a moderator of environmental influence (e.g., El-Sheikh, 2005). Thus, it is informative to investigate its role in moderating youths' reactions to their environment, and in the case of the current study, youths' reactions to a web-based mindfulness intervention.

Prior work has shown how differences in initial baseline physiological activity can have strong moderating influences on intervention success. For example, one study found significant moderating effects of young children's RSA baseline on the effects of a behavioral parent-training intervention on children's disruptive behavior (Bagner, Graziano, Jaccard et al., 2012). Results indicated that low levels of baseline RSA were associated with greater improvements in child disruptive behavior following the intervention. These findings suggest that children with lower capacity for emotion regulation (i.e., low basal RSA) receive even greater treatment gains. Beauchaine, Gartner, and Hagen (2000) found that RSA, measured during an inpatient intake procedure, interacted with diagnostic status in predicting inpatient treatment response among 56 adolescent males with conduct disorder. Specifically, low basal RSA before treatment was associated with increased aggression for patients with comorbid depression but decreased aggression for patients without depression. This study suggests that low



basal RSA is associated with an improved treatment response for children and adolescents without disruptive behaviors. Taken together, these findings suggest that targeted interventions might improve treatment efficacy. Assessing biological factors such as psychophysiology that may affect treatment response can clarify why some youth do not respond adaptively to current treatment approaches; this information can be used to develop targeted interventions that are more effective (Beauchaine et al., 2005; Gunnar & Fisher, 2006).

### The Benefits of Web-Based Interventions

Contemporary psychology and psychiatry fields have adopted secularized versions of mindfulness practice as a method for encouraging self-awareness and responding adaptively to mental processes that are involved in emotional distress and maladaptive behavior (Kabat-Zinn, 1990; Bishop et al., 2004; Carmody et al., 2009). The current conceptualization for mindfulness has been successfully incorporated into a number of evidenced-based clinical interventions, including Mindfulness-based Stress Reduction exercises and courses (MBSR; Kabat-Zinn, 1990) and Mindfulness-based Cognitive Therapy (MBCT; (Segal et al., 2002). Though both these approaches involve mindfulness techniques, there are slight differences between each modality. MBSR and MBCT actively teach mindfulness meditation, but MBCT also integrates cognitive behavioral therapy techniques as part of treatment. Since the development of MBSR and MBCT, numerous other Mindfulness-based Interventions (MBIs) have been developed and hundreds of research studies have been conducted to examine the efficacy of these programs.

Although these various mindfulness-based interventions have proven to be quite effective (e.g., Chiesa & Serretti, 2011), they can be extremely time consuming. Most of the programs are based on the general framework of an 8-week program of meditation and gentle Hatha yoga training, including 26 hours of formal instruction (8 classes/2.5-h/ea.), variable amount of meditation time at home (45 min/day; averages reported of 246 min/week), plus an all-day 6-hour class during the sixth week (Carmody and Baer, 2009). Many individuals do not have the time flexibility to commit to such a demanding schedule. Thus, other methods of delivery with variations in time commitments have been presented. For example, Mindfulness meditation residential retreat programs beginning from as short as 3 days are another option for delivering intensive and well-controlled doses of mindfulness intervention (e.g., Creswell et al., 2016; Rosenberg et al., 2015). Brief mindfulness meditation interventions have also been developed, ranging from 2- to 3-week programs (Lim et al., 2015; Mrazek et al., 2013) to lab-based 3- to 4-day mindfulness interventions (Creswell et al., 2014; Zeidan et al., 2011). The interventions mentioned above describe the different types of mindfulness-based training that are currently in circulation and the general time commitments involved in each.

For this dissertation, I used a less time-consuming, easily assessable web-based mindfulness curriculum adapted for adolescents. In fact, there have been reported improvements in clinical symptoms and executive function in short-term training of specific mindfulness-based practices as short as three 20-minute sessions (Zeidan et al., 2010) and changes in white matter connectivity after only 11 hours of training (Tang et al., 2010). Thus, I argue that 45-minute sessions of mindfulness instruction, once a week

for seven weeks, should be efficacious in supporting youths' adjustment across broader developmental domains without too much disruption to their daily schedules. The current study investigated this mindfulness meditation design.

As children develop, they will inevitably encounter new challenges (e.g., social, interpersonal, academic). Failure to successfully respond to and address these challenges may result in poor adjustment and potential development of mental disorders. The global prevalence and burden of mental disorders is substantial, and delivering mental health services effectively to millions in need remains a challenge (Kazdin & Rabbitt, 2013). A major concern in mental health care remains the limited access to evidence-based treatments and the low treatment rates. For example, only a minority of individuals with anxiety disorders seek and have access to evidence-based mental health treatment (Mackenzie et al., 2012; Roberge et al., 2011). Low treatment rates are associated with the restricted availability of effective treatments (Wang et al., 2007). Web-based interventions offer solutions to these barriers in treatment seeking. Web-based learning or training is a contemporary form of distance learning that is providing new opportunities for educational institutions and their students as well as for public and private organizations and their employees. Kjeldsen, Krogsdal, and Gomme (2003) characterized web-based learning as any learning that uses web-based content or communication via the Internet focusing on flexibility and the demands of individual learners. Given its' ease of access, web-based interventions, not surprisingly, are gaining empirical support (Geraghty, Torres, Leykin, Perez-Stable, & Munoz, 2013).

Many of the mindfulness interventions described above have also been modified and presented online (e.g., Cavanagh, Strauss, Cicconi, Griffiths et al., 2013; Krusche, Cyhlarova, King, Williams et al., 2012). Delivering a MM curriculum via an online platform is cost-effective and easily accessible, and could be offered virtually to adolescents anywhere in the United States. The Kaiser Family Foundation reports that, on average, youth between the ages of 8 and 18 years old spend an hour a day on a computer in a non-school capacity, with 73% using computers daily (Roberts, Foehr, & Rideout, 2005). Evidence indicates that adolescents prefer receiving health information from the computer and from the web than from printed materials or other more traditional mediums (Casazza & Ciccazzo, 2007). Thus, due to the technological savviness of preadolescents and adolescents, web-based interventions are now being recommended for use with this population (Roberts, Foehr, & Rideout, 2005). Subsequently, many youth can benefit from formal education of socioemotional abilities, which mindfulness training arguably promotes. Some school districts have begun to do this (e.g., Los Angeles Unified School District, New Haven School District). Unfortunately, not all schools have the resources to provide this training, which is why I sought to explore and investigate other methods (i.e., web-based interventions) by which mindfulness can be taught. Web-based mindfulness intervention programs have a tremendous advantage in that they are inexpensive and portable and can be more easily implemented in harder to reach populations that can access the internet (e.g., youth in rural areas, youth incarcerated in the juvenile justice system).

The field has already seen success in web-based interventions aimed at decreasing alcohol consumption (e.g., Bewick, Trusler, Barkham et al., 2008), smoking (e.g., Hutton, Wilson, Apelberg et al., 2011) and substance use disorders (e.g., Copeland & Martin, 2004). Even web-based interventions with adolescents and children have seen successful results with improving eating behavior (e.g., Hamel & Robbins, 2012) and weight management (see An, Hayman, Park, Dusaj et al., 2009 for review). Web-based cognitive-behavioral therapy interventions for youth have also been empirically tested, with many studies showing promising initial evidence for its success (e.g., decreasing chronic pain; Palermo, Wilson, Peters, Lewandowski, & Somhegyi, 2009).

Relative to web-based interventions targeting pain and addiction, far fewer efforts have aimed to promote typical socio-emotional development. One exception was a web-based mindfulness intervention with adults (Gluck and Maercker, 2011), where forty-nine adults were randomized into either a 2-week treatment group ( $N = 28$ ) or a waitlist-control group ( $N = 21$ ). 26 participants completed the post-test measures. Results found that the web-based, brief mindfulness training reduced negative affect (PANAS) and perceived stress (PSQ) for individuals who participated in at least 50% of the training (for at least 6 days). Another study examined the efficacy of a web-based mindfulness meditation program with a sample of juvenile justice-involved youth. Results revealed that youth (age 19-23) scored significantly higher on interpersonal self-restraint at post-test than those in the control group (Evans-Chase, 2013). These findings provide initial support that mindfulness can be successfully taught online and has been shown to improve distress, perceived stress, and negative affect for consistent participants. Thus,

an important and appropriate next step was to empirically assess whether a web-based mindfulness intervention for typically developing youth would result in similar benefits.

### Current Study

The overarching goal of my dissertation was to examine the potential wide-ranging benefits of a web-based MM intervention on youths' socioemotional, cognitive, and physiological functioning. I leveraged a multi-modal design incorporating self-report, physiological (cardiac), and behavioral (computer tasks) measures to gain a richer understanding of the potential wide-ranging developmental benefits of this type of web-based training. Participants were adolescents between the ages of 10 and 15 years. Early adolescence is a highly transient time, commonly characterized as a period of both opportunity and risk (Eccles & Roeser, 2009; Steinberg et al., 2008). During early adolescence, the transition from elementary to secondary school occurs, which is accompanied by large developmental changes and challenges in the cognitive, biological, and social domain. Subsequently, adolescence is a sensitive developmental period where hormonal changes, brain plasticity, and increased stressors make youth vulnerable to the growing demands of their social and emotional environment (Broderick & Jennings, 2012). Given the broad adaptability of this developmental stage, adolescents represent a population that is likely to substantially benefit from mindfulness meditation training, in multiple areas of functioning (socioemotional, cognitive, and physiological). This represents an appropriate sample of youth to have received the Tools for Peace mindfulness meditation intervention.

Additionally, in order to identify mechanisms and skills that can be fostered through interventions, and have a positive influence across multiple domains of development, there is a need to move away from investigating single domains of development toward adopting a multiple-levels-of-analysis approach (Cicchetti & Blender, 2006; Curtis & Cicchetti, 2003; DeCarmen-Wiggins, 2008). Adopting this multi-level approach is important in the field of intervention research because it not only offers a way to identify a variety of biological processes that may lead youth away from risk and toward positive mental health and well-being but also can provide critical information for the design and implementation of effective interventions (Greenberg, 2006).

The current study utilized a wait-list control experimental design, in which participants were randomly assigned to either the experimental condition (the MM intervention), or the control condition. The control condition received a parallel non-mindfulness curriculum and were given the option to receive MM training halfway through the study. There were two main research aims:

(1) Evaluate whether a web-based mindfulness meditation intervention leads to changes in adolescent's socio-emotional, cognitive, and physiological functioning over time. I formed three specific hypotheses:

(1a) The decentering skills (letting go of one's thoughts and feelings) that are taught as part of MM may promote emotion regulation and social skills by enabling youth to notice and disengage from strong negative emotions, mitigating their consequences for

socio-emotional functioning. I hypothesized that **MM training would lead to socio-emotional benefits over time (improvements in compassion towards oneself and others, and better emotion regulation abilities)** compared to youth in the control condition.

(1b) One component of MM training is to provide guided instruction on how to control, focus, and regulate attention. I thus hypothesized that MM would impact youths' cognitive functioning (attention bias and inhibitory control) in positive ways, such that **MM training would promote improvements over time in attention biases and inhibitory control** (deliberate control of automatic thoughts and behaviors) compared to youth in the control condition.

(1c) MM training is also likely to have important effects on stress physiology as well as behavior. Thus, as an additional level of analysis, I examined changes in youths' resting stress physiology over the course of the study. I hypothesized that **MM training would lead to changes in resting physiology over time that would be indicative of better physiological function.** Specifically, I expected MM training to lead to higher basal levels of parasympathetic function (the calming, regulatory system), and lower basal levels of sympathetic function (the “fight or flight” stress response system) compared to youth in the control condition.

(2) Next, individual differences in physiological activity are known to have moderating influences on the success of interventions. Some work suggests that youth with low basal RSA levels, which have typically been associated with poor adjustment,



respond better to interventions based on the idea they have more room for improvement (e.g., Bagner, Graziano, Jaccard et al., 2011). However, other work suggests that youth with high basal RSA levels, typically associated with better adjustment, are more sensitive to environmental influences (e.g., Boyce & Ellis, 2005). Given the mixed findings in the literature, I had no *a priori* hypotheses about whether youth with high initial basal RSA or youth with low initial basal RSA would show improvements in response to a mindfulness intervention, and instead sought to explore this possible moderator of intervention effectiveness.

In sum, this longitudinal study assessed changes in socio-emotional functioning (e.g., compassion, emotion regulation), cognitive processes (e.g., attention, inhibitory control), and physiology (e.g., resting psychophysiology) in response to a web-based mindfulness meditation intervention. No other research has utilized psychophysiological assessments to examine the effects of mindfulness among adolescents, and previous studies have often been limited to self-report data, which can be biased. Physiological assessments of adolescents' stress responding represent an implicit measurement technique, and will help expand the focus of work in this field to be more comprehensive in examining biobehavioral processes that relate to MM.

## METHODS

### *Participants*

*A priori* power analysis using G\*Power software estimated the number of participants needed to detect moderate effect sizes for the predicted differences in

functioning between youth assigned to the intervention and control conditions (Beauchemin et al., 2008). G\*Power software enables the computation of high-precision, statistical power analyses for common inferential tests used in behavioral research (Erdfelder et al., 1996). These calculations indicated that a minimum sample of a total of 64 participants would be necessary to find a statistical difference between groups over time. G\*Power calculation was based on alpha level .05, minimum power established at .80, and a medium treatment effect size ( $f = .25$ ) based on Cohen's (1992) guidelines. To offset the impact of anticipated attrition over the course of the study, I recruited a total of 80 youth between the ages of 10 and 15 years old, along with their parents, to take part in the study.

Participants were recruited from the UCR Child Studies database, which contains contact information for families who are interested in participating in developmental psychological research. These families have been recruited over the last decade from many community events at parks, libraries, and public spaces throughout the Inland Empire area of Southern California. Additional recruitment was done via referrals from participating families, flyers posted around the University campus, and local establishments (e.g., coffee shops). Families from the database were invited to participate if they had a child who met the following inclusion criteria: (1) was between the ages of 10-15 years old (2) had no mental or learning disabilities, and (3) was a fluent English speaker.

Trained graduate students and research assistants contacted eligible families from the database and explained the curriculum and dates for the entire course. If they were

interested and available, they were scheduled to come to the lab for the first assessment. Approximately 150 participants were contacted and invited to participate in the course and the study. Eighty participants initially verbally agreed to participate and were scheduled to attend the first assessment. Of these, 63 participants attended the first in-lab assessment (Control  $N = 31$ ; MM  $N = 32$ ). The average age for participants in this sample was 12.92 years ( $SD = 1.71$ ); 30 male and 33 female participants. None reported any prior formal meditation training. Sixty returned for the second assessment (Control  $N = 30$ ; MM  $N = 30$ ), 56 returned for the third assessment (Control  $N = 29$ ; MM  $N = 27$ ), 36 returned for the fourth assessment (Control  $N = 21$ ; MM  $N = 15$ ), 40 returned for the fifth assessment (Control  $N = 22$ ; MM  $N = 18$ ), and finally 37 returned for the final assessment (Control  $N = 20$ ; MM  $N = 17$ ). Note that 36 out of the 37 participants who returned for the final assessment completed all 6 assessments. Only 1 participant of the final 37 participants missed an assessment (this was Assessment 4). Participants were compensated \$20 at each assessment, for a total of \$120 for participation in all six assessments. Adolescents self-reported race and ethnicity. The sample was composed of multiracial (50.8%), Caucasian (20.6%), Hispanic (14.3%), African American (6.3%), Asian (1.6%), or other (3.2%) participants. One participant did not provide demographic information. Descriptive statistics describing the sample are presented in Table 1. An overall description of the entire sample is provided, as well as a break-down of the sample by condition to illustrate that participants in both the experimental and control conditions were generally matched across gender, age, and ethnicity.

## *Design*

Many prior studies examining the effectiveness of a mindfulness intervention have successfully utilized wait-list control designs (e.g., Campbell, Labelle, Bacon, Faris et al., 2012). Likewise, the current study adopted a randomized wait-list control design, that included an experimental manipulation in which participants were randomly assigned to either the waitlist-control or the experimental (MM intervention) condition. Those in the experimental condition received the Tools for Peace “Stop, Breathe, and Think” mindfulness meditation intervention taught by highly experienced counselors delivered virtually using an interactive, online platform (i.e., CANVAS Learning Management System). Those in the control condition first participated in a matched online curriculum that omitted MM, in which they learned about the seven continents, delivered by graduate students at UCR. Then, they were given the option to participate in the mindfulness intervention after they completed the control curriculum (seven weeks).

The waitlist control design serves two purposes. First, it provides an untreated comparison for the active experimental condition to determine if the intervention had an effect. With the waitlist control condition serving as a comparison, I can isolate the independent variable (i.e., receipt of the mindfulness meditation intervention) and examine the impact it had on various outcomes. It is important to have the control condition participate in an active course that parallels the mindfulness curriculum except for the mindfulness component to control for other aspects of participating in a web-based curriculum that might drive differences between the conditions (e.g., instructor attention; peer relations). Second, for ethical reasons, it allows the wait-listed participants

an opportunity to participate in the intervention at a later time. This wait-list control design also allowed me to examine the long-term effects of MM among treatment youth who began their training at week one (I followed them for the remainder of the 14-week course) while ensuring that all participants eventually had the option to receive MM training.

### ***Procedure***

The current study involved an at-home/online component and an on-campus/in-lab component. Youth participated in an online course at home in their own time for about 45 minutes each week for 14 weeks, and during that time, they attended six in-lab assessments where they completed a battery of self-report questionnaires, computer tasks, and provided physiological data. I will describe each component in more detail in the following two sections: (1) In-lab assessments (2) Online Course Participation. In the first section, I will describe the timing of the in-lab assessments and the specific tasks youth completed at each one. In the second section, I will describe the at-home procedures, including the online material that comprised the experimental and control curricula. All procedures and materials of the current study were approved by the University of California, Riverside Human Research Review Board (HRRB) before data collection began (HS #17-181).

### ***In-lab Assessments***

Youth participated in five in-lab assessments, spaced out over 14 weeks, followed by a sixth in-lab assessment (reunion) two months later. Time 1 (baseline) took place

prior to the start of the online mindfulness training (April 5-8, 2018). Online classes began on April 9, 2018. The next four assessments were spaced out every 3-4 weeks (Assessment 2: 5/3-5/6; Assessment 3: 6/2-6/3; Assessment 4: 6/23-6/24; Assessment 5: 7/21-7/22). The final sixth assessment (the reunion) was held two months after the 5<sup>th</sup> assessment (9/22-9/23). Halfway through the study, the youth who were learning the control curriculum switched to learning the MM curriculum, making it so all participants had the option to engage with MM training for at least 7 weeks. Timing of the assessments relative to the course timeline are presented in Figure 1 for youth in the experimental condition and Figure 2 for youth in the control condition.

In-lab assessments were scheduled and run across the span of an entire weekend. One-hour time slots for individual participants were scheduled at 60-minute intervals from 8am to 8pm, with 3-5 youth scheduled within each time slot. Data collection took place in two large computer labs (labeled, “Youth Testing Room”, “Parent Room”) and an adjacent conference room (“Physio Acquisition Room”). Both computer labs had individual computers that were separated by tri-fold cardboard dividers to ensure privacy for each participant. One room was used for data collection with youth (i.e., Youth Testing Room). Three to four research assistants were present at all times in the Youth Testing Room. The other room was used as a space for parents to relax and wait for their child to finish assessment procedures (i.e., Parent Room). At least one research assistant was present in the Parent Room to answer any questions parents had while their children were completing the assessment. The private adjacent conference room was used for physiological data collection (Physio Acquisition Room). Two research assistants were

always present in the “Physio Acquisition Room,” so that no research assistant was ever alone with a child during the psychophysiological portion of the data collection.

Participants were instructed to first visit the Information booth on UC Riverside campus to receive their parking permit. Directional arrow signs labeled “Mindfulness Meditation Study” were provided from the UC Riverside parking facilities to direct participants to the Information booth from the nearby major cross streets. Attendants working at the Information booth provided them with a map and driving instructions to the Psychology building. Signs were also displayed guiding participants from the Psychology parking lot to the lobby (first floor) of the Psychology building, where research assistants were waiting to greet them. Participants were then brought to the Check-In tables, where I or my trained research assistants consented the parents and assented the youth. To check in, parents read and signed a consent form and youth verbally assented and completed a written assent form. Note that youth were verbally reassented at each assessment and were reminded each time that participation was completely voluntary and they could choose not to participate (or to skip any of the procedures) if they wished. Families were invited to ask questions about anything they wished during the consent process. After informed consent procedures, parents were asked to wait in the Parent Room and youth were brought to one of the two main testing rooms. Youth first completed two computer-based tasks: the Dot probe and the Go-No-Go. Then, they were instructed to complete the self-report questionnaires using Qualtrics, an online survey-delivery platform. Detailed explanations of these tasks and questionnaires are described below, in the measures section. After completion of the

computer tasks and self-report questionnaires, youth were asked to wait in the lobby (supervised by a trained research assistant) until it was their turn to complete the physiology acquisition segment of the study in the “Physio Acquisition Room”. When time, they were escorted into the room for physio testing. The schedule of the in-lab assessments is illustrated in Figure 3.

*Physiological data acquisition.* Youths’ resting psychophysiology was non-invasively assessed for 5 minutes. ECG and ICG were collected locally using an ambulatory impedance cardiograph (MindWare Technologies, Westerville, OH, USA) and MindWare Wi-Fi ACQ Version 3.0.10 acquisition software. Data were collected via self-adhesive spot electrodes placed on youths’ rib cage. Two experimenters (at least one of whom was female) were present at all times, and used a cartoon diagram to help explain where on the body (i.e., the front and back of the torso) seven sticky self-adhesive electrodes were to be placed. The experimenters explained that youth would wear the sticky sensors on their bodies so that the experimenters could listen to their hearts during the study. Seven disposable pre-gelled electrodes were placed on youths’ torsos in ECG and ICG configuration. Three electrodes were placed on the distal right collarbone, lower left rib, and lower right rib to acquire electrocardiograph (ECG) signal. Four additional electrodes were placed to derive impedance data. Two voltage electrodes were placed below the suprasternal notch and xiphoid process, and two current electrodes were placed on the back with one 3 to 4 cm above and one 3 to 4 cm below the voltage electrodes (e.g., Musser, Backs, Schmitt et al., 2011; Shih, Quinones-Camacho, Karan, & Davis, 2018). Once electrodes were attached and youth acclimated to wearing the sensors,



physiological recording began for the resting baseline measure. If youth preferred to put the electrodes on themselves, they were given the cartoon diagram of electrode placement, and were left alone in the room to place the electrodes on their own torsos privately. Once the electrodes were placed correctly (by either the experimenter or youth independently—this was checked by the experimenter before beginning the data acquisition if youth opted to place electrodes on themselves), and the signals were screened, physiological data was collected for 5 minutes while youth sat quietly. This provided a resting (basal) measure of youths’ cardiac function. After 5 minutes, experimenters helped remove the electrodes. If youth preferred to remove the electrodes on their own, experimenters briefly left them alone in the room to give them privacy. After the electrodes were successfully removed, youth were reunited with their parent in the “Parent Room” and debriefed together.

### ***At-Home Class Participation***

During the first assessment, youth were each given a login and password to assess CANVAS (e.g., MindfulnessApple@gmail.com). The University of California, Office of the President supported the administration of the study via CANVAS. CANVAS is a popular, open-source learning management system (LMS) that allows students to participate in online courses and remote/distance learning. Youth were asked to log in to their CANVAS account once a week to complete that week’s lesson. Each lesson consisted of discussion questions, journaling, and watching videos, and was approximately 45 minutes in length. New content was made available each week. When youth logged in, they first saw a landing page with direct links to relevant course pages

(e.g., Week 1: What is Peace?; Week 2: Reflective vs. Reactive). Youth could navigate through the virtual pages, lessons, quizzes, and discussions at their own pace, and could review content on previous pages as much as they liked. Screenshots of the primary course site pages are presented in Appendix A.

Each participant was assigned a “teaching assistant” (TA; these were undergraduate research assistants). TAs were the primary contact for any questions or comments either youth or parents had during the week. TAs also sent weekly reminders via text messages (up to 3 reminders per week) encouraging youth to log in to the site and complete the week’s material on time. The reminders were given (verbatim) as follows:

“Hello! This is your TA, sending you a friendly reminder to complete the online material for this week. Please complete the material by [date]. If you have any questions or concerns, please don’t hesitate to text back or give me a call.”

“Hello! This is your TA. Our records still show that you have yet to complete your weekly material for this week, please do so by [date]. If you have any questions or concerns, please don’t hesitate to text back or give me a call.”

“Hello! This is your TA, sending you your last reminder to complete the online material for this week. Please try not to fall behind. We really appreciate your participation in this study thus far! If you no longer wish to participate, please let us know and we will remove you from our contact list. If you have any other questions or concerns, please don’t hesitate to text back or give me a call.”

The mindfulness “Stop, Breathe, & Think” curriculum was developed by Tools for Peace, a 501(c)(3) organization dedicated to strengthening and supporting emotional and social intelligence as well as academic and professional success. TFP personnel have extensive experience implementing this curriculum in multiple settings (in after-school programs, in annual summer camp retreats, and in online training seminars). They have adapted their lesson plans to be suitable for this youth population by including more fun visual aids in the tasks, and changing the conceptual examples to be relevant for this sample (e.g., “Imagine you are at work, and a coworker makes you upset....” is changed to “Imagine you are at school, and a classmate makes you upset...”).

A new topic was discussed each week (listed below):

Week 1: What is Peace?

Week 2: Reflective vs. Reactive

Week 3: Emotions and the Body

Week 4: Becoming Aware of Labels

Week 5: Relax Ground and Clear

Week 6: Self-Compassion

Week 7: Kindness

Week 8: Change

Week 9: Commonality of Suffering

Week 10: Cause & Effect

Week 11: Equanimity

Week 12: Compassion

Week 13: Joy

Week 14: Interdependence & Motivation

Each week, youth completed a “check-in” about their feelings. First, they were prompted with two questions asking them to label how they felt mentally and physically with the following response options for each: “Great, Good, Meh, Poor, Rough.” Then, they were asked to report how they felt emotionally. Emotion prompts were split into 7 separate questions, each offering a set of related emotion words from which they could choose. Different emotion words were provided for them as multiple-choice responses in the following sets: “hyper, hysterical, super excited, wild”; “cheerful, happy, excited, great, proud”; “appreciative, caring, cozy, loving, peaceful”; “nervous, restless, uncomfortable, worried”; “curious, quiet, on my own, shy”; “disappointed, hurt, lonely, sad, sorry”; and “cranky, impatient, jealous, mad, mean.” Youth could select up to 3 options out of the available responses for each question (i.e., for each set of emotions). Screen shots of the check-in questions are also presented in Appendix A.

Next, youth participated a journaling exercise. They responded to questions prompting them to think about things they are grateful for in their lives (e.g., “What are three material things that you grateful for? - Example: things you use every day, like running water or your bed.”). Next, youth watched videos where a TFP instructor delivered a lesson on the weekly topic. After watching each video, youth were asked to reflect on the lesson and respond to the discussion questions relevant to the lesson. They were also allowed to view and comment on their peers' responses. About 30% of all youth engaged in active discussion with their peers. There were 2-3 short videos each

week. Each video was approximately 10 minutes long. Detailed gratitude journaling and discussion questions for each week are presented in Appendix B. Youth in the experimental condition continued with the mindfulness curriculum for 14 weeks, even after youth in the control condition switched after 7 weeks to begin the mindfulness curriculum.

Youth in the control condition learned about the 7 continents for the first seven weeks of the study. Then, they switched over to the mindfulness curriculum for the remaining 7 weeks, beginning with the topic of “What is Peace” during Week 8. Topics covered in the control course included the history, geography, food, and common activities characteristic of the continent. The material for the control curriculum was designed using information largely acquired from “Wikipedia” with facts about the seven continents. A film script for the control curriculum was created, modeled from the presentation and organizational format used in the mindfulness curriculum videos. A research assistant with acting experience, whose tone and demeanor mimicked that of the mindfulness instructor, memorized the script and served as the “face” of the videos in the control curriculum. For consistency, videos in the control curriculum were filmed against a similar white backdrop and blue couch like the background used in the mindfulness curriculum videos.

A new continent was discussed each week (listed below):

Week 1: North America

Week 2: South America

Week 3: Asia

Week 4: Africa

Week 5: Antarctica

Week 6: Europe

Week 7: Australia/Oceania

Week 8: What is Peace?

Week 9: Reflective vs. Reactive

Week 10: Emotions and the Body

Week 11: Becoming Aware of Labels

Week 12: Relax Ground and Clear

Week 13: Self-Compassion

Week 14: Kindness

The control curriculum was designed to parallel the content in the mindfulness curriculum. Like their peers in the experimental condition, youth in the control condition also completed an identical “check-in” questionnaire about their feelings, labeling how they felt physically and mentally, and identifying different emotion words. To parallel the gratitude journaling exercise completed by youth in the experimental condition, youth were prompted to complete journal entries about neutral daily activities (e.g., What did you do today? Who did you see today? What did you eat today?). The format of the videos, journaling, and discussion questions mirrored the format of the journals and discussion questions in the mindfulness curriculum (e.g., “Write three words that remind you of kindness” vs. “Write three words that remind you of North America”). If the

mindfulness curriculum included a discussion topic that contained three separate prompts, the control curriculum also included a discussion topic with three separate prompts. If the mindfulness curriculum had 2 videos one week, the control curriculum also only had 2 videos that week. The matching of the protocols between the two conditions were carefully thought out to ensure that the only differences would be the mindfulness training. Detailed journaling and discussion questions for each week are also presented in Appendix C. After the first 7 weeks, youth in the control condition switched over to the mindfulness curriculum during Week 8.

## ***Measures***

### ***Questionnaires***

Questionnaires were administered on a desktop computer in the “Youth Testing Room” using Qualtrics, an online survey software. Questionnaire items were manually entered into Qualtrics and formatted to be presentable on a computer screen. Youth accessed the survey using a Qualtrics link provided by the experimenters. Complete questionnaires are presented in Appendix D.

*Emotion Regulation Questionnaire (ERQ; Gross & John, 2003)*. The ERQ comprises 10 items assessing the typical use of the emotion regulation strategies cognitive reappraisal (6 items) and expressive suppression (4 items). Example items include “When I want to feel more *positive* emotion (such as joy or amusement), I change what I’m thinking about.” (Cognitive Reappraisal), and “I keep my emotions to myself” (Expressive Suppression). Items are rated on a 7-point Likert-type response scale.

Participants indicate their degree of agreement with items on a scale ranging from 1 (strongly disagree) to 7 (strongly agree). Scores for each of the subscales are calculated by taking the mean of the items on the subscales. Higher scores indicate greater use of the corresponding emotion regulation strategy. In the current sample, alphas for the two scales were 0.86 (Reappraisal) and 0.64 (Suppression). Both scales were used in the current project, with reappraisal viewed as being more putatively adaptive and suppression as putatively less adaptive.

*Difficulty in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004).* The DERS is a 36-item self-report measure that comprehensively assesses individuals' emotion regulation problems across six domains, including (a) lack of emotional awareness (*Awareness*, "I am attentive to my feelings"); (b) lack of emotional clarity (*Clarity*; "I have difficulty making sense out of my feelings"); (c) nonacceptance of negative emotions (*Nonacceptance*; "When I'm upset, I become angry at myself for feeling that way"); (d) limited access to emotion regulation strategies perceived to be effective (*Strategies*; "When I'm upset, I believe there is nothing I can do to feel better"); (e) difficulties controlling impulsive behavior when experiencing negative emotions (*Impulse*; "When I'm upset, I become out of control"); (f) inability to engage in goal-directed behavior when experiencing negative emotions (*Goals*; "When I'm upset, I have difficulty getting work done"). Items are rated on a 5-point Likert scale ranging from 1 (almost never) to 5 (almost always). The measure is scored such that higher scores reflect greater dysregulation.



Several factor analytic studies have provided support for the original six-factor model as an adequate fit in a variety of populations, including adolescents (Weinberg and Klonsky, 2009; Neumann et al., 2010). Gratz and Roemer (2004) found that the instrument showed excellent test-retest reliability. In the current sample, alphas for the six subscales were 0.86 (Nonacceptance); 0.86 (Goals); 0.87 (Impulse); 0.82 (Awareness); 0.91 (Strategies); 0.71 (Clarity); 0.94 (Total). All subscales showed excellent test-retest reliability, except “Clarity,” which only showed moderate consistency. I had no *a priori* hypotheses about the DERS subscales, so I used the total scale (sum of all the items) for analyses.

*Self-Compassion Scale (SCS; Neff, 2003)*. The Self-compassion Scale assesses the positive and negative aspects of the three main components of self-compassion: self-kindness vs. self-judgement; common humanity vs. isolation; mindfulness vs. over-identification. The three main components are divided into six different subscales. The questionnaire consists of 26 items, with responses given on a 5-point scale ranging from 1 (almost never) to 5 (almost always). To get a total self-compassion score, an average of all the items is calculated. Example of items are “I try to be understanding and patient toward aspects of my personality I don’t like” (Self-Kindness), “I’m disapproving and judgmental about my own flaws and inadequacies” (Self-Judgment), “I try to see my failings as part of the human condition” (Common-Humanity), “When I think about my inadequacies, it tends to make me feel more separate and cut off from the rest of the world” (Isolation), “When something upsets me I try to keep my emotions in balance” (Mindfulness), and “When I’m feeling down, I end to obsess and fixate on everything

that's wrong (over-identification). In the current sample, alphas for the six subscales were 0.79 (Kindness); 0.86 (Judgment); 0.82 (Common Humanity); 0.79 (Isolation); 0.79 (Mindfulness); 0.65 (Over-Identified); and 0.90 (Total). All subscales showed strong to moderate test-retest reliability, except "Over-Identified" which only showed moderate consistency.

*Compassion for Others Scale (COS; Pommier, 2011).* The Compassion for Others Scale consists of 24 items subdivided into 6 separate subscales (designed to parallel the scales in Neff's Self-Compassion Questionnaire): (1) Kindness, (2) Indifference, (3) Common Humanity, (4) Separation, (5) Mindfulness, and (6) Disengagement. This scale was adapted from Neff's (2003) model of self-compassion representing positively and negatively worded items of the three components proposed to entail compassion. Example items include: "I like to be there for others in times of difficulty" (Kindness), "When others are feeling troubled, I usually let someone else attend to them" (Indifference), "Suffering is just a part of the common human experience" (Common Humanity), "I can't really connect with other people when they're suffering" (Separation), "I tend to listen patiently when people tell me their problems" (Mindfulness), and "I don't think much about the concern of others" (Disengagement). Responses were given on a 5-point Likert scale ranging from 1 (almost never) to 5 (almost always). In the current sample, alphas for the six subscales were 0.81 (Kindness); 0.71 (Indifference); 0.83 (Common Humanity); 0.66 (Separation); 0.76 (Mindfulness); 0.67 (Disengagement); and 0.88 (Total). A total compassion towards others score was calculated by averaging all the items together (Indifference, separation, and

disengagement items are reverse-scored). Including individual scales in analyses provides insight to what specific compassionate components might be more targeted and changing in response to the current assessed intervention. All subscales showed good test-retest reliability in this sample, except Indifference, Mindfulness,” and “Disengagement,” which only showed moderate consistency.

### ***Dot Probe (Attention Bias) Task***

The dot-probe task was run on a Dell computer, with software programmed using E-prime. It consisted of 240 experimental trials randomly presented in 2 blocks of 120 trials. The computer-based dot probe task was designed to assess bias to preferentially attend to threatening information. Each trial began with the presentation of a central fixation cross for 500 ms followed by a pair of faces that were presented vertically for 500 ms. The faces would disappear, and then a visual probe appears (< or >) in place of one of the faces. The participant was instructed to indicate the direction the arrow is pointing (< symbolizes left) and (> symbolizes right) as fast as possible. There were two different combinations of faces: Angry-Neutral (159 trials) and Neutral-Neutral (81 trials). Ten different actors (5 male) were used from the NimStim face stimulus set (Tottenham et al., 2009). Sequence of events are presented in Figure 4. Congruent trials were those in which the probe (i.e., the cross) replaced the affective face (i.e., angry face). Incongruent trials were those in which the probe (i.e., the cross) replaced the neutral face. Response accuracy and reaction times were recorded for each trial.

Attention bias scores were calculated as in previous dot-probe studies (O'Toole & Dennis, 2012; Perez-Edgar et al., 2011), which involves subtracting the mean reaction time on trials where the angry emotion face and probe appeared on the same side of the screen (congruent trials) from the mean reaction time on trials where the angry emotion face and probe appeared on the opposite side of the screen (incongruent trials) for each participant. Positive values indicate a bias towards threat whereas negative values indicate bias away from threat. The whole case was excluded if the participant failed to answer or incorrectly answered at least 60% of the items. The sequence of events is presented in Figure 4.

### ***Go/No Go Inhibitory Control Task***

This computer-based task was programmed using E-prime, designed to examine inhibitory control abilities (Durston et al., 2002; Durston, Mulder, Casey, Ziermans, & van Engeland, 2006). In this task, participants are presented with different Pokémon characters on the computer screen and are instructed to press the space bar as fast as they can when the target images appear (e.g., in order to “catch the Pokemon”). Each trial began with the presentation of a Pokeball for 3500 ms followed by a picture of a Pokemon displayed for 500 ms. The participant is instructed to “catch the Pokemon” by pressing the spacebar as quickly as they can (Go Trials). On some trials, participants must instead inhibit their behavioral response of pressing the space bar when a non-target image (i.e., the cat Meowth) is displayed (No-Go Trials). Response accuracy and reaction times were recorded for each trial. The task consisted of a practice trial, containing 1 block of 16 trials, and experimental trials randomly presented in 3 blocks of 57 trials. To

prevent youth from learning a predesignated pattern to the Go and No-Go trials, trials in the task were presented in a pseudorandomized order in which the number of consecutive Go trials preceding a No-Go trial varied from one to five. Consistent with previous research (e.g., Durston et al., 2002), false positives and false alarms were calculated using response accuracy, where false positives are scored for every time a participant pressed “Go” on a “No-Go” trial and false alarms were scored every time a participant pressed “No-Go” on a “Go” trial. Given our interest in measuring inhibitory control, only false positives were used for analyses, with higher values indicating poorer inhibitory control abilities (more incorrect responses), and lower values indicating better inhibitory control (fewer incorrect responses). An illustration of the sequence of events for this task is presented in Figure 5.

### ***Cardiac Physiology Scoring - RSA and PEP***

The ECG data were processed off-line using a multi-pass algorithm designed to detect R-waves in MindWare Wi-Fi HRV 3.2 software (Mindware Technologies, Columbus OH). Heart rate was quantified from ECG as the number of R-R intervals per minute. Respiratory sinus arrhythmia (RSA) was used as a measure of parasympathetic activity. RSA was calculated in 30-s epochs and integrated over the frequency band for respiration set at .15 to .80Hz (Johnson et al., 2017). This relatively conservative high frequency range was selected to bridge recommendations for HF band-pass ranges used in early childhood (.24 to 1.04Hz; Bar-Haim, Marshall, & Fox, 2000) and adulthood (.12 to .40Hz; Porges, 1986). Adjusting the HF parameters to fall between the ranges used in early childhood and adulthood is an approach that has been previously used in other

studies with wide age ranges (e.g., Porges et al., 2013). Each 30-s epoch was visually inspected for errors (most often these were missed R-waves or peaks misidentified as R-waves), which were manually corrected by trained researchers as needed. Research assistants achieved RSA values for each epoch of data within 0.1 of the master coder's (my) values before they were considered reliable (Buss, Davis, & Kiel, 2011; Davis, Parsafar, Quinones-Camacho, & Shih, 2017).

Pre-ejection period (PEP) was derived from ECG and ICG, and impedance data was ensemble averaged within 30-second epochs, and each waveform was verified or edited prior to analyses. Data was coded offline using MindWare Impedance Cardiography V. 3.2 (ANS Suites; Mindware, Westerville, OH). PEP is qualified as the time interval in milliseconds from the onset of the Q-wave to the B point of the  $dZ/dt$  wave, using the method outlined by Berntson and colleagues (2004). The Q-onset in the ECG is placed using a validated automated scoring algorithm. Artifacts were visually inspected to ensure accurate placement and adjusted if needed.

## RESULTS

### *Data Analysis Overview*

Analyses were conducted using the Statistical Package for Social Sciences (SPSS) software, Version 24, produced by International Business Machines Corporation (IBM). I tested 21 dependent variables, in line with hypotheses. The results are organized into five sections. First, descriptive information about conditions and assessments is presented. Second, correlational analyses evaluating the relations among various outcomes for both

conditions across assessments are described. These correlations identify which outcome variables are related to one another within assessment and across assessments (time), providing insight into related constructs. In the third section, I present analyses to address my first hypothesis and assess whether there would be improvements in various domains of adjustment (socio-emotional, cognitive, physiological) for those in the experimental condition compared to those in the control condition. Multiple mixed repeated measure ANOVAs were conducted to assess within- and between- subject main effects, and, more importantly, for any interactions between condition and time. Results for each domain are subsequently labeled within this section. The fourth set of analyses were conducted to examine the second hypothesis, that youths' initial physiological regulation would moderate the effects of the mindfulness intervention on various adjustment variables. Multiple repeated measure ANOVAs were conducted to assess for interactions between condition, physiology, and time. Again, results for each domain are subsequently labeled within this section.

### **Descriptive Statistics**

Data from the first three assessments were partially missing for 13 participants, due to incomplete items on the questionnaires, as well as attrition. Missing data were multiply imputed using the expectation method (EM) algorithm in SPSS. This approach is superior to listwise deletion, mean substitution, or multiple regression techniques for handling missing data (Musil, Warner, Yobas, & Jones, 2002). Twenty imputations were generated, and the pooled estimates were used in analyses.

Due to heavy attrition during the last three assessments and a seeming lack of interest from most participants once summer began (before assessment 4), only the first three assessments were used for analyses. The third assessment indicates the point where the control condition switched over to the mindfulness curriculum (refer to Figure 2 for timeline of curriculum and in-lab assessments). Thus, using data from only the first three time points still allowed me to answer my primary research questions, while maintaining that the data were not compromised due to youths' lack of interest. Descriptive statistics for main variables for the first three assessments are presented in Table 2. Independent samples t-tests were conducted on all variables during time 1 to assess for any significant differences at baseline between youth in the control condition and youth in the experimental condition. As expected (because of random assignment to condition), there were no significant differences between those in the control condition and those in the experimental condition at baseline for any variable.

### ***Correlational Analyses***

Next, I ran correlations to describe the relations between age, gender, and the main dependent variables within each assessment, and across assessments using Pearson's point biserial correlations. Outcome variables are grouped by domains and related constructs. Table 3 presents correlations between measures of emotion regulation strategies and difficulties. Gender was correlated with *Total DERS* at Time 1 ( $r = 0.34, p = 0.006$ ) and Time 2 ( $r = 0.31, p = 0.01$ ), such that girls reported more difficulty with emotion regulation than boys. Youths' self-reported *use of Reappraisal* was negatively correlated with *total DERS* within assessment: Time 1 ( $r = -0.36, p = 0.004$ ), Time 2 ( $r =$



-0.35,  $p = 0.005$ ), and Time 3 ( $r = -0.55$ ,  $p = 0.0001$ ), such that the more reappraisal they reported using, the less they reported difficulty with emotion regulation.

Table 4a-c presents correlations between age, gender, and *Compassion for Others* subscales. Age was positively correlated with Mindfulness at Time 3 ( $r = 0.26$ ,  $p = 0.05$ ), such that older youth reported more mindfulness. Gender was not correlated with any of the subscales in the *Compassion for Others* measure.

Table 5a-c presents correlations between age, gender, and self-compassion subscales. Age was correlated with *Self-Judgement* at Time 1 ( $r = 0.26$ ,  $p = 0.04$ ). Gender was also correlated with *Self-Judgement* ( $r > 0.26$ ,  $p < 0.04$ ), *Self-Isolation* ( $r > 0.25$ ,  $p < 0.002$ ), and *Self-Over-Identified* ( $r > 0.28$ ,  $p < 0.03$ ) at all three time points, such that girls reported more self-judgement, self-isolation, and being more over-identified than boys. Gender was also negatively correlated with *Total Self-Compassion* at Time 1 ( $r = -0.34$ ,  $p = 0.006$ ), such that girls reported less self-compassion.

Table 6 presents correlations between age, gender, cognitive measures and physiological measures. Age was negatively correlated with inhibitory control at Time 1 ( $r = -0.33$ ,  $p = 0.01$ ), Time 2 ( $r = -0.45$ ,  $p = 0.0001$ ), and Time 3 ( $r = -0.31$ ,  $p = 0.02$ ). Age was also negatively correlated with basal RSA at Time 1 ( $r = -0.26$ ,  $p = 0.04$ ), and positively correlated with basal PEP at Time 1 ( $r = 0.56$ ,  $p = 0.0001$ ), Time 2 ( $r = 0.42$ ,  $p = 0.001$ ), and Time 3 ( $r = 0.50$ ,  $p = 0.0001$ ), indicating lessened parasympathetic and sympathetic arousal with increasing age. Gender was positively correlated with attention bias only at Time 3 ( $r = 0.25$ ,  $p = 0.05$ ), and with basal PEP at Time 3 ( $r = 0.27$ ,  $p =$

0.04). Basal RSA at Time 2 was positively correlated with inhibitory control at Time 2 ( $r = 0.35, p = 0.005$ ), such that more parasympathetic dominance at rest was related with better inhibitory control. Basal PEP at Time 1 was negatively correlated with inhibitory control at Time 2 ( $r = -0.32, p = 0.01$ ), such that less sympathetic dominance at rest was related with better inhibitory control abilities. Basal PEP at Time 2 was negatively correlated with inhibitory control at Time 2 ( $r = -0.29, p = 0.02$ ); and basal PEP at Time 3 was also negatively correlated with inhibitory control at Time 3 ( $r = -0.28, p = 0.03$ ).

***RQ1: Does a web-based mindfulness meditation intervention lead to changes in adolescents' socio-emotional, cognitive, and physiological functioning over time?***

My first research question investigated whether there would be significant differences between youth who received online mindfulness training and youth who received a parallel control curriculum across different developmental domains of functioning (e.g., socio-emotional, cognitive, physiological). Multiple 2x3 mixed repeated measure ANOVAs were conducted to identify any interaction effects between time and condition. For all models, time (Time 1, Time 2, Time 3) was entered as a within-subjects factor, and condition (control, experimental) was entered as a between-subjects factor. Significant main effects of condition would indicate differences between youth in the control condition compared to those in the experimental condition, collapsing across time. Significant interaction effects would indicate whether there were any changes across time between youth in the control condition compared to youth in the experimental condition. Age and gender were included as covariates in the models. The current study included a large age range (10-15 years of age) spanning from late

childhood to middle adolescence. Thus, it was important to include age as a covariate, considering age is a proxy for many developmental milestones that should be accounted for when examining the success of an intervention (e.g., cognition, social competency). Additionally, it is also important to include gender as a covariate, as gender was significantly correlated with many of the adjustment outcomes, suggesting that the variability within dependent variables might be partially due to gender. Additional independent and paired sample t-tests were conducted as needed to probe simple effects. The analyses for this research question are organized by sub-main hypotheses assessing changes in socioemotional, cognitive, and physiological functioning separately. Socioemotional outcomes include youths' compassion for others and themselves (i.e. *Compassion for Others, Self-Compassion*) and emotion regulation strategies and difficulties (i.e., *ERQ, DERS*). Cognitive outcomes include attention bias and inhibitory control measures. Physiological outcomes are resting RSA and PEP as measures of parasympathetic activity and sympathetic activity, respectively.

#### *RQ1a: Socioemotional Functioning*

Mindfulness training focuses on improving emotion regulation and increasing compassion. Thus, the current study looked at how a web-based mindfulness intervention might influence changes across these various socio-emotional domains using the *ERQ, DERS, COS, and SCS* questionnaires. There were no significant results with the *ERQ, DERS, or SCS* measures. There were significant results with the *kindness* and *separation* subscales of the *COS* measure. Coefficients for significant models are presented and described below. Table 7 presents coefficients for all models predicting measures of

emotion regulation strategies and difficulties (i.e., *ERQ*, *DEERS*). Table 8 presents coefficients for all models predicting *Compassion for Others* subscales. Table 9 presents coefficients for all models predicting *Self-Compassion* subscales.

#### *Compassion for Others – Kindness*

The sphericity assumption was met ( $p = 0.11$ ), so no corrections were needed. Neither age,  $F(1, 56) = 0.10, p = 0.75, \eta^2 = 0.002$ ; nor gender,  $F(1, 56) = 2.32; p = 0.13; \eta^2 = 0.04$ , were significant covariates. There was not a main effect of time;  $F(2, 112) = 0.70; p = 0.50; \eta^2 = 0.01$ , or main effect of condition;  $F(1, 56) = 0.59; p = 0.45; \eta^2 = 0.01$ . However, results revealed a significant interaction between time and condition;  $F(2, 112) = 3.11; p = 0.05; \eta^2 = 0.05$ , indicating that there was a significant difference in youths' self-reported kindness for others over time, as a function of condition assignment.

I probed this interaction in two ways. First, I used independent samples t-tests to examine condition-based differences in youths' self-reported *kindness for others* at each time point separately. No differences between the conditions emerged at time one ( $t[61] = 1.57, p = 0.12$ ), time two ( $t[61] = -0.85, p = 0.40$ ) or time three ( $t[61] = 0.54, p = 0.59$ ). Next, I used paired-samples t-tests to examine differences in self-reported *kindness for others* at consecutive time points (i.e., between time 1 and time 2; between time 2 and time 3) for each condition separately. There was a significant difference in self-reported kindness towards others from time 2 ( $M = 4.00, SD = 0.86$ ) to time 3 ( $M = 3.69, SD = 0.78$ ) for those in the experimental condition;  $t(31) = 2.54, p = 0.02$ , such that youth reported less *kindness for others* during time 3 compared to time 2. The described patterns are illustrated in Figure 6.

### *Compassion for Others – Separation*

The sphericity assumption was met ( $p = 0.78$ ), so no corrections were needed. Neither age,  $F(1, 56) = 0.17, p = 0.68, \eta^2 = 0.003$ ; nor gender,  $F(1, 56) = 0.55; p = 0.46; \eta^2 = 0.01$ , were significant covariates. There was no significant main effect of time;  $F(2, 112) = 1.52; p = 0.22; \eta^2 = 0.03$ , or condition;  $F(1, 56) = 0.77; p = 0.39; \eta^2 = 0.01$ , indicating that there were no significant differences in youths' self-report of *separation from others* across time or between groups. However, there was a significant interaction between time and condition;  $F(2, 112) = 3.18; p = 0.05; \eta^2 = 0.05$ , indicating that there was a significant difference in youths' self-reported *separation from others* between conditions as a function of time.

Independent samples t-tests were carried out to test for any differences in youths' self-reported *separation from others* in the control condition compared to the experimental condition for each assessment separately. There were no significant differences in youths' self-reported *separation from others* between those in the control condition compared to those in the experimental condition during time one ( $t[61] = 1.02, p = 0.31$ ) or three ( $t[61] = -1.56, p = 0.12$ ). However, there were significant differences during time 2 ( $t[61] = -2.06, p = 0.04$ ), where those in the experimental condition ( $M = 2.30, SD = 0.77$ ) showed significantly more separation from others compared to those in the control condition ( $M = 1.92, SD = 0.71$ ). Paired samples t-tests were carried out to test for differences between consecutive time points from time 1 to time 2, and from time 2 to time 3 for each condition separately (by splitting the file by condition). There was a significant difference in self-reported *separation from others* between time 1 ( $M = 2.47,$

$SD = 0.90$ ) and time 2 ( $M = 1.92, SD = 0.71$ ) for those in the control condition;  $t(30) = 3.33, p = 0.002$ , where youth reported less *separation from others* during time 2 compared to time 1. There was no significant difference between time 1 ( $M = 2.25, SD = 0.79$ ) and time 2 ( $M = 2.30, SD = 0.77$ ) for those in the experimental condition;  $t(31) = -0.29, p = 0.78$ . There was also no significant differences between time 2 and time 3 for those in the control condition ( $t[30] = -0.56, p = 0.58$ ; time 2,  $M = 1.92, SD = 0.71$ ; time 3  $M = 1.99, SD = 0.11$ ) or for those in the experimental condition ( $t[31] = -0.01, p = 0.99$ ; time 2,  $M = 2.30, SD = 0.77$ ; time 3,  $M = 2.30, SD = 0.91$ ) The described findings are illustrated in Figure 7.

#### *RQ1b: Cognitive Functioning*

Attention bias and inhibitory control are two cognitive components that are related to mindfulness meditation. Thus, I wanted to examine whether there would be any changes across time for youths' attention bias and inhibitory control after participating in a mindfulness intervention. Two mixed multiple repeated measures ANOVAs were conducted to predict attention bias and inhibitory control. These models were constructed similarly to the models predicting the socio-emotional outcomes, where age and gender were entered as covariates, time was entered as the within-subjects factor, and condition was entered as the between-subjects factor. There were no significant main effects or interactions. Coefficients are presented in Table 10.

### *RQ1c: Physiological Functioning*

Given the role that the autonomic nervous system plays during mindfulness meditation, I wanted to examine whether there would be any changes across time for youths' basal parasympathetic and sympathetic activity after participating in a mindfulness intervention. Two mixed multiple repeated measures ANOVAs were conducted to predict RSA (parasympathetic) and PEP (sympathetic). Models were constructed similarly to the models predicting socio-emotional and cognitive outcomes. There were no significant main effects or interactions. Coefficients are presented in Table 11.

### *Summary of Findings: Research Question 1*

Results yielded differences in youths' compassion for others (i.e., kindness, separation) across time between those in the experimental condition compared to those in the control condition. However, the observed patterns were not in the direction that I had originally predicted. Youth in the experimental condition were not clearly improving across time. Additionally, there were no other significant differences across time in measures of physiology, attention bias, inhibitory control, self-compassion, or emotion regulation between youth in the experimental condition compared to youth in the control condition. Review and interpretation of these findings will be addressed in the discussion.

***RQ2: Does the effect of mindfulness vary as a function of youths' physiological regulation?***

My second research question was to investigate whether a web-based mindfulness intervention would be more effective for youth who were better physiologically regulated to begin with than for youth who were less physiologically regulated with regard to the current sample. To answer this question, multiple 2x2x3 mixed repeated measure ANOVAs were conducted to investigate interaction effects between time, condition, and RSA group. To characterize youths' baseline RSA, I created a dichotomous variable based on a median split of RSA values from Time 1 to divide the sample into low RSA (N = 31) vs. high RSA (N = 32) groups. (e.g., Sach, Hopper, & Lamprecht, 2004; Glenn, Lochman, Dishion, Powell et al., 2018; Connell, Hughes-Scalise, Klostermann, & Talla, 2011). Youth who were above the sample median were categorized as "better regulated," and youth who were below the sample median were categorized as "less well-regulated." Splitting my sample allowed me to generate categorical independent variables to include in the ANOVAs, as well as conceptualize the current sample into youth who had "high RSA" and were better physiological regulated than average and youth who had "low RSA" and were thus physiologically regulated less well than average (e.g., Porges, 2003).

I was interested in examining how condition, RSA group, and time worked together to predict various developmental outcomes (e.g., socioemotional, cognitive). In the following models, time was entered as the within-subjects variable, and condition and RSA group were entered as the between-subject variables. Significant interaction effects will inform whether there were any changes across time between youth in the control and



experimental conditions, and/or between youth who were better or less well physiologically regulated at the start of the study.

### *RQ2: Socioemotional Functioning*

The measures used to index socio-emotional outcomes were *ERQ* (emotion regulation strategies); *DERS* (difficulty with emotion regulation); *COS* (compassion for others), and *SCS* (self-compassion). The models predicting the *DERS* and *COS* measures were not significant. However, the models predicting *total self-compassion* from the *SCS* and *use of reappraisal* from the *ERQ* were significant. Coefficients and descriptions of the significant models are presented below in the following sections. Table 12 presents coefficients predicting emotion regulation strategies and difficulties (i.e., *ERQ*, *DERS*). Table 13 presents coefficients predicting *Compassion for Others* and related subscales. Table 14 presents coefficients predicting *Self-compassion* and related subscales.

### *Total Self-Compassion*

The model investigating *total self-compassion* as an outcome was significant. The sphericity assumption was met ( $p = 0.05$ ), so no adjustments were needed. Age was not a significant covariate;  $F(1,54) = 0.49, p = 0.49, \eta^2 = 0.009$ . Gender was a marginally significant covariate;  $F(1,54) = 3.99, p = 0.05, \eta^2 = 0.07$ . There was a marginal main effect of time;  $F(2, 108) = 3.04, p = 0.05, \eta^2 = 0.05$ . There was no main effect of condition;  $F(1,54) = 1.03, p = 0.31, \eta^2 = 0.02$ . There was a significant main effect of RSA group;  $F(1, 54) = 14.45, p = 0.001, \eta^2 = 0.21$ , and a significant 2-way interaction between condition and RSA group;  $F(1, 54) = 6.88, p = 0.01, \eta^2 = 0.11$ . There was also a significant 2-way interaction between time and RSA group;  $F(2, 108) = 4.62, p = 0.01,$

$\eta^2 = 0.08$ , and a significant three-way interaction between time, condition, and RSA group;  $F(2, 108) = 4.28, p = 0.02, \eta^2 = 0.07$ , indicating significant differences in youths' self-reported *total self-compassion* over time as a function of condition and RSA group.

Independent samples t-tests were carried out to test for any differences in youths' *total self-compassion* in the control condition compared to youth in the experimental condition for each time point separately, and for any differences in the “better regulated” group compared to the “less well-regulated” group at each time point. There were no significant differences in youths' *total self-compassion* between those in the control condition compared to those in the experimental condition in time one ( $t[61] = 0.84, p = 0.41$ ; control,  $M = 3.25, SD = 0.75$ ; experimental,  $M = 3.11, SD = 0.61$ ), time two ( $t(61) = 0.73, p = 0.47$ ; control,  $M = 3.28, SD = 0.86$ ; experimental,  $M = 3.14, SD = 0.57$ ), or time three ( $t[61] = 0.84, p = 0.41$ ; control,  $M = 3.28, SD = 0.79$ ; experimental,  $M = 3.14, SD = 0.57$ ). There were significant differences in youths' *total self-compassion* between those in the “better regulated” group compared to those in the “less well-regulated” group across all three time points: time one ( $t[61] = -3.92, p = 0.001$ ; low RSA,  $M = 2.87, SD = 0.68$ ; high RSA,  $M = 3.48, SD = 0.55$ ), time two ( $t[61] = -2.01, p = 0.05$ ; low RSA,  $M = 3.03, SD = 0.75$ ; high RSA,  $M = 3.38, SD = 0.67$ ), and time three ( $t[61] = -4.33, p = 0.001$ , low RSA,  $M = 2.88, SD = 0.59$ ; high RSA,  $M = 3.54, SD = 0.62$ ). Paired samples t-tests were carried out to test for differences in consecutive time points, from Time 1 to Time 2, and from Time 2 to Time 3 for each group (by splitting the file into four groups: by control condition and experimental condition and by better and less well-regulated groups). There were significant differences for “better regulated” youth in the

experimental condition from Time 1 to Time 2 ( $t[16] = 3.48, p = 0.003$ ) and from Time 2 to Time 3 ( $t[16] = -3.59, p = 0.002$ ). There were also significant differences for “less well-regulated” youth in the experimental condition from Time 1 to Time 2 ( $t[14] = -2.27, p = 0.04$ ) and from Time 2 to Time 3 ( $t[14] = 2.31, p = 0.04$ ). These results are illustrated in Figures 8 and 9. As shown, for youth who were categorized as “better regulated,” there was a pattern where those in the experimental condition illustrated a significant decrease from Time 1 to Time 2 and then a significant increase from Time 2 to Time 3. For youth who were categorized as “less well-regulated,” there was a pattern where those in the experimental condition started with a strong significant increase from Time 1 to Time 2, but this was followed by a significant decrease from Time 2 to Time 3.

#### *Emotion Regulation Questionnaire – Reappraisal*

The model investigating *use of reappraisal* as an outcome was significant. The sphericity assumption was met ( $P = 0.62$ ), so no adjustments were needed. Neither age;  $F(1,54) = 1.89, p = 0.18, \eta^2 = 0.03$ , nor gender;  $F(1,54) = 0.69, p = 0.41, \eta^2 = 0.01$ , were significant covariates. There was no main effect of time;  $F(2, 108) = 1.34, p = 0.27, \eta^2 = 0.02$  or condition;  $F(1,54) = 3.18, p = 0.08, \eta^2 = 0.06$ . There was a marginal main effect of RSA group;  $F(1, 54) = 3.31, p = 0.07, \eta^2 = 0.06$ , and a significant 2-way interaction between condition and RSA group;  $F(1, 54) = 4.20, p = 0.05, \eta^2 = 0.07$ . There was no significant 2-way interaction between time and condition;  $F(2, 108) = 0.71, p = 0.49, \eta^2 = 0.01$ ; or between time and RSA group;  $F(2, 108) = 0.60, p = 0.55, \eta^2 = 0.01$ . There was a significant three-way interaction between time, condition, and RSA group;  $F(2, 108) =$

3.13,  $p = 0.05$ ,  $\eta^2 = 0.06$ , indicating significant differences in youths' self-reported *use of reappraisal* over time as a function of condition and RSA group.

Independent samples t-tests were carried out to test for any differences in youths' *use of reappraisal* in the control condition compared to youth in the experimental condition for each time point separately, and for any differences in the "better regulated" group compared to the "less well-regulated" group at each time point. There were no significant differences in youths' *use of reappraisal* between those in the control condition compared to those in the experimental condition in time one ( $t[61] = 1.79$ ,  $p = 0.08$ ; control,  $M = 4.87$ ,  $SD = 1.36$ ; experimental,  $M = 4.27$ ,  $SD = 1.26$ ), time two ( $t[61] = 0.97$ ,  $p = 0.34$ ; control,  $M = 4.80$ ,  $SD = 1.67$ ; experimental,  $M = 4.44$ ,  $SD = 1.26$ ), or time three ( $t[61] = 1.48$ ,  $p = 0.14$ ; control,  $M = 4.85$ ,  $SD = 1.44$ ; experimental,  $M = 4.35$ ,  $SD = 1.19$ ). There were also no significant differences in youths' *use of reappraisal* between those in the "better regulated" group compared to those in the "less well-regulated" group across all three time points: time one ( $t[61] = -0.81$ ,  $p = 0.42$ ; low RSA,  $M = 4.43$ ,  $SD = 1.32$ ; high RSA,  $M = 4.70$ ,  $SD = 1.36$ ), time two ( $t[61] = -1.11$ ,  $p = 0.27$ ; low RSA,  $M = 4.41$ ,  $SD = 1.57$ ; high RSA,  $M = 4.82$ ,  $SD = 1.36$ ), and time three ( $t[61] = -1.30$ ,  $p = 0.20$ , low RSA,  $M = 4.37$ ,  $SD = 1.26$ ; high RSA,  $M = 4.81$ ,  $SD = 1.39$ ). Paired samples t-tests were carried out to test for differences in consecutive time points, from Time 1 to Time 2, and from Time 2 to Time 3 for each group (by splitting the file into four groups: by control condition and experimental condition and by better and less well-regulated groups). There were no significant differences for "better regulated" youth in the experimental condition from Time 1 to Time 2 ( $t[16] = 0.57$ ,  $p = 0.58$ ) and from Time 2

to Time 3 ( $t[15] = -0.29, p = 0.78$ ). There were no significant differences for “better regulated” youth in the control condition from Time 1 to Time 2, ( $t[13] = -1.15, p = 0.27$ ) and from Time 2 to Time 3 ( $t[13] = 0.48, p = 0.64$ ). There were significant differences for “less well-regulated” youth in the experimental condition from Time 1 to Time 2 ( $t[13] = -2.43, p = 0.03$ ), but no significant differences from Time 2 to Time 3 ( $t[13] = 1.52, p = 0.27$ ). There were no significant differences for “less well-regulated” youth in the control condition from Time 1 to Time 2 ( $t[14] = 1.03, p = 0.32$ ) and from Time 2 to Time 3 ( $t[14] = -0.02, p = 0.98$ ). These results are illustrated in Figures 10 and 11.

#### *RQ2: Cognitive Functioning*

The measures used to index cognitive outcomes were the dot probe (attention bias) and GNG (inhibitory control). Two mixed repeated measures ANOVAs were conducted to predict attention bias and inhibitory control, separately. Neither model produced any significant results. Coefficients are presented in Table 15.

## DISCUSSION

The two primary goals of the current study were to (1) investigate the effects of a web-based mindfulness intervention on youths’ socio-emotional, cognitive, and physiological functioning, and (2) to assess whether the effects of a mindfulness curriculum would vary as a function of individual differences in physiological regulation. Prior literature has demonstrated that engagement in mindfulness practices is beneficial for youths’ socioemotional, cognitive, and physiological adjustment (e.g., Zoogman, Goldberg, Hoyt, & Miller, 2015). The current study is one of the first to adopt a multiple-

levels-of-analysis approach towards investigating a web-based mindfulness meditation intervention on youths' adjustment in these domains. Contrary to my hypotheses, results did not reflect clear patterns of improvements across any of these domains. There was a significant difference between conditions, where youth in the experimental condition reflected changes in self-reported kindness for others and separation from others compared to youth in the control condition. However, these differences were not in the direction that I had originally predicted (i.e., youth in the experimental condition did not consistently show more kindness towards others and less separation from others). Additionally, results from my second research question showed that physiological regulation moderated the effect of condition assignment in measures of self-compassion and use of reappraisal, but again patterns were not aligned with the directional changes that I had anticipated. Explanation for these findings are discussed in the following sections.

***RQ1: Does a web-based mindfulness meditation intervention lead to changes in adolescents' socio-emotional, cognitive, and physiological functioning over time?***

First, results from the current study suggest that youth in the control condition differed in their levels of kindness for others and separation from others across time, compared to youth in the experimental condition. These findings reflected patterns in the opposite direction of what I had initially predicted, such that youth in the experimental condition did not show any improvements. These patterns were unexpected, given the extant literature advocating for the effectiveness of mindfulness interventions on youths' functioning. There are at least three ways to interpret the obtained pattern of results: (1)

Youths' participation in this mindfulness meditation curriculum did not affect socioemotional, cognitive, and physiological functioning, (2) methodological elements of the mindfulness meditation intervention design I used here could account for the lack of predicted effects, or (3) the mindfulness meditation had an iatrogenic effect.

It is possible that mindfulness meditation does not successfully elicit improvements in youths' adjustment. The field is still unsure on the efficacy of mindfulness meditation. An increasing number of meta-analyses and systematic reviews have investigated the effectiveness of mindfulness-based interventions. These reviews inconsistently report findings about the size of treatment effects for promoting kindness and compassion (e.g., Galante, Galante, Bekkers et al., 2014; Kirby, Tellegen, & Steindl, 2017), and reducing stress associated with physical illness or psychological disorders (Baer, 2003; Bohlmeijer et al., 2010, Chiesa and Serretti, 2010, Chiesa and Serretti, 2011, Cramer et al., 2012, de Vibe et al., 2012, Eberth and Sedlmeier, 2012, Fjorback et al., 2011, Grossman et al., 2004, Hofmann et al., 2010). Furthermore, a meta-analysis by Goyal, Singh, Sibinga et al., (2014) found evidence from a few studies that did not show any effects on positive affect or well-being from any meditation programs. In an article recently published in *Perspectives on Psychological Science* (Van Dam, van Vugt, & Vago, 2017), researchers caution that despite its popularity and supposed benefits, scientific data on mindfulness are still lacking. The authors argue that many studies on mindfulness and meditation are poorly designed – compromised by inconsistent definitions of what mindfulness is, and are often devoid of a suitable control group. Unfortunately, publication bias has become a major problem since journals tend to report

only empirical examinations that have been successful (e.g., Clarke, Kuosmanen, & Barry, 2015; Pennant, Loucas, Whittington et al., 2015; Reyes-Portillo, Mufson, Greenhill et al., 2014). To combat this, more public reports of null findings are needed, as consistent with key points described in the *file drawer problem* (Rosenthal, 1979). This might hold especially true in current mindfulness research, given that, historically, mindfulness as a practice and state of being has come pre-equipped with a positive expectation bias. Taken together, the evidence from these reviews and meta-analyses suggest that there is insufficient evidence to indicate that meditation programs promote reliable improvements across all domains of functioning.

Another possible explanation for the unexpected findings could be that the design of the intervention may not have effectively taught mindfulness meditation, which could account for the lack of desired effects. One of the goals of the current study was to assess the feasibility of whether mindfulness meditation could be delivered via a web-based platform for youth. It is possible that the design of the web-based intervention was not feasible and did not effectively teach mindfulness meditation or possibly might have distanced youth from others. Although there has been success using web-based mindfulness interventions with adults (e.g., Gluck and Maercker, 2011), no work to my knowledge has tested this with an adolescent population and findings from the current study suggest that this method of delivery might not be an effective way to teach mindfulness to youth.

A review by Mahoney (2010) discusses three pillars of intervention success: (1) target group, (2) process, and (3) content. The first pillar is the selection of an appropriate



target group. Adolescents were the chosen target group for the current study. Given the dramatic changes (e.g., puberty, advancements in cognitive abilities, expanded social worlds) that adolescents experience, this developmental stage is a particularly vulnerable one where prevention and intervention efforts are greatly needed to help protect against poor adjustment later in life. Some researchers have attempted to discuss why interventions that aim to influence adolescent behavior often fail. For example, Yeager and colleagues (Yeager, Dahl, & Dweck, 2018) argue that interventions for youth can become ineffective when they fail to consider adolescents' sensitivity to social status. Research shows that adolescents have a greater sensitivity to status and have shown greater reactivity to experiences that threaten their status (e.g., Gunnar, Wewerka, Fenn, Long, & Griggs, 2009). Also, adolescents may come to recognize adults' efforts to influence their behavior, unless sensitively and respectfully navigated, as an indication that they are being undermined, disrespected, or deprived of the status of a full adult. The mindfulness instructor in the current study largely relied on using stickers and post-it notes on white posters as means to list and present examples. For example, in response to the question "What is peace?," the instructor would write examples (e.g., calm, quiet) on the post-it notes to then display on the poster. It is possible that using stickers and post-it notes in the videos in attempt to deliver the lessons in an artistic and interactive way might have been construed as rudimentary, and unknowingly could have undermined adolescents' sense of status as an adult. Additionally, the examples provided by the instructor might have also been too simple and modest. Youth might not have felt sufficiently challenged, which might have also resulted in youth feeling undermined.

Research has not conclusively shown how the tone of the instructor might also influence behavior change in adolescents. It is possible that the “calm” tone, exaggerated by the instructor with the goal to model mindfulness, might have been undermining and not sufficiently engaging enough for youth. This is not to say that a “calm” tone would not be effective for in-person mindfulness interventions, but for web-based interventions where interactions are limited to the capabilities of a computer screen, a livelier tone might be required (especially a tone that communicates respect effectively with an adolescent audience). A couple of participants and their parents commented that they found the mindfulness instructor to be “too slow” and “mono-toned.” More research is needed to investigate how the tone used in web-based mindfulness interventions might be construed by youth, and whether this or other aspects of content presentation compromise the effectiveness of the lessons being taught.

Additionally, programs that require youth to risk social status to participate can be unsuccessful – even when adolescents know that the skills are useful for their long-term goals. For example, one field experiment made an SAT-prep course appear to have low status. This subsequently decreased youth sign-ups for the free course, even though students believed the course was helpful and knew that high SAT scores were critical for college admission and long-term success (Bursztyjn & Jensen, 2015). It is unclear as to how adolescents might view mindfulness meditation. It could be construed as “uncool” which subsequently would threaten their status and reputation amongst their peers. Future work should investigate youths’ appraisals of mindfulness meditation to obtain a better

understanding of whether they respect the practice and whether they find it beneficial for their well-being.

The modification of the original “Stop, Breathe, & Think” web-based curriculum for adults to suit an adolescent audience may not have been accurately calibrated for this age group. There is support for this line of reasoning in the broader mindfulness literature. The MBCT-C is an adaptation of MBCT for children. It has been tested on youth ages 8-14 years (e.g., Semple et al., 2010). Three primary modifications from MBCT were made to meet the developmental needs of youth. First, sessions focused upon sensory observation rather than reflection upon abstract or interior experience. The mindfulness curriculum in the current study utilized reflection upon abstract experiences (e.g., what does peace mean to you?) rather than sensory observation, like in the MBCT-C. This could partially have contributed to why null results were found.

Second, due to youths’ shorter attention span relative to adults, repetition was employed, length of sessions and length of breath meditation were decreased, while number of sessions and frequency of breath meditation were increased. The current mindfulness curriculum might have included too many disparate lessons (a new lesson each week). Youth could have benefited from more repetition and elaboration of less content material. Brain research reveals that repetition strengthens neural connections (e.g., Jensen, 2005). Additionally, feedback (either positive or negative) is also important for increasing the effectiveness of learning. Unfortunately, there was very limited feedback given to the participants to help elaborate on the material. It is also possible that 45 minutes for each session might have been too long, and the intervention should have

been modified to include multiple shorter sessions. In educational contexts, optimizing learning time for each subject (i.e., math, science) has been presented as one of the key measures in improving student achievement (Scheerens, 2001; Marzano, 2003). Thus, deciding on the optimal amount of time for each subject is an important task for policy makers. Likewise, the subject of mindfulness meditation interventions is no exception, and the field could benefit from deciding and investigating the optimal amount of instruction time that propels youths' interest and learning of mindfulness meditation.

Third, since youth exist within the context of their families, parents were involved in the MBCT-C treatment. Parents were trained to support changes in their children by attending an orientation before the start of the program, completing homework with their children, and providing feedback on the intervention. The current study did not include parental involvement in the mindfulness intervention, and it is possible that more improvements might have been observed had parents also participated.

Thus, an incredibly important component of an intervention study is to understand who the target group is and ensure that the design of the study and assessments align with the demands and characteristics of that group's developmental stage. Though the current study attempted to modify its curriculum to be adapted for the adolescent population, it is possible that this was not done comprehensively enough to successfully deliver mindfulness meditation.

The second pillar of intervention success relates to the delivery method or process by which the intervention content is distributed. It is easy to overlook the importance of process, and many intervention studies provide limited to no details on this construct. The

current study utilized a web-based intervention for youth. It is possible that, although web-based interventions have been found to be effective for reducing anxiety and depressive symptoms (e.g., Ye, Bapuji, Winters et al., 2014; Rice, Goodall, Hetrick, et al., 2014; Pennant, Loucas, Whittington et al., 2015), it may not be the best suited method of delivery for teaching the topic of mindfulness meditation. Mindfulness is an elusive concept to teach, and thus might require more active involved instruction in order to be taught effectively for younger populations (e.g., music, smell, touch, emotion can focus students on learning; Wilson & Horch, 2002). Unfortunately, this was limited given the constraints of a web-based medium. Prior work has evidenced success of in-person mindfulness interventions for youth, suggesting that it is possible to teach mindfulness meditation to younger populations. However, findings from the current study contribute to existing literature by offering new evidence that mindfulness meditation might not be as successful in improving youths' socio-emotional, cognitive, and physiological functioning when delivered via a web-based platform. Youth might require different mediums to sustain their interest and attention when learning about mindfulness meditation (e.g., incorporating the senses and emotions to focus the learning; Wilson & Horch, 2002). Thus, it is possible that a web-based method of delivery fails to sufficiently capture their interest to produce similar effects as prior studies with adults have seen. A review of web-based interventions (not limited to teaching mindfulness meditation) found that some studies saw no improvements in the behavior among youth when it came to seeking help from web-based services (e.g., Kauer, Mangan, & Sancu, 2014). Findings

from the current study contribute to this literature by being one of the first to evidence null results from a web-based intervention delivering mindfulness meditation.

Finally, the third pillar of intervention success is content. Content is all the components that make up the design of an intervention. The weekly lessons in the mindfulness intervention included instruction on finding inner peace, reflecting and not reacting to negative events, understanding that pain and suffering is a shared experience, treating others and oneself with kindness and compassion, and more. Given the null findings from the study, it is possible that the curriculum might have been too broad in its content to be effective. There might have been too much material to cover and not enough time for youth to internalize the lessons. Considering the topics changed each week, it is possible that additional time is needed to expand on each specific lesson in order to see an effect. For example, spending more time focusing and elaborating on self-compassion alone, might have yielded improvements in this area. A review of the literature suggests that many mindfulness-related interventions focus on one specific component at a time: kindness-based (e.g., Galante, Galante, Bekkers, & Gallacher, 2014), self-compassion (e.g., Germer & Neff, 2013); attention regulation (e.g., Felver, Tipsord, Morris et al., 2017), art-based mindfulness (e.g., Klatt, Harpster, Browne et al., 2013), or yoga-based (e.g., Mendelson & Dariotis et al., 2013). The current intervention might have been too ambitious in delivering many different mindfulness-relevant topics within a short amount of time. It could also be that the multi-content approach meant that the messages (lessons) were muddled and confusing for students. Results from the current study suggest that short-term web-based mindfulness interventions for youth

might need to simplify their content and focus on fewer topics. A better design for the current intervention could have been to only present and discuss one topic in between the in-lab assessments. For example, the current intervention could have focused exclusively on lessons of self-compassion for the first three weeks (bookended by the 1<sup>st</sup> and 2<sup>nd</sup> assessment), followed by lessons on reappraisal (bookended by the 2<sup>nd</sup> and 3<sup>rd</sup> assessment). This would have allowed me to track changes that corresponded to content of the curriculum rather than just the duration of it. Future studies investigating short-term web-based interventions could focus on a smaller subset of mindfulness (i.e., self-compassion) at a time.

A third explanation for the unexpected findings could be that participation in the current web-based mindfulness intervention yielded iatrogenic effects--negative outcomes in response to treatment. Specifically, the current study documented decreases in kindness for others and increases in separation from others for youth in the experimental condition. Iatrogenic effects in response to pharmacological studies are not uncommon (e.g., Van Emmerik, Kamphuis, Hulsbosch, & Emmelkamp, 2002), but they are less often observed (and/or less often reported) in research examining mindfulness meditation practices (Dobkin, Irving, & Amar, 2012; Shonin, Van Gordon, Griffiths, 2014). Below, I discuss possible reasons for the iatrogenic effects observed in the current study.

One explanation could be that mindfulness amplifies already existing psychopathologies or vulnerabilities. Meditation practice can be extremely psychologically challenging (Grabovac, 2015), and studies that report iatrogenic effects

have suggested that the practice of meditation may be associated with psychological (e.g., emotional stress, confusion, disorientation, and dependence on practice), psychopathological (e.g., anxiety, deliriums, and hallucinations), and physiological (e.g., pain, sensorial dysfunction) symptoms (Lustyk, Chawla, Nolan, & Marlatt, 2009). This is more likely to occur for people who have or are at risk of developing a psychological disorder. For example, people who have Posttraumatic Stress Disorder (PTSD) sometimes experience adverse effects in response to mindfulness treatments (e.g., Brewin, 2015). PTSD arises in the aftermath of a traumatic event (e.g., youth experiencing domestic violence or physical trauma). It is characterized by feelings of intense fear and helplessness, as well as engagement in avoidance and numbing behaviors (e.g., avoidance of reminders of the traumatic event, restricted range of affect; Asmundson, Stapleton, & Taylor, 2004). Because the tenets of mindfulness meditation (e.g., noticing and accepting one's feelings) are contrary to the avoidance that is characteristic of PTSD, engaging in mindfulness meditation may lead to aversive and distressing emotional experiences (e.g., flashbacks, intrusive thoughts and memories) and may put them at risk to be potentially re-traumatized. Additionally, long meditation periods are sometimes contraindicated for adults with psychiatric problems (Walsh & Roche, 1979), as they may trigger the onset of mental illness and psychosis (French, Schmid, & Ingalls, 1975). Although the current study did not utilize a clinical sample or rely on participants with PTSD diagnoses or symptoms, it is important to consider the results of prior research that shows mindfulness interventions can have adverse effects for certain individuals.



There have also been reports of negative experiences associated with practicing mindfulness in non-clinical samples. For example, a cross-sectional study on the effects of intensive and long-term meditation reported that over 60% of individuals had at least one negative effect, which ranged from increased anxiety to depression and full-blown psychosis (Shapiro, 1992). Qualitative research on mindfulness meditation shows that it may increase the awareness of difficult feelings and exacerbate psychological problems (Lomas, Cartwright, Edginton, & Ridge, 2015). Another study examined an 8-week trial of a yoga-based mindfulness intervention with fourth- and fifth-grade girls. Results showed no main effects for program participation, but reported a potentially iatrogenic effect where girls in the yoga intervention reported higher levels of perceived stress than those in the control condition (White, 2011).

Given that people rarely sit with their thoughts unprompted, it is easy to see how this practice might lead to difficult thoughts and emotions rising to the surface for some individuals, which they may or may not be equipped to deal with. The emergence of difficult emotional material from mindfulness practice may be a positive, rather than an adverse, experience on the whole, but whether it is positive or negative depends largely on the context in which these feelings and memories emerge. For example, if it occurs in a therapeutic context, it is more likely to be a positive, healing experience. If not, a positive outcome is less likely, and mindfulness practice may result in unexpected distress.

A second explanation for the unanticipated iatrogenic effects seen in this study could be that mindfulness encourages disengagement and disconnect. A core aspect of

practicing mindfulness is to attempt a withdrawal from streams of thought that have to do with current challenges (e.g., Shapiro, Carlson, Astin, & Freedman, 2006; Teasdale et al., 2002). Unfortunately, such withdrawal supports escape from thinking about difficult problems, which could inadvertently teach youth to disconnect and retreat into a meditative mindset. Such a mindset could have manifested in the decreased kindness towards others and enhanced separation from others seen in this study.

Less is known in the literature about the neutral and iatrogenic effects of mindfulness. This gap in knowledge could be explained by the lack of standardization in reporting null findings and reporting harm, and by the lack of data on the types of individuals who may not benefit from these types of practices (Lustyk, Chawla, Nolan, & Marlatt, 2009). The current study is one of the first to report and discuss these effects with a sample of youth. Results yielded for my first research question illustrated patterns of decreased kindness towards others and increased separation from others for youth in the experimental condition. I discussed three potential reasons for this unexpected pattern: (1) youths' participation in this mindfulness meditation curriculum did not affect socioemotional, cognitive, and physiological functioning, (2) methodological elements of the mindfulness meditation intervention design I used here could account for the lack of predicted effects, and (3) the mindfulness meditation had an iatrogenic effect. Taken together, these results and accompanying explanations provide further insight into the feasibility (or lack thereof) of a web-based intervention and the various ways participation in mindfulness might affect youths' lives. Future investigations, regardless of whether null results or iatrogenic effects are observed, require reporting and action.

The field needs to be more informed about potential negative (or null) effects of mindfulness interventions for us to better understand their concept and practice.

***RQ2: Does the effect of mindfulness vary as a function of youths' physiological regulation?***

My second goal was to examine the role of individual differences in youths' physiological regulation in qualifying or moderating the success of the current web-based intervention. I had no *a priori* hypotheses about whether the mindfulness intervention would be more effective for youth who were better or less well physiologically regulated. However, I did explore the potential differences in how youth responded to the web-based mindfulness intervention depending on their initial physiological regulation. Findings from the current study were mixed; differences emerged only for measures of total self-compassion and use of reappraisal between conditions, for youth who were categorized as "better regulated" compared to youth who were categorized as "less well-regulated." Despite having mixed results and having patterns which did not cleanly reflect improved self-compassion or increased use of reappraisal, these findings still support the argument that individual differences in physiological regulation contribute to how youth respond to an intervention. Understanding factors that contribute to individual differences in intervention success is essential for refining intervention protocols to meet the broad needs of all individuals and develop effective rubrics for individualizing the selection of protocols.

Findings from the current study support theories suggesting that individual differences in physiological regulation, more specifically vagal regulation indexed by

respiratory sinus arrhythmia, denotes differential sensitivity to environmental influences (Belsky, 2016; Boyce & Ellis, 2005). These theories argue that more plastic or malleable individuals are more susceptible than others to environmental influences, for better and for worse. Recent research suggests that individual differences in RSA may index differential susceptibility to environmental influences. Yet, it is still unclear whether physiological patterns of lower basal RSA or higher basal RSA would be classified as more plastic.

#### *Total Self-Compassion*

One of the most important lessons taught in the mindfulness curriculum was self-compassion. There was a whole weekly lesson dedicated to the topic (Week 6). Additionally, each week, youth in the experimental condition were instructed to list what they were thankful for and participate in gratitude training as part of the mindfulness curriculum. It is possible that the weekly practice of gratitude was subsequently training self-compassion in tandem, as the two concepts go hand in hand. Dispositional gratitude has been described as part of a life orientation toward noticing and appreciating the positive aspects of one's life and the world (Wood, Froh, & Geraghty, 2010). Self-compassion entails treating one's self with kindness and acceptance (Neff, 2003). Self-compassion arises out of gratitude of one's own experiences and characteristic traits (e.g., Zessin et al., 2015), and individuals who are more self-compassionate display higher levels of positive affect and gratitude (Breen, Kashdan, Lenser, & Finchan, 2010; Neff, Rude, & Kirkpatrick, 2007). The developmental stage of adolescence can be particularly trying, as adolescents are often consumed with self-judgment and questioning their self-

worth (Harter & Jackson, 1993; Jacobs et al., 2002). Thus, the component of self-compassion may be particularly relevant to this stage of development, where adolescents are frequently more critical of themselves. However, results from the current study yielded mixed patterns for self-compassion, where youth in the experimental condition who were “better regulated” showed a significant decrease from Time 1 to Time 2, followed by a significant increase from Time 2 to Time 3. Those in the experimental condition who were “less well-regulated” showed a significant increase from Time 1 to Time 2, followed by a significant decrease from Time 2 to Time 3. Overall, this was a negative effect, but the inconsistent pattern makes it difficult to interpret. The findings with youth who were “better regulated” are in line with prior work suggesting that youth with high basal RSA seem to adapt better than other youth in some contexts and have better developmental outcomes. Youth with high basal RSA may fare better than youth with low basal RSA in low-risk contexts, like the mindfulness intervention, where their physiological regulatory skills are adequate. Though in this case, the patterns did not reflect clean positive responses to the intervention (i.e., steady improvements in self-compassion). Nonetheless, the inconsistent pattern still evidences how high basal RSA might serve as an individual difference factor that confers biological sensitivity to context (Boyce & Ellis, 2005).

The findings also suggest that youth who were “less well-regulated” demonstrated a mixed response to the intervention, where we saw a significant rise in self-compassion from Time 1 to Time 2 and then a decline from Time 2 to Time 3. Some research suggests that lower basal RSA is related to increased negative emotional reactivity

(Beauchaine et al., 2001; Kagan & Fox, 2006), and negative reactivity has been viewed as an indicator of susceptibility to the environment (Belsky & Pluess, 2009). Findings from the current study partially support this argument. This is also in line with Belsky's (2016) differential susceptibility hypothesis and Boyce and Ellis' (2005) related notion of biological sensitivity to context. Although individuals with low baseline RSA have less optimal psychological states and outcomes (e.g., Calkins & Dedmon, 2000), these individuals may also be more responsive to positive environmental influences, such as a mindfulness intervention. For example, a study of 23 school-aged children (7-12 years old) with disruptive behavior disorders indicated that children with lower baseline HR were less likely than children with higher baseline HR to respond to a 2-week summer treatment program (Stadler et al., 2008). Another study by Bagner, Graziano, Jaccard, Sheinkopf, Vohr, & Lester (2011) found results indicating that basal RSA significantly interacted with treatment condition in predicting changes in child disruptive behavior. Specifically, low levels of baseline RSA were associated with greater improvements in child disruptive behavior following the parent-child interaction therapy intervention. Beauchaine, Gartner, and Hagen (2000) found that RSA, measured during an inpatient intake procedure, interacted with diagnostic status in predicting inpatient treatment response. Specifically, low basal RSA before treatment was associated with increased aggression for patients with comorbid depression but decreased aggression for patients without depression. This study suggests low RSA might also be an individual difference factor propelling variable responses to an intervention, which was also reflected in the findings from the current study.

### *Use of Reappraisal*

Though the topics varied by week, the instructor continually grounded the lessons in positivity and encouraged viewing and approaching negative emotions and situations in an open and accepting manner. Though not explicitly taught, there was an underlying message promoting reappraisal that flowed throughout the course. For example, youth were taught to tackle negative emotions by remembering activities that bring them inner peace, which allows them to reframe the negative emotion (week 1). Youth were also taught not to be reactive but rather reframe negative events by reflecting and practicing acceptance (week 2). Thus, not surprisingly, results yielded changes in youths' use of reappraisal specifically, but these changes varied as a function of youths' physiological regulation. Like the patterns observed with self-compassion, results were mixed in terms of youths' use of reappraisal in response to the mindfulness intervention. For youth who were "less well-regulated" in the experimental condition, there was a significant increase in their use of reappraisal from Time 1 to Time 2, followed by a (nonsignificant) decrease in use from Time 2 to Time 3. For youth who were "less well-regulated" in the control condition, there was a pattern of decreased use of reappraisal from Time 1 to Time 2, followed by increased use from Time 2 to Time 3 (though none of these changes were significant). Additionally, there were no changes in use of reappraisal for youth who were "better regulated" in the experimental condition or for youth who were "better regulated" in the control condition. The inconsistent pattern observed for youth who were "less well-regulated" and the stable pattern for youth who were "better regulated" provides additional evidence supporting how lower basal RSA might be a physiological indicator

of susceptibility to the environment (Belsky & Pluess, 2009). Taken together, these findings further buttress the argument that youth with “low basal RSA” might be more plastic and malleable (Belsky & Pluess, 2009; Boyce & Ellis, 2005).

The current results for research question 2 only saw changes in youths’ self-compassion and use of reappraisal, and not changes in the other domains. This could be a product of the broadness and variation of lessons delivered in the mindfulness curriculum. Because the current curriculum was multi-faceted spanning many different topics, it was difficult to isolate how specific topics might have contributed to certain effects. It is possible that one specific lesson was elaborated more in depth than others or one message was repeated more consistently throughout the course (e.g., self-compassion, reappraisal). The current study did still find some varying effects of the MM intervention when considering youths’ physiological regulation. Thus, there could also be other important moderators that would characterize which youth benefit the most (or least). Future studies should investigate how other important moderators (e.g., other stress response systems in the body: HPA axis) might vary the effects of a mindfulness intervention. This will further help illuminate for whom mindfulness trainings will be most effective, making it so we can better personalize interventions in the future to promote higher program success rates and efficacy.

Taken together, these findings evidence additional support for how individual differences in physiological regulation might vary the effects of an intervention. Assessment of biological factors such as RSA may predict treatment responses and provide information about how to enhance current evidence-based practices. Findings



from the current study evidence how physiology is an important individual difference to consider, as results yielded disparate patterns of findings for youth who were “better regulated” compared to youth who were “less well-regulated.”

### ***Limitations and Future Directions***

The current study had several limitations. First, I had a small sample size that restricted the statistical power to perform more complex analyses, such as multi-level modeling in replace of the repeated measures ANOVA analyses used in the current study. ANOVA is a nomothetic approach to data analysis (e.g., Krueger & Tian, 2004). It assumes that the mean response is representative of all individuals within a group, and differences among individuals within groups are considered error. Although these methods provide valid statistical conclusions about group-level effects, information about the response patterns of different individuals is ignored (Petrinovich & Widaman, 1984). Multi-level models are more flexible than ANOVAs and can be used to test a broader array of research hypotheses. Future work should secure larger sample sizes in order to obtain enough power and run MLMs (e.g., growth curve models).

A second limitation was the short duration of the intervention. The current study examined the effects of a mindfulness intervention over a short period of time (7 weeks), with only 45 minutes of training each week. This duration of time for the intervention was initially chosen with the goal to find a balance between an efficient amount of time needed for mindfulness training and the amount of time that youth are able to sustain attention to this program. It is possible that modification to the duration of the

intervention is needed (e.g., more time spent weekly in shorter intervals is needed to further solidify and perfect the practice). Descriptives from the current study seem to suggest active engagement and participation from youth within the first three weeks of the intervention, which was followed by a steep decline of interest (possibly as a result of the school year ending and summer break beginning). With this new information, follow-up studies should investigate a condensed mindfulness intervention (with more focused content) that can both sustain youths' attention and protect against attrition by taking into consideration youths' academic schedules that might interfere with level of participation.

Another limitation is youths' potential lack of adherence to the course. There were no systematic checks of whether youth were adhering to the intervention besides reviewing their responses to the discussions. Even then, providing responses to the discussion boards does not guarantee that youth were watching the videos attentively. Unfortunately, the CANVAS platform was not able to track whether youth had watched the videos in entirety, and there was no way to know whether youth were actually paying attention while the videos were playing, or actively attempting breathing as instructed while the audio clips were playing. The lack of information about adherence makes it difficult to interpret the current findings—they could be treatment effects or the result of poor adherence to the treatment. Instead of watching pre-recorded videos, future studies may offer live sessions in virtual space, where all participants can log in at a set time to join a live online class. Another option for checking youths' adherence to the curriculum could be to require them to record and upload videos of themselves completing the

activity as instructed. Additionally, live sessions could be offered during the in-lab assessments to ensure the accurate practice of mindfulness.

### *Conclusion*

The current dissertation has several strengths. It is one of the first to empirically investigate a web-based mindfulness meditation intervention for youth by adopting a longitudinal multi-level approach and examining multiple domains of functioning. Results from the study contribute knowledge about mindfulness interventions suggesting that mindfulness meditation training delivered via a web-based platform may not be as feasible for youth, or may only be effective for youth who have certain characteristics (i.e., basal RSA). Results showed varying patterns of change in self-compassion and use of reappraisal for youth who were “better regulated” compared to youth who were “less well-regulated,” suggesting that resting physiology played a role in determining the outcome of an intervention. My study was one of the first to examine physiological resting levels as individual differences that could moderate the effectiveness of a mindfulness intervention over time. Individual differences are important to consider and empirically assess in order to allow for re-modification and design of interventions to be more suited for the population of interest. This would subsequently optimize the chances of intervention success.

In summary, the current study provides preliminary evidence that interventions delivered via a web-based platform for youth might need additional refinement and evaluation to enhance likelihood of success. There are some intricacies about a web-based intervention that might need to be further specified (e.g., timing, youth

characteristics) in order to be successful. This is especially true for interventions designed for a population that inhabits a developmental stage characterized as having more turbulent, unpredictable attentional and emotional states. Nonetheless, the current study serves as one of the first to comprehensively assess the feasibility of web-based interventions and identify the role of individual physiological regulation in varying the effects of the intervention. Mindfulness interventions for youth are taught in schools with increasing frequency, and a breath of research has already shown its success in promoting youths' broader adjustment across various domains of functioning (e.g., Felver, Celis-de Hoyos, Tezanos, & Singh, 2016). Subsequently, given the potential of mindfulness interventions to better the lives of youth, it would be important to expand its reach to broader audiences. One way would be by using web-based platforms. The current study is important for showing clear next steps (i.e., delivering a more easily accessible mindfulness intervention via a web-based platform) to refining intervention work in this area of research.

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Table 1

*Means and standard deviations for demographics by condition during baseline*

	Overall	Control Condition	Experimental Condition
Sample	N = 63	N = 31	N = 33
% Female	52.4%	51.6%	53.1%
Age	M = 12.92 SD = 1.71	M = 12.83 SD = 1.87	M = 13.01 SD = 1.59
White	20.6%	16.1%	25.0%
African American	6.3%	9.7%	3.1%
Asian	1.6%	3.2%	0%
Hispanic	14.3%	12.9%	15.6%
Native American	1.6%	3.2%	0%
Multiracial	50.8%	51.6%	50.0%
Other	3.2%	3.2%	3.1%

Table 2

*Descriptive statistics for main variables for the first three assessments.*

Variable	Assessment	Min	Max	Mean	Std
Age	Time 1	9.06	15.99	12.92	1.71
Gender	Time 1	1.00	2.00	1.52	0.50
ERQ Reappraisal	Time 1	1.50	7.00	4.57	1.34
	Time 2	1.00	7.00	4.62	1.50
	Time 3	1.00	7.00	4.58	1.43
ERQ Suppression	Time 1	1.75	7.00	3.95	1.25
	Time 2	1.00	7.00	3.73	1.44
	Time 3	1.00	6.00	3.68	1.24
DERS-Total	Time 1	50.00	156.00	83.22	24.49
	Time 2	36.00	156.00	82.98	26.18
	Time 3	37.00	155.00	83.07	26.67
COS Kindness for Others	Time 1	1.00	5.00	3.91	0.88
	Time 2	1.00	5.00	3.89	1.07
	Time 3	2.00	5.00	3.77	0.94
COS Indifference	Time 1	1.00	5.00	2.12	0.85
	Time 2	1.00	3.50	2.09	0.72
	Time 3	1.00	5.00	2.20	0.87
COS Common Humanity	Time 1	1.25	5.00	3.98	0.95
	Time 2	1.00	5.00	4.02	1.05
	Time 3	1.25	5.00	3.92	1.01
COS Separation	Time 1	1.00	5.00	2.36	0.85
	Time 2	1.00	3.75	2.11	0.77
	Time 3	1.00	5.00	2.15	0.85
COS Mindfulness	Time 1	1.00	5.00	3.74	0.85
	Time 2	1.00	5.00	3.65	0.93
	Time 3	1.00	5.00	3.63	0.90
COS Disengagement	Time 1	1.00	5.00	2.02	0.83
	Time 2	1.00	4.50	2.06	0.79
	Time 3	1.00	5.00	2.18	0.90
Total Compassion for Others	Time 1	1.25	4.75	3.86	0.64
	Time 2	2.58	5.00	3.89	0.58
	Time 3	1.67	4.83	3.80	0.66
CS Kindness	Time 1	1.00	5.00	2.46	1.00
	Time 2	1.40	5.00	2.95	0.86
	Time 3	2.00	5.00	3.45	0.89
CS Judgement	Time 1	1.00	5.00	2.47	1.23
	Time 2	1.00	5.00	2.46	1.12
	Time 3	1.00	5.00	2.58	1.11
CS Common Humanity	Time 1	1.00	5.00	2.80	1.14
	Time 2	1.00	5.00	2.97	1.11
	Time 3	1.00	5.00	3.06	1.05
CS Mindfulness	Time 1	1.00	5.00	2.68	1.01
	Time 2	1.00	5.00	3.00	0.93
	Time 3	1.25	5.00	3.17	1.00
CS Isolation	Time 1	1.00	5.00	2.58	1.21
	Time 2	1.00	5.00	2.53	1.08
	Time 3	1.00	5.00	2.78	1.05
CS Over-Identified	Time 1	1.00	4.50	2.56	1.07

	Time 2	1.00	4.25	2.55	0.88
	Time 3	1.00	5.00	2.63	0.86
	Time 1	1.73	4.69	3.18	0.69
Total Compassion for Self	Time 2	1.46	4.85	3.20	0.74
	Time 3	1.73	4.85	3.21	0.73
	Time 1	-492.13	115.35	-11.95	77.17
Attention Bias	Time 2	-43.48	59.56	2.37	21.71
	Time 3	-109.40	52.24	1.14	26.73
	Time 1	5.00	118.00	36.47	21.53
Inhibitory Control	Time 2	4.00	114.00	39.81	23.99
	Time 3	5.00	113.00	41.94	25.71
	Time 1	5.34	9.34	7.00	0.94
Respiratory Sinus Arrhythmia	Time 2	4.18	9.49	7.24	1.11
	Time 3	4.55	9.43	6.91	1.05
	Time 1	98.60	148.44	117.11	10.36
Pre-ejection Period	Time 2	78.00	143.00	116.82	13.63
	Time 3	66.67	160.80	114.19	17.18

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Table 4a

*Bivariate correlations between Age, Gender, and Compassion for Others subscales at Time 1*

	1	2	3	4	5	6	7	8	9
1. Age	1	0.09	-0.12	-0.02	0.17	-0.08	0.10	0.09	0.04
2. Gender		1	0.21	-0.02	-0.02	-0.13	0.00	-0.12	0.11
3. COS Kindness (T1)			1	-0.52**	0.33**	-0.33**	0.72**	-0.63**	0.79**
4. COS Indifference (T1)				1	-0.13	0.55**	-0.57**	0.77**	-0.79**
5. COS Common Humanity (T1)					1	-0.20	0.38**	-0.21	0.53**
6. COS Separation (T1)						1	-0.38**	0.64**	-0.68**
7. COS Mindfulness (T1)							1	-0.56**	0.80**
8. COS Disengagement (T1)								1	-0.85**
9. COS Total (T1)									1

Table 4b

*Bivariate correlations between Age, Gender, and Compassion for Others subscales at Time 2*

	1	2	3	4	5	6	7	8	9
1. Age	1	0.09	0.01	0.01	0.14	0.09	0.13	0.04	0.04
2. Gender		1	0.21	-0.12	0.07	0.01	0.23	-0.01	0.17
3. COS Kindness (T2)			1	-0.15	0.48**	-0.02	0.76**	-0.35**	0.77**
4. COS Indifference (T2)				1	0.15	0.50**	-0.14	0.59**	-0.49**
5. COS Common Humanity (T2)					1	-0.07	0.48**	-0.02	0.57**
6. COS Separation (T2)						1	-0.14	0.63**	-0.54**
7. COS Mindfulness (T2)							1	-0.34**	0.78**
8. COS Disengagement (T2)								1	-0.69**
9. COS Total (T2)									1

Table 4c

*Bivariate correlations between Age, Gender, and Compassion for Others subscales at Time 3*

	1	2	3	4	5	6	7	8	9
1. Age	1	0.09	0.04	-0.05	0.19	-0.13	0.26*	-0.02	0.16
2. Gender		1	0.07	-0.03	0.09	-0.06	-0.08	0.00	0.05
3. COS Kindness (T3)			1	-0.38**	0.37**	-0.35**	0.74**	-0.43**	0.75**
4. COS Indifference (T3)				1	0.05	0.68**	-0.45**	0.83**	-0.73**
5. COS Common Humanity (T3)					1	-0.21	0.39**	-0.05	0.48**
6. COS Separation (T3)						1	-0.51**	0.77**	-0.79**
7. COS Mindfulness (T3)							1	-0.51**	0.82**
8. COS Disengagement (T3)								1	-0.80**
9. COS Total (T3)									1

Table 5a

*Bivariate correlations between Age, Gender, and Self-Compassion Subscales at Time 1*

	1	2	3	4	5	6	7	8	9
1. Age	1	0.09	-0.04	0.26*	0.10	0.11	-0.11	0.14	-0.16
2. Gender		1	0.00	0.32*	-0.08	0.27*	-0.11	0.28*	-0.34**
3. SCS Kindness (T1)			1	-0.31*	0.57**	-0.12	0.75**	-0.07	0.55**
4. SCS Judgement (T1)				1	-0.05	0.77**	-0.11	0.76**	-0.72**
5. SCS Common Humanity (T1)					1	0.07	0.60**	0.11	0.36**
6. SCS Isolation (T1)						1	-0.03	0.76**	-0.58**
7. SCS Mindfulness (T1)							1	0.05	0.46**
8. SCS Over Identified (T1)								1	-0.58**
9. SCS Total Self-Compassion (T1)									1

Table 5b

*Bivariate correlations between Age, Gender, and Self-Compassion Subscales at Time 2*

	1	2	3	4	5	6	7	8	9
1. Age	1	0.09	-0.07	0.16	0.05	0.05	0.15	-0.03	-0.04
2. Gender		1	-0.01	0.36**	0.01	0.38**	-0.06	0.29*	-0.20
3. SCS Kindness (T2)			1	-0.35**	0.76**	-0.21	0.73**	-0.15	0.75**
4. SCS Judgement (T2)				1	-0.21	0.85**	-0.17	0.78**	-0.69**
5. SCS Common Humanity (T2)					1	-0.09	0.68**	-0.04	0.66**
6. SCS Isolation (T2)						1	-0.11	0.76**	-0.58**
7. SCS Mindfulness (T2)							1	-0.06	0.60**
8. SCS Over Identified (T2)								1	-0.58**
9. SCS Total Self-Compassion (T2)									1

Table 5c

*Bivariate correlations between Age, Gender, and Self-Compassion Subscales at Time 3*

	1	2	3	4	5	6	7	8	9
1. Age	1	0.09	-0.15	0.13	0.11	-0.05	0.08	-0.03	0.01
2. Gender		1	-0.04	0.26*	0.02	0.25*	-0.08	0.38**	-0.22
3. SCS Kindness (T3)			1	-0.46**	0.52**	-0.24	0.76**	-0.11	0.65**
4. SCS Judgement (T3)				1	-0.14	0.76**	-0.31*	0.72**	-0.76**
5. SCS Common Humanity (T3)					1	-0.04	0.59**	0.02	0.23
6. SCS Isolation (T3)						1	-0.11	0.72**	-0.66**
7. SCS Mindfulness (T3)							1	-0.03	0.50**
8. SCS Over Identified (T3)								1	-0.54**
9. SCS Total Self-Compassion (T3)									1





Table 7

*Coefficients for 2x3 mixed repeated measures ANOVA models predicting socio-emotional measures of emotion regulation strategies and difficulties*

		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
ERQ Reappraisal	Time	0.96	2	0.39	0.02
	Time X Age	1.66	2	0.19	0.03
	Time X Gender	1.44	2	0.24	0.03
	Time X Condition	0.58	2	0.56	0.01
		Between Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Age	0.72	1	0.40	0.13
	Gender	1.11	1	0.30	0.02
	Condition	2.63	1	0.11	0.05
<hr/>					
		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
ERQ Suppression	Time	1.93	1.73	0.16	0.03
	Time X Age	1.82	1.73	0.17	0.03
	Time X Gender	0.13	1.73	0.85	0.002
	Time X Condition	1.20	1.73	0.30	0.02
		Between Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Age	0.16	1	0.69	0.003
	Gender	1.49	1	0.23	0.03
	Condition	0.33	1	0.57	0.01
<hr/>					
		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
DERS Total	Time	1.48	2	0.23	0.03
	Time X Age	1.04	2	0.36	0.02
	Time X Gender	0.77	2	0.47	0.01
	Time X Condition	0.17	2	0.84	0.003
		Between Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Age	0.94	1	0.34	0.02
	Gender	6.53	1	0.01	0.10
	Condition	3.23	1	0.08	0.06

Table 8

*Coefficients for 2x3 mixed repeated measures ANOVA models predicting compassion for others and related subscales*

		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
COS Kindness	Time	0.70	2	0.50	0.01
	Time X Age	0.90	2	0.41	0.02
	Time X Gender	0.80	2	0.45	0.01
	Time X Condition	3.11	2	0.05	0.05
		Between Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Age	0.10	1	0.75	0.002
	Gender	2.32	1	0.13	0.04
	Condition	0.59	1	0.45	0.01
		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
COS Indifference	Time	0.11	2	0.90	0.002
	Time X Age	0.14	2	0.87	0.003
	Time X Gender	0.26	2	0.77	0.01
	Time X Condition	0.30	2	0.74	0.01
		Between Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Age	0.02	1	0.89	0
	Gender	0.60	1	0.44	0.01
	Condition	0.08	1	0.78	0.001
		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
COS Common Humanity	Time	0.13	2	0.88	0.002
	Time X Age	0.09	2	0.92	0.002
	Time X Gender	0.57	2	0.57	0.01
	Time X Condition	0.75	2	0.48	0.01
		Between Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Age	2.43	1	0.13	0.04
	Gender	0.001	1	0.97	0
	Condition	0.41	1	0.52	0.01

		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
COS Separation	Time	1.52	2	0.22	0.03
	Time X Age	1.09	2	0.34	0.02
	Time X Gender	0.49	2	0.61	0.01
	Time X Condition	3.18	2	0.05	0.05
		Between Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Age	0.17	1	0.68	0.003
	Gender	0.55	1	0.46	0.01
	Condition	0.76	1	0.39	0.01
		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
COS Mindfulness	Time	0.79	2	0.46	0.01
	Time X Age	1.32	2	0.27	0.02
	Time X Gender	3.81	2	0.03	0.06
	Time X Condition	1.24	2	0.29	0.02
		Between Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Age	2.57	1	0.12	0.04
	Gender	0.17	1	0.68	0.003
	Condition	4.17	1	0.05	0.07
		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
COS Disengagement	Time	0.33	2	0.72	0.01
	Time X Age	0.40	2	0.67	0.01
	Time X Gender	0.28	2	0.76	0.01
	Time X Condition	0.10	2	0.90	0.002
		Between Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Age	0.15	1	0.70	0.003
	Gender	0.45	1	0.51	0.01
	Condition	0.16	1	0.69	0.003

		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
COS Total	Time	0.68	2	0.51	0.01
	Time X Age	0.96	2	0.39	0.02
	Time X Gender	0.47	2	0.63	0.01
	Time X Condition	0.52	2	0.56	0.01
		Between Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Age	0.47	1	0.49	0.01
	Gender	0.95	1	0.33	0.02
	Condition	1.17	1	0.29	0.02

Table 9

*Coefficients for 2x3 mixed repeated measures ANOVA models predicting self-compassion and related subscales.*

		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
Self-Kindness	Time	4.98	1.65	0.01	0.08
	Time X Age	0.90	1.65	0.39	0.02
	Time X Gender	0.18	1.65	0.79	0.003
	Time X Condition	0.03	1.65	0.95	0.001
		Between Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Age	0.36	1	0.55	0.01
	Gender	0.03	1	0.87	0.001
	Condition	2.76	1	0.10	0.05
<hr/>					
		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
Self-Judgement	Time	1.88	2	0.16	0.03
	Time X Age	1.61	2	0.21	0.03
	Time X Gender	0.75	2	0.47	0.01
	Time X Condition	0.84	2	0.44	0.02
		Between Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Age	1.93	1	0.17	0.03
	Gender	6.91	1	0.01	0.11
	Condition	0.03	1	0.86	0.001
<hr/>					
		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
Self-Common Humanity	Time	0.05	2	0.95	0.001
	Time X Age	0.07	2	0.93	0.001
	Time X Gender	0.43	2	0.65	0.01
	Time X Condition	0.81	2	0.45	0.01
		Between Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Age	0.67	1	0.42	0.01
	Gender	0.41	1	0.52	0.01
	Condition	0.03	1	0.85	0.001

		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
Self-Isolation	Time	1.86	2	0.16	0.03
	Time X Age	1.13	2	0.33	0.02
	Time X Gender	0.89	2	0.42	0.02
	Time X Condition	0.84	2	0.43	0.02
		Between Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Age	0.01	1	0.94	0
	Gender	8.55	1	0.01	0.13
	Condition	0.06	1	0.81	0.001
		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
Self-Mindfulness	Time	2.15	2	0.12	0.04
	Time X Age	3.40	2	0.04	0.06
	Time X Gender	0.06	2	0.94	0.001
	Time X Condition	2.24	2	0.11	0.04
		Between Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Age	0.28	1	0.60	0.01
	Gender	0.61	1	0.44	0.01
	Condition	2.31	1	0.14	0.04
		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
Self-Over Identified	Time	1.76	2	0.18	0.03
	Time X Age	1.79	2	0.17	0.03
	Time X Gender	0.13	2	0.88	0.002
	Time X Condition	2.30	2	0.11	0.04
		Between Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Age	0.001	1	0.98	0
	Gender	8.99	1	0.004	0.14
	Condition	0.10	1	0.75	0.002

		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
Total Self-Compassion	Time	2.36	2	0.10	0.04
	Time X Age	1.52	2	0.22	0.03
	Time X Gender	1.42	2	0.25	0.03
	Time X Condition	0.06	2	0.94	0.001
		Between Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Age	0.09	1	0.76	0.002
	Gender	5.24	1	0.03	0.09
	Condition	0.46	1	0.50	0.01

Table 10

*Coefficients for 2x3 mixed repeated measures ANOVA models predicting attention bias and inhibitory control*

		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
Attention Bias	Time	3.86	1.23	0.05	0.06
	Time X Age	2.82	1.23	0.09	0.05
	Time X Gender	2.18	1.23	0.14	0.04
	Time X Condition	0.57	1.23	0.49	0.01
		Between Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Age	2.62	1	0.11	0.05
	Gender	0.37	1	0.55	0.01
	Condition	0.73	1	0.40	0.01
		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
Inhibitory Control	Time	1.51	1.77	0.23	0.03
	Time X Age	0.80	1.77	0.44	0.01
	Time X Gender	2.33	1.77	0.11	0.04
	Time X Condition	0.67	1.77	0.50	0.01
		Between Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Age	11.10	1	0.002	0.17
	Gender	0.95	1	0.34	0.02
	Condition	0.62	1	0.43	0.01



Table 11

*Coefficients for 2x3 mixed repeated measures ANOVA models predicting RSA and PEP*

		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
RSA	Time	0.71	2	0.49	0.01
	Time X Age	0.23	2	0.79	0.004
	Time X Gender	1.11	2	0.33	0.02
	Time X Condition	0.15	2	0.86	0.003
		Between Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Age	4.94	1	0.03	0.08
	Gender	3.67	1	0.06	0.06
	Condition	5.40	1	0.02	0.09
		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
PEP	Time	3.16	2	0.05	0.05
	Time X Age	1.34	2	0.27	0.02
	Time X Gender	1.93	2	0.15	0.03
	Time X Condition	1.48	2	0.23	0.03
		Between Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Age	30.6	1	0.001	0.35
	Gender	1.56	1	0.22	0.03
	Condition	1.22	1	0.28	0.02

Table 12

*Coefficients for 2x2x3 mixed repeated measures ANOVA models predicting socio-emotional emotion regulation related developmental outcomes*

		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
ERQ Reappraisal	Time	1.34	2	0.27	0.02
	Time X Age	1.88	2	0.16	0.03
	Time X Gender	1.24	2	0.29	0.02
	Time X Condition	0.71	2	0.49	0.01
	Time X RSA Group	0.60	2	0.55	0.01
	Time X Condition X RSA Group	3.13	2	0.05	0.06
			Between Subject Effects		
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Age	1.89	1	0.18	0.03
	Gender	0.68	1	0.41	0.01
	Condition	3.18	1	0.08	0.06
	RSA Group	3.31	1	0.07	0.06
	Condition X RSA Group	4.20	1	0.05	0.07
		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
ERQ Suppression	Time	1.30	1.72	0.28	0.02
	Time X Age	1.35	1.72	0.26	0.02
	Time X Gender	0.18	1.72	0.80	0.00
	Time X Condition	1.24	1.72	0.29	0.02
	Time X RSA Group	0.66	1.72	0.50	0.01
	Time X Condition X RSA Group	0.12	1.72	0.86	0.002
			Between Subject Effects		
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Age	0.82	1	0.37	0.02
	Gender	0.76	1	0.39	0.01
	Condition	0.19	1	0.67	0.003
	RSA Group	3.91	1	0.05	0.07
	Condition X RSA Group	0.11	1	0.74	0.002

		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Time	1.02	2	0.36	0.02
	Time X Age	0.73	2	0.48	0.01
	Time X Gender	0.66	2	0.52	0.01
	Time X Condition	0.14	2	0.87	0.003
	Time X RSA Group	0.38	2	0.68	0.01
DERS Total	Time X Condition X RSA Group	0.25	2	0.78	0.01
		Between Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Age	2.06	1	0.16	0.04
	Gender	4.90	1	0.03	0.08
	Condition	3.85	1	0.06	0.07
	RSA Group	3.57	1	0.06	0.06
	Condition X RSA Group	0.13	1	0.72	0.002

Table 13

*Coefficients for 2x2x3 mixed repeated measures ANOVA models predicting compassion for others and related subscales*

		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
COS Kindness	Time	1.92	2	0.15	0.03
	Time X Age	2.02	2	0.14	0.04
	Time X Gender	0.56	2	0.57	0.01
	Time X Condition	2.99	2	0.06	0.05
	Time X RSA Group	3.55	2	0.03	0.06
	Time X Condition X RSA Group	0.83	2	0.44	0.02
			Between Subject Effects		
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Age	0.004	1	0.95	0.000
	Gender	2.57	1	0.12	0.05
	Condition	0.61	1	0.44	0.01
	RSA Group	0.50	1	0.48	0.010
	Condition X RSA Group	8.03	1	0.01	0.13
		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
COS Indifference	Time	0.25	2	0.78	0.01
	Time X Age	0.25	2	0.78	0.01
	Time X Gender	0.33	2	0.72	0.01
	Time X Condition	0.38	2	0.69	0.01
	Time X RSA Group	0.41	2	0.67	0.01
	Time X Condition X RSA Group	2.42	2	0.09	0.04
			Between Subject Effects		
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Age	0.34	1	0.56	0.010
	Gender	1.14	1	0.29	0.02
	Condition	0.18	1	0.68	0.003
	RSA Group	2.96	1	0.09	0.05
	Condition X RSA Group	0.22	1	0.64	0.004

		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
COS Common Humanity	Time	0.26	2	0.77	0.01
	Time X Age	0.06	2	0.94	0.001
	Time X Gender	0.79	2	0.46	0.01
	Time X Condition	0.81	2	0.45	0.02
	Time X RSA Group	0.72	2	0.49	0.01
	Time X Condition X RSA Group	0.64	2	0.53	0.01
			Between Subject Effects		
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Age	4.84	1	0.03	0.08
	Gender	0.17	1	0.68	0.003
	Condition	0.75	1	0.39	0.01
	RSA Group	6.24	1	0.02	0.10
	Condition X RSA Group	0.07	1	0.79	0.001
		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
COS Separation	Time	2.00	2	0.14	0.04
	Time X Age	1.58	2	0.21	0.03
	Time X Gender	0.47	2	0.63	0.01
	Time X Condition	3.21	2	0.04	0.06
	Time X RSA Group	1.07	2	0.35	0.02
	Time X Condition X RSA Group	0.13	2	0.88	0.002
			Between Subject Effects		
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Age	0.42	1	0.52	0.010
	Gender	0.75	1	0.39	0.01
	Condition	0.84	1	0.36	0.02
	RSA Group	0.84	1	0.37	0.02
	Condition X RSA Group	0.67	1	0.42	0.01

		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
COS Mindfulness	Time	1.16	2	0.32	0.02
	Time X Age	1.79	2	0.17	0.03
	Time X Gender	3.08	2	0.10	0.05
	Time X Condition	1.45	2	0.24	0.03
	Time X RSA Group	0.91	2	0.41	0.02
	Time X Condition X RSA Group	1.20	2	0.30	0.02
			Between Subject Effects		
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Age	3.12	1	0.08	0.06
	Gender	0.15	1	0.70	0.003
	Condition	4.27	1	0.04	0.07
	RSA Group	0.10	1	0.75	0.002
	Condition X RSA Group	6.30	1	0.02	0.10
		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
COS Disengagement	Time	1.10	2	0.35	0.02
	Time X Age	0.93	2	0.40	0.02
	Time X Gender	0.21	2	0.81	0.004
	Time X Condition	0.08	2	0.92	0.002
	Time X RSA Group	2.80	2	0.07	0.05
	Time X Condition X RSA Group	0.49	2	0.61	0.01
			Between Subject Effects		
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Age	0.06	1	0.80	0.001
	Gender	0.46	1	0.50	0.010
	Condition	0.16	1	0.69	0.003
	RSA Group	0.13	1	0.72	0.002
	Condition X RSA Group	1.00	1	0.32	0.02

		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
COS Total	Time	1.64	2	0.20	0.03
	Time X Age	1.79	2	0.17	0.03
	Time X Gender	0.28	2	0.75	0.01
	Time X Condition	0.73	2	0.48	0.01
	Time X RSA Group	2.70	2	0.07	0.05
	Time X Condition X RSA Group	0.15	2	0.86	0.003
		Between Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Age	1.20	1	0.28	0.02
	Gender	1.38	1	0.35	0.03
	Condition	1.37	1	0.25	0.03
	RSA Group	2.00	1	0.16	0.04
	Condition X RSA Group	3.31	1	0.07	0.06

Table 14

*Coefficients for 2x2x3 mixed repeated measures ANOVA models predicting self-compassion and related subscales*

		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
Self-Kindness	Time	5.96	1.66	0.01	0.1
	Time X Age	1.40	1.66	0.25	0.03
	Time X Gender	0.35	1.66	0.67	0.01
	Time X Condition	0.06	1.66	0.91	0.001
	Time X RSA Group	1.24	1.66	0.29	0.02
	Time X Condition X RSA Group	0.51	1.66	0.57	0.01
			Between Subject Effects		
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Age	0.01	1	0.94	0.000
	Gender	0.02	1	0.88	0.000
	Condition	3.83	1	0.06	0.07
	RSA Group	6.13	1	0.02	0.10
	Condition X RSA Group	9.65	1	0.003	0.15
		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
Self-Judgment	Time	1.65	2	0.20	0.03
	Time X Age	1.42	2	0.25	0.03
	Time X Gender	0.83	2	0.44	0.02
	Time X Condition	0.74	2	0.48	0.01
	Time X RSA Group	0.29	2	0.75	0.01
	Time X Condition X RSA Group	1.17	2	0.31	0.02
			Between Subject Effects		
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Age	0.38	1	0.54	0.010
	Gender	5.10	1	0.03	0.09
	Condition	0.001	1	0.98	0.000
	RSA Group	9.94	1	0.003	0.16
	Condition X RSA Group	1.67	1	0.20	0.03



		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
Self-Common Humanity	Time	0.16	2	0.86	0.003
	Time X Age	0.15	2	0.87	0.003
	Time X Gender	0.23	2	0.79	0.004
	Time X Condition	0.99	2	0.38	0.02
	Time X RSA Group	2.63	2	0.08	0.05
	Time X Condition X RSA Group	1.89	2	0.16	0.03
	Between Subject Effects				
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Age	1.14	1	0.29	0.02
	Gender	0.42	1	0.52	0.010
	Condition	0.03	1	0.87	0.001
	RSA Group	0.39	1	0.54	0.010
	Condition X RSA Group	7.13	1	0.01	0.12
		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
Self-Isolation	Time	1.24	2	0.29	0.02
	Time X Age	0.79	2	0.46	0.01
	Time X Gender	0.75	2	0.48	0.01
	Time X Condition	0.87	2	0.42	0.02
	Time X RSA Group	0.32	2	0.72	0.01
	Time X Condition X RSA Group	0.27	2	0.77	0.02
	Between Subject Effects				
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Age	1.16	1	0.29	0.02
	Gender	6.13	1	0.02	0.10
	Condition	0.46	1	0.50	0.010
	RSA Group	21.64	1	0.001	0.29
	Condition X RSA Group	0.14	1	0.71	0.003

		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u>η<sup>2</sup></u>
Self-Mindfulness	Time	1.03	2	0.36	0.02
	Time X Age	2.03	2	0.14	0.04
	Time X Gender	0.06	2	0.94	0.001
	Time X Condition	1.91	2	0.15	0.03
	Time X RSA Group	2.32	2	0.10	0.04
	Time X Condition X RSA Group	0.31	2	0.74	0.01
	Between Subject Effects				
		<u>F</u>	<u>df</u>	<u>p</u>	<u>η<sup>2</sup></u>
	Age	1.27	1	0.27	0.02
	Gender	0.40	1	0.53	0.010
	Condition	2.97	1	0.09	0.05
	RSA Group	3.35	1	0.07	0.06
	Condition X RSA Group	11.42	1	0.001	0.18
		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u>η<sup>2</sup></u>
Self-Over Identified	Time	0.95	2	0.39	0.02
	Time X Age	1.17	2	0.32	0.02
	Time X Gender	0.19	2	0.83	0.003
	Time X Condition	2.35	2	0.10	0.04
	Time X RSA Group	1.35	2	0.26	0.02
	Time X Condition X RSA Group	1.28	2	0.28	0.02
	Between Subject Effects				
		<u>F</u>	<u>df</u>	<u>p</u>	<u>η<sup>2</sup></u>
	Age	0.52	1	0.47	0.01
	Gender	6.69	1	0.01	0.11
	Condition	0.01	1	0.92	0.000
	RSA Group	8.65	1	0.010	0.14
	Condition X RSA Group	0.08	1	0.79	0.001

		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
Total Self-Compassion	Time	3.04	2	0.05	0.05
	Time X Age	2.26	2	0.11	0.04
	Time X Gender	1.35	2	0.26	0.02
	Time X Condition	0.22	2	0.80	0.004
	Time X RSA Group	4.62	2	0.01	0.08
	Time X Condition X RSA Group	4.28	2	0.02	0.07
			Between Subject Effects		
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Age	0.49	1	0.49	0.010
	Gender	3.99	1	0.05	0.07
	Condition	1.03	1	0.31	0.02
	RSA Group	14.45	1	0.000	0.21
	Condition X RSA Group	6.88	1	0.01	0.11

Table 15

*Coefficients for 2x2x3 mixed repeated measures ANOVA models predicting attention bias and inhibitory control*

		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
Attention Bias	Time	3.55	1.22	0.06	0.06
	Time X Age	2.65	1.22	0.10	0.05
	Time X Gender	2.11	1.22	0.15	0.04
	Time X Condition	0.58	1.22	0.48	0.01
	Time X RSA Group	0.02	1.22	0.92	0.001
	Time X Condition X RSA Group	0.30	1.22	0.63	0.01
			Between Subject Effects		
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Age	2.39	1	0.13	0.04
	Gender	0.42	1	0.52	0.01
	Condition	0.78	1	0.38	0.01
	RSA Group	0.01	1	0.92	0.001
	Condition X RSA Group	1.11	1	0.30	0.02
		Within Subject Effects			
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
Inhibitory Control	Time	0.81	1.72	0.43	0.02
	Time X Age	0.31	1.72	0.70	0.01
	Time X Gender	2.27	1.72	0.12	0.04
	Time X Condition	0.51	1.72	0.58	0.01
	Time X RSA Group	2.50	1.72	0.10	0.04
	Time X Condition X RSA Group	0.42	1.72	0.63	0.01
			Between Subject Effects		
		<u>F</u>	<u>df</u>	<u>p</u>	<u><math>\eta^2</math></u>
	Age	10.14	1	0.002	0.16
	Gender	0.95	1	0.34	0.02
	Condition	0.63	1	0.43	0.01
	RSA Group	0.01	1	0.91	0.001
	Condition X RSA Group	0.12	1	0.73	0.002

# MINDFULNESS CURRICULUM TIMELINE

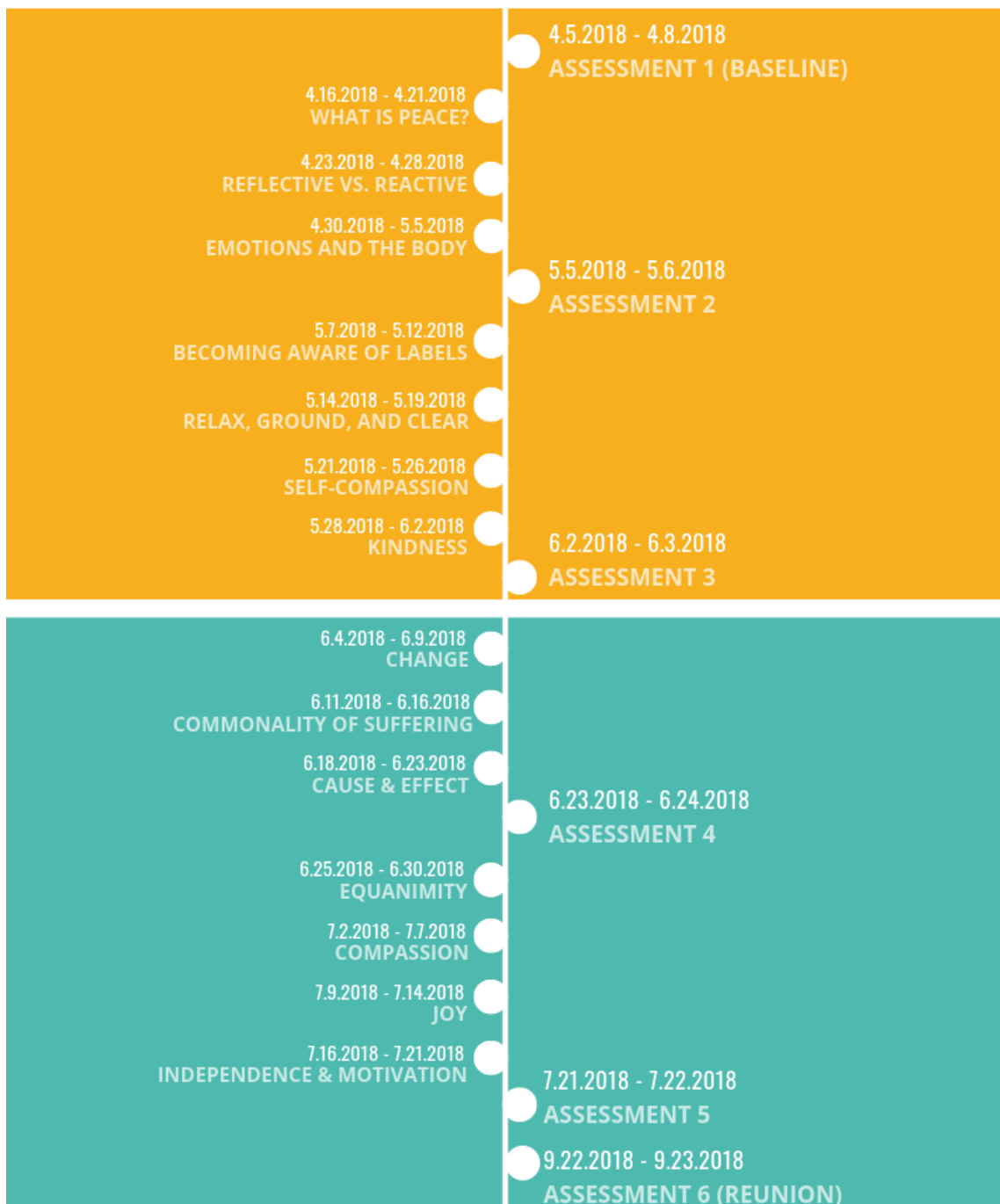


Figure 1. Timeline of the mindfulness curriculum and in-lab assessments

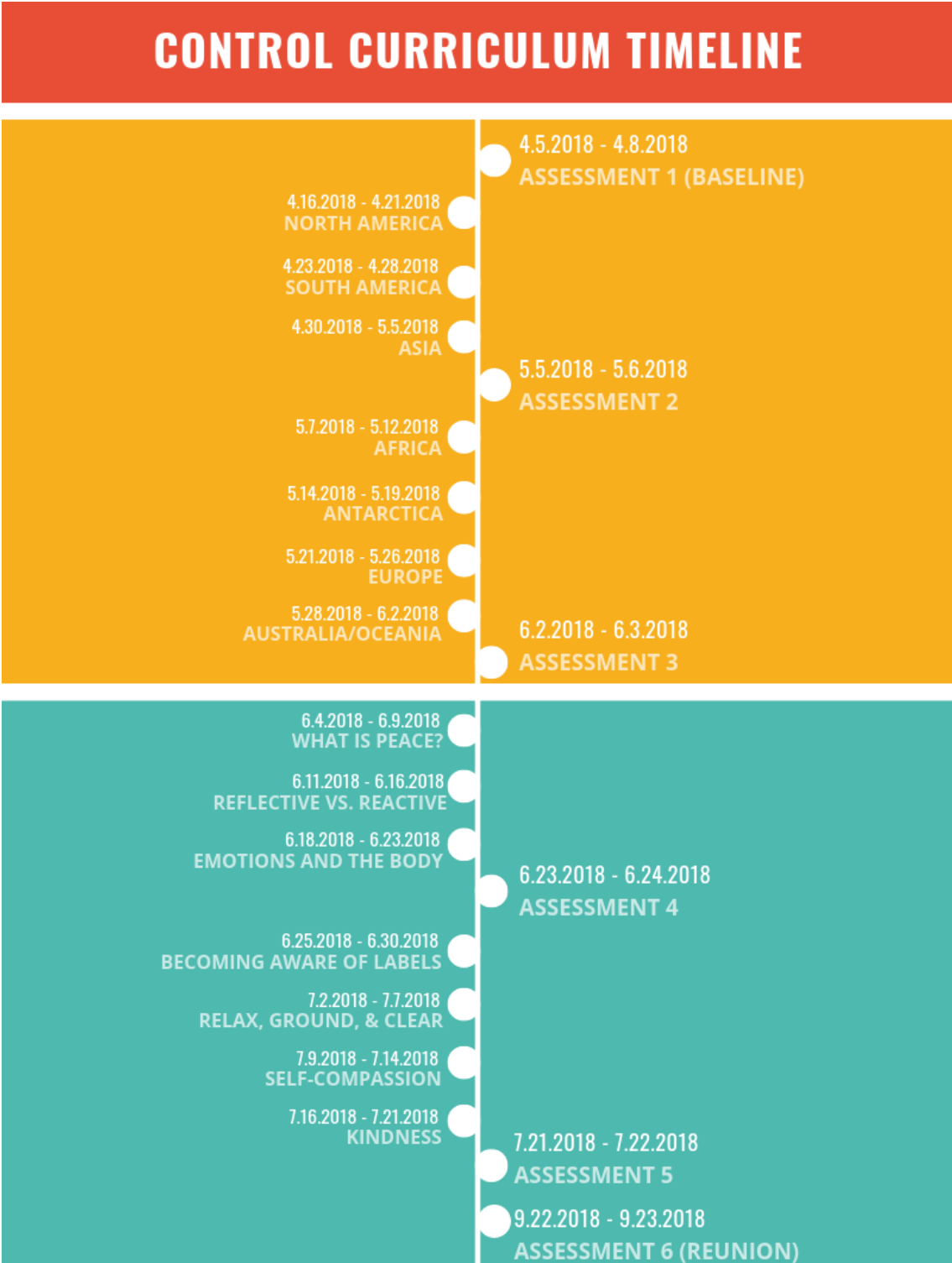


Figure 2. Timeline of the control curriculum and in-lab assessments

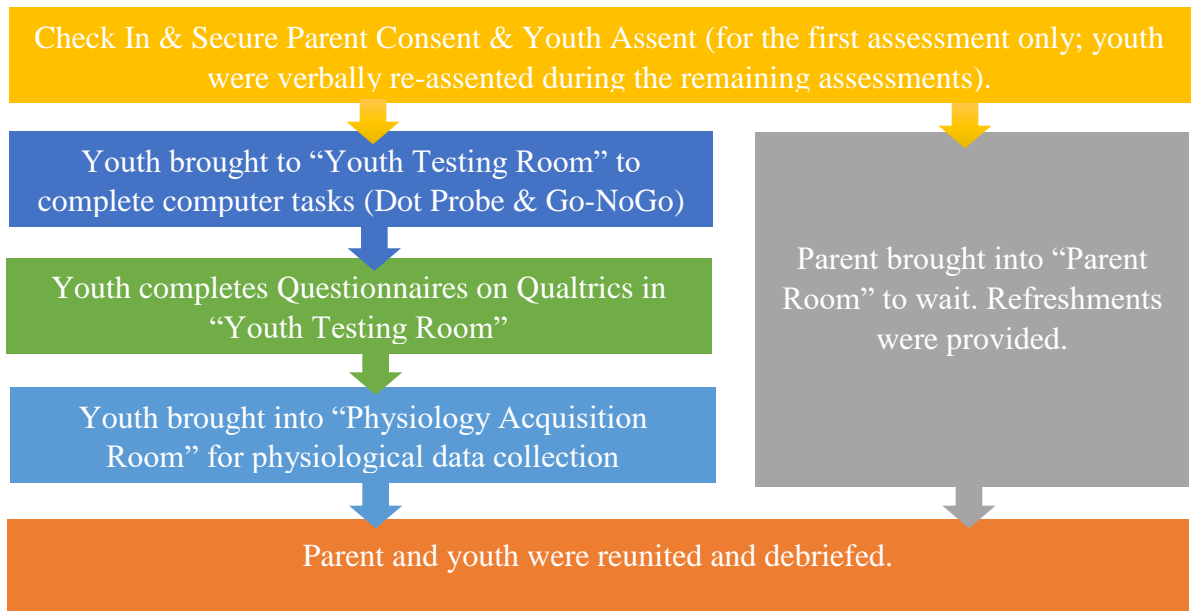


Figure 3. Schedule of In-lab Assessment Procedures

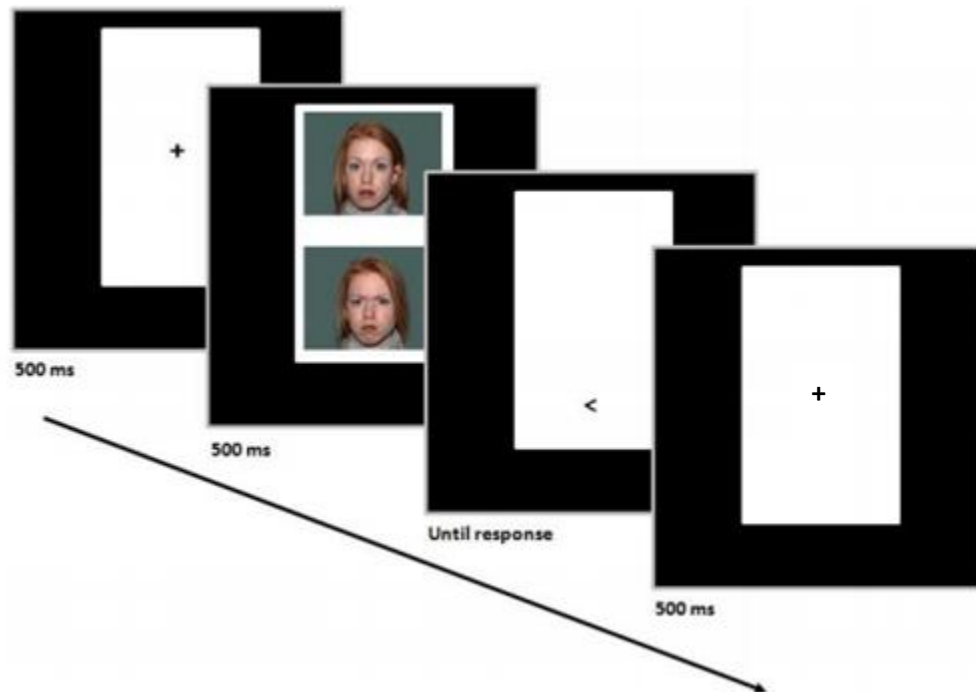


Figure 4. Sequence of events in a dot-probe attention task trial

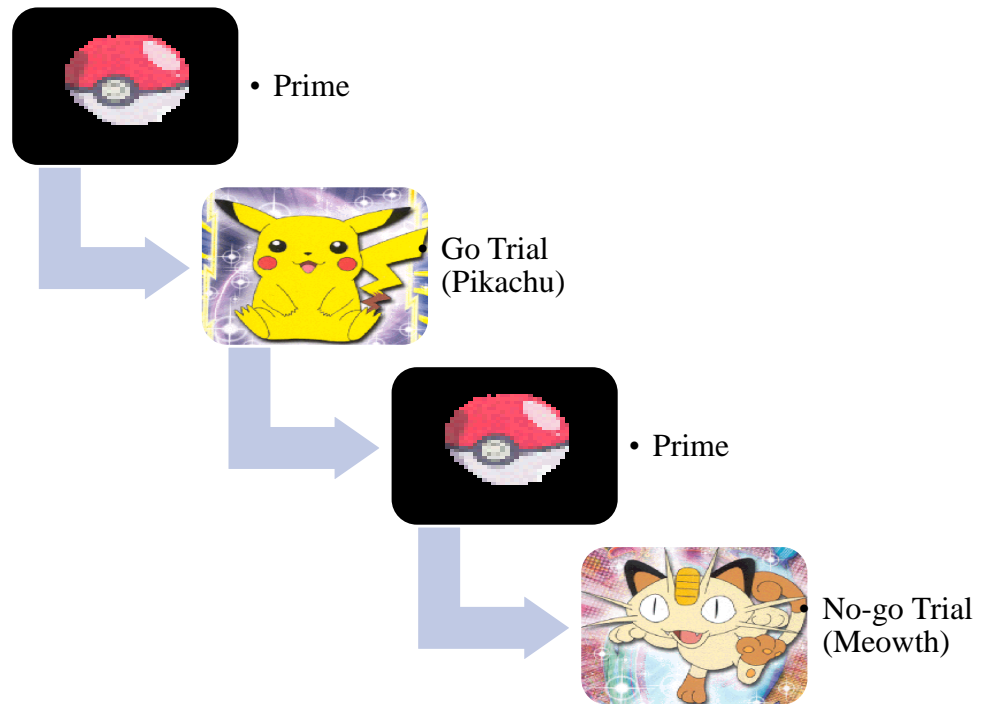


Figure 5. Sequence of events in a Go/No-Go inhibitory task trial



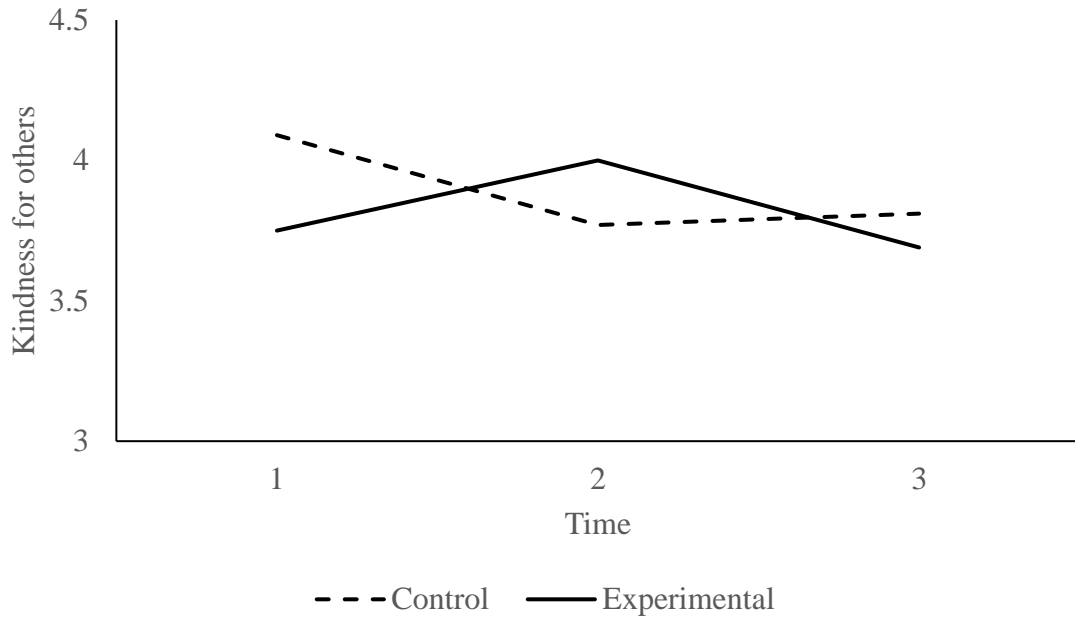


Figure 6. Youths' self-reported kindness for others across 3 time points

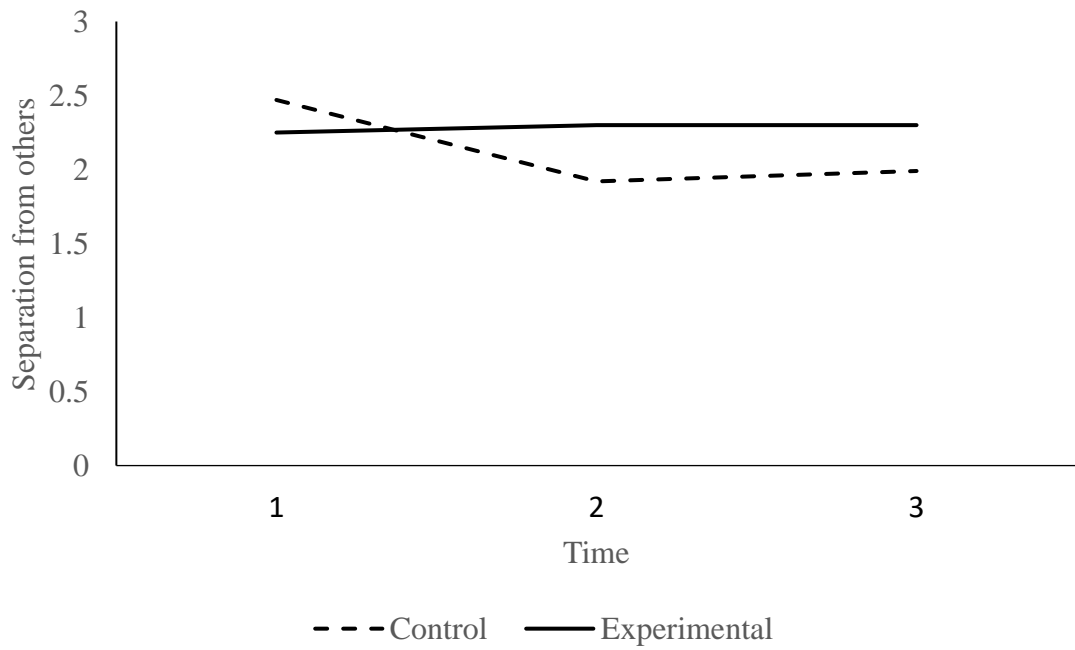


Figure 7. Youths' self-reported separation from others across 3 time points

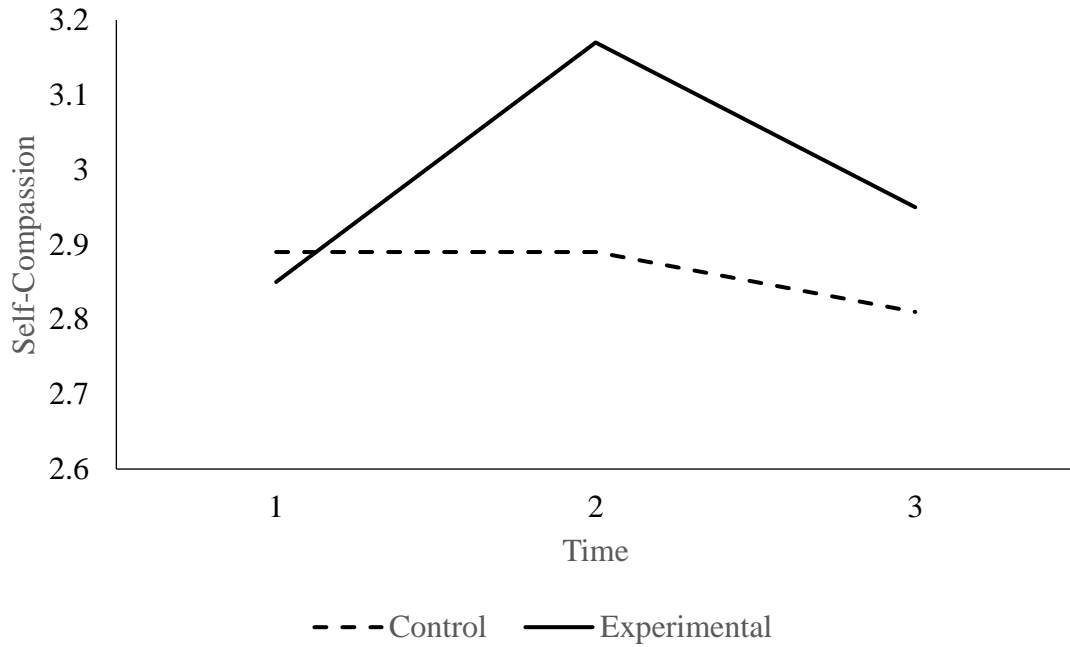


Figure 8. Youths’ self-compassion across three time points for youth characterized as “less well-regulated”.

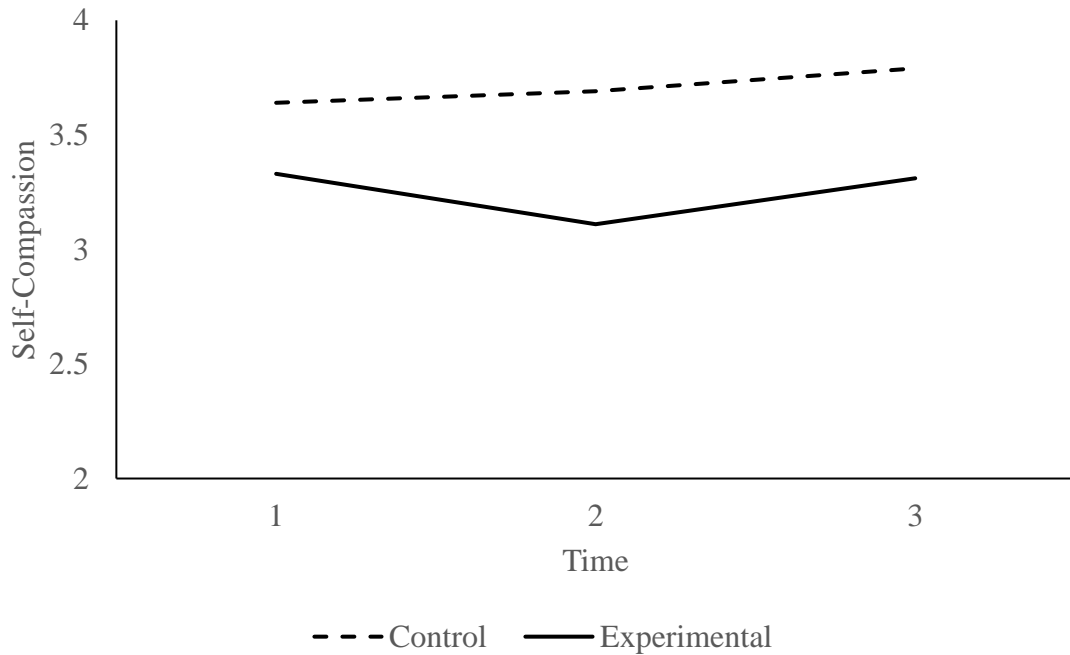


Figure 9. Youths’ self-compassion across three time points for youth characterized as “better regulated.”

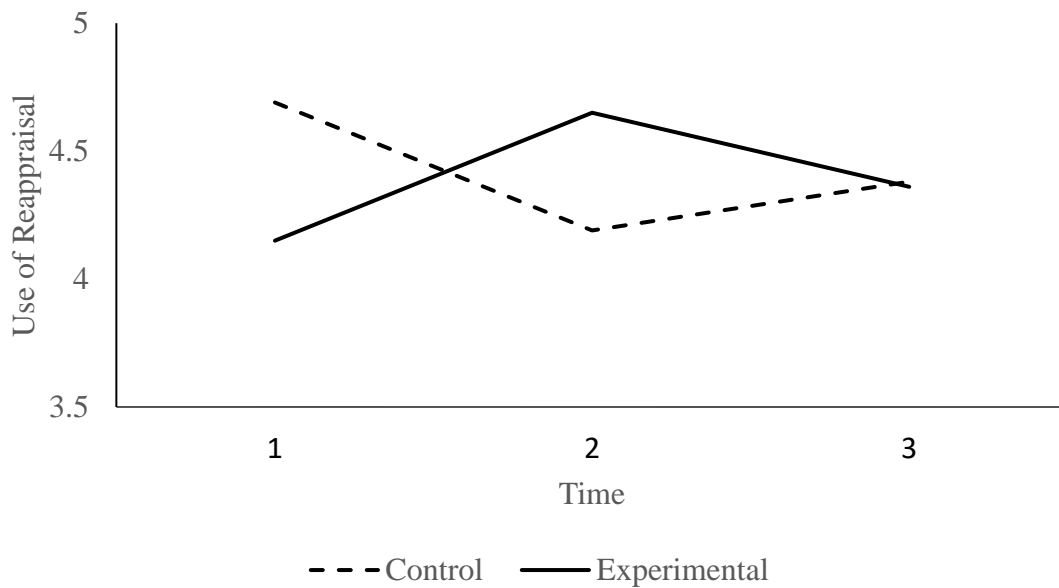


Figure 10. Youths' use of reappraisal across three time points for youth characterized as "less well-regulated".

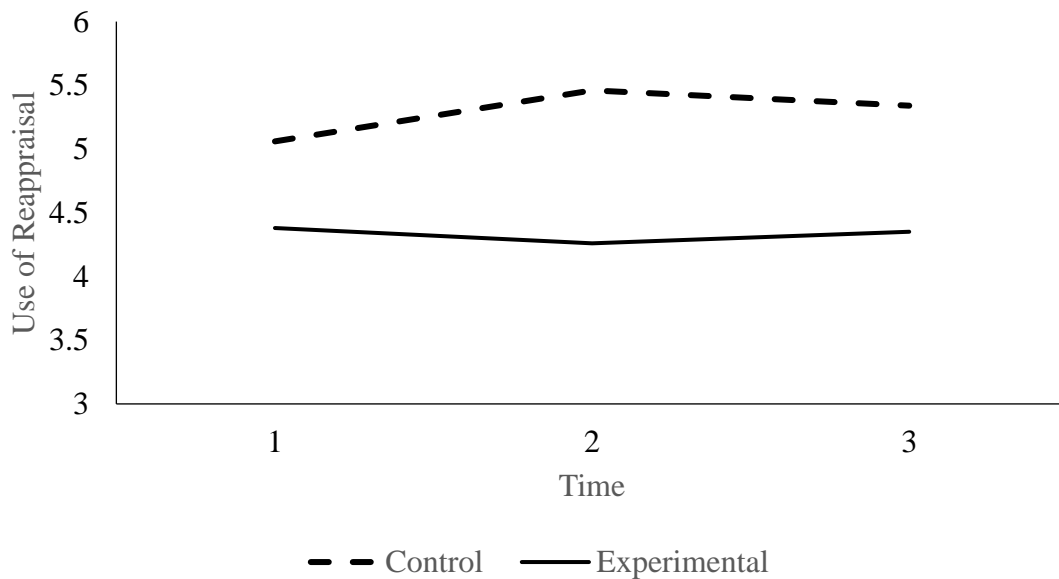


Figure 11. Youths' use of reappraisal across three time points for youth characterized as "better regulated."

# APPENDIX A


This screenshot shows the home page of the 'Stop, Breathe & Think' course on the University of California, Cole2U online platform. The browser address bar shows the URL <https://cole2uonline.edu/courses/885409>. The page features a dark blue sidebar with navigation options: Account, Dashboard, Courses, Calendar, Inbox, and Help. The main content area is titled 'Stop, Breathe & Think' and lists 14 weekly topics as blue hyperlinks: Week 1: What is Peace?, Week 2: Reflective Vs. Reactive, Week 3: Emotions & the Body, Week 4: Becoming Aware of Labels, Week 5: Relax, Ground & Clear, Week 6: Self-Compassion, Week 7: Kindness, Week 8: Change, Week 9: Commonality of Suffering, Week 10: Cause & Effect, Week 11: Equanimity, Week 12: Compassion, Week 13: Joy, and Week 14: Motivation & Interdependence. On the right side, there are buttons for 'View Course Stream' and 'View Course Calendar', and a 'To Do' section that is currently empty. At the bottom of the page, there is a row of four cartoon illustrations of people in various meditative or peaceful poses. A purple banner at the bottom of the page indicates that the user is logged into Student View and provides options to 'Reset Student' or 'Leave Student View'.

This screenshot shows the first page of the 'Week 1: What is Peace?' course. The browser address bar shows the URL <https://cole2uonline.edu/courses/885409/pages/week-1-what-is-peace>. The page features the same dark blue sidebar as the home page. The main content area is titled 'Week 1: What is Peace?' and includes a welcome message: 'Welcome to the course! In this week's class, we will watch 5 videos, and complete journal questions after each video. We will also be listening to a mindfulness audio clip towards the end of class today, and a journal question following.' Below this, there are 'General Instructions' in red text: 'To proceed onto the next page, select the "Next" icon on the bottom right corner of your screen. Please complete all the material on the current page before moving on to the next page.' The central part of the page is dominated by a large, detailed black and white line drawing of a city street scene. In the foreground, a man with glasses and a green shirt is shown from the chest up, looking directly at the viewer. The background shows tall buildings, a bus, a traffic light, and a 'ONE WAY' street sign. A purple banner at the bottom of the page indicates that the user is logged into Student View and provides options to 'Reset Student' or 'Leave Student View'.

Week 1: Check-In & Gratitude Exercise

Home

## Week 1: Check-In & Gratitude Exercise



W1\_V1

Powered by Panopto

• Previous Next •

63 You are currently logged into Student View Reset Student Leave Student View

Resetting the last student will clear all history for this student, allowing you to view the course as a brand new student.

Type here to search

10:00 PM 5/5/2019

Week 1: Check-In Journal: Stop

Home

## Week 1: Check-In Journal

Due No due date Questions 9 Time Limit None

### Instructions

How are you? Take a deep breath and think about how your mind and body feel.

When you are finished please select the "Next" button below to continue.

[Take the Survey](#)

• Previous Next •

63 You are currently logged into Student View Reset Student Leave Student View

Resetting the last student will clear all history for this student, allowing you to view the course as a brand new student.

Type here to search

10:00 PM 5/5/2019

Survey: Week 1: Check-In Journal x +

https://cole2.uonline.edu/courses/885409/quizzes/1736818/take

UNIVERSITY OF CALIFORNIA

Stop > Quizzes > Week 1: Check-In Journal

Home

## Week 1: Check-In Journal

Started: May 5 at 10pm

### Quiz Instructions

How are you? Take a deep breath and think about how your mind and body feel.


When you are finished please select the "Next" button below to continue.

Questions

- Question 1
- Question 2
- Question 3
- Question 4
- Question 5
- Question 6
- Question 7
- Question 8

Time Elapsed: Hide  
0 Minutes, 1 Second

Question 1 1 pts

 I'm mentally...

- Great
- Good
- Meh
- Poor
- Rough

60 You are currently logged into Student View

Resetting the test student will clear all history for this student, allowing you to view the course as a brand new student.

Reset Student Leave Student View

Type here to search

10:00 PM 5/5/2019

https://cole2.uonline.edu/courses/885409/quizzes/1736818/take

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Account

Dashboard


Courses

Calendar

Inbox

Help

Question 1 1 pts

 I'm mentally...

- Great
- Good
- Meh
- Poor
- Rough

Question 7

Question 8

Time Elapsed: Hide  
0 Minutes, 9 Seconds

Question 2 1 pts

60 You are currently logged into Student View

Resetting the test student will clear all history for this student, allowing you to view the course as a brand new student.

Reset Student Leave Student View

← → ↻ <https://cole2.uonline.edu/courses/885409/quizzes/1736818/take> ☆ 👤

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Account

Dashboard


Courses

Calendar

Inbox

Help

Question 2 1 pts

 I'm physically...

- Great
- Good
- Meh
- Poor
- Rough

63 You are currently logged into Student View Resetting the test student will clear all history for this student, allowing you to view the course as a brand new student. [Reset Student](#) [Leave Student View](#)

← → ↻ <https://cole2.uonline.edu/courses/885409/quizzes/1736818/take> ☆ 👤

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Account

Dashboard

Courses


Calendar

Inbox

Help

Question 3 1 pts

I'm emotionally...  
Choose any emotion words from the list below. Pick up to 3 total.



- Hyper
- Hysterical
- Super Excited
- Wild
- None of the Above

63 You are currently logged into Student View Resetting the test student will clear all history for this student, allowing you to view the course as a brand new student. [Reset Student](#) [Leave Student View](#)

11:01 AM

Survey: Week 1: Check-In Journal x +

← → ↻ https://cole2.uonline.edu/courses/885409/quizzes/1736818/take

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Account

Dashboard

Courses


Calendar

Inbox

Help

**Question 4** 1 pts

I'm emotionally...  
Choose any emotion words from the list below. Pick up to 3 total



- Cheerful
- Happy
- Excited
- Great
- Proud
- None of the Above

63 You are currently logged into Student View *Resetting the test student will clear all history for this student, allowing you to view the course as a brand new student.* [Reset Student](#) [Leave Student View](#)

Survey: Week 1: Check-In Journal x +

← → ↻ https://cole2.uonline.edu/courses/885409/quizzes/1736818/take

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Account

Dashboard

Courses


Calendar

Inbox

Help

**Question 5** 1 pts

I'm emotionally...  
Choose any emotion words from the list below. Pick up to 3 total.



- Appreciative
- Caring
- Cozy
- Loving
- Peaceful
- None of the Above

63 You are currently logged into Student View *Resetting the test student will clear all history for this student, allowing you to view the course as a brand new student.* [Reset Student](#) [Leave Student View](#)




Survey: Week 1: Check-In Journal x +  
https://cole2.uonline.edu/courses/885409/quizzes/1736818/take

UNIVERSITY OF CALIFORNIA

Account  
Dashboard  
Courses  
Calendar  
Inbox  
Help

**Question 6** 1 pts

I'm emotionally...  
Choose any emotion words from the list below. Pick up to 3 total.



- Nervous
- Restless
- Uncomfortable
- Worried
- None of the Above

6d You are currently logged into Student View *Resetting the test student will clear all history for this student, allowing you to view the course as a brand new student.* [Reset Student](#) [Leave Student View](#)


Survey: Week 1: Check-In Journal x +  
https://cole2.uonline.edu/courses/885409/quizzes/1736818/take

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Account  
Dashboard  
Courses  
Calendar  
Inbox  
Help

**Question 7** 1 pts

I'm emotionally...  
Choose any emotion words from the list below. Pick up to 3 total.



- Curious
- Quiet
- On my own
- Shy
- None of the Above

6d You are currently logged into Student View *Resetting the test student will clear all history for this student, allowing you to view the course as a brand new student.* [Reset Student](#) [Leave Student View](#)


Survey: Week 1: Check-In Journal x +  
https://cole2.uonline.edu/courses/885409/quizzes/1736818/take

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Account  
Dashboard  
Courses  
Calendar  
Inbox  
Help

**Question 8** 1 pts

I'm emotionally...  
Choose any emotion words from the list below. Pick up to 3 total.



- Disappointed
- Hurt
- Lonely
- Sad
- Sorry
- None of the Above

63 You are currently logged into Student View *Resetting the test student will clear all history for this student, allowing you to view the course as a brand new student.* [Reset Student](#) [Leave Student View](#)


Survey: Week 1: Check-In Journal x +  
https://cole2.uonline.edu/courses/885409/quizzes/1736818/take

UNIVERSITY OF CALIFORNIA

Account  
Dashboard  
Courses  
Calendar  
Inbox  
Help

**Question 9** 1 pts

I'm emotionally...  
Choose any emotion words from the list below. Pick up to 3 total.



- Cranky
- Impatient
- Jealous
- Mad
- Mean
- None of the Above

63 You are currently logged into Student View *Resetting the test student will clear all history for this student, allowing you to view the course as a brand new student.* [Reset Student](#) [Leave Student View](#)

Topic: Week 1: Gratitude Journal

https://cole2.uonline.edu/courses/885409/discussion\_topics/2846453?module\_item\_id=16335044

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Stop > Discussions > Week 1: Gratitude Journal

Home

Account

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Help

Week 1: Gratitude Journal

Reflect on gratitude and reply to the following questions below. Responses should be at least 1-2 sentences long.

Gratitude is the feeling of being thankful and appreciative.

1. What are three material things you are grateful for? (Example: things you use everyday like running water or your bed).
2. Why are they important to you, and how do they make you feel?

After posting your reply, please make a friendly and supportive response on at least two of your fellow peers' posts.

This topic was edited by Maymie D

Search entries or author Unread

Reply

Replies are only visible to those who have posted at least one reply.

Previous Next

63 You are currently logged into Student View

Resetting the test student will clear all history for this student, allowing you to view the course as a brand new student.

Reset Student Leave Student View

Type here to search

10:01 PM 5/5/2019

What is Peace?: Stop, Breathe &

https://cole2.uonline.edu/courses/885409/pages/what-is-peace?module\_item\_id=16334977

UNIVERSITY OF CALIFORNIA

Stop > Pages > What is Peace?

Home

Account

Dashboard

Courses

Calendar

Inbox

Help

What is Peace?

W1\_V3

WHAT IS PEACE?

PEACE

Powered by Panopto

Previous Next

63 You are currently logged into Student View

Resetting the test student will clear all history for this student, allowing you to view the course as a brand new student.

Reset Student Leave Student View

Type here to search

10:01 PM 5/5/2019

Topic: What is Peace? Discussion x +

https://cole2uonline.edu/courses/885409/discussion\_topics/2849218

UNIVERSITY OF CALIFORNIA

Stop > Discussions > What is Peace? Discussion

Home

What is Peace? Discussion  
Emily Shah  
All Sections

Write three words that relate to peace. Example, "calm"  
This topic was edited by Mayme D

Search entries or author Unread [?] [?]

Subscribed

Reply

Mindfulness Mango3  
Apr 9, 2018

- 1.Calm
- 2.Relaxed
- 3.Comfortable

(1 like)

Mindfulness Mango5  
Apr 12, 2018

You did better than me. :(

63 You are currently logged into Student View  
Resetting the test student will clear all history for this student, allowing you to view the course as a brand new student.  
Reset Student Leave Student View

Type here to search

10:02 PM 5/5/2019

Topic: Experience of Peace Discus x +

https://cole2uonline.edu/courses/885409/discussion\_topics/2849219?module\_item\_id=16341740

UNIVERSITY OF CALIFORNIA

Stop > Discussions > Experience of Peace Discussion

Home

Experience of Peace Discussion  
Emily Shah  
All Sections

Peace is an internal state of calmness and openness, an inner sense of well-being that exists regardless of what is going on around us."  
Reflect on what peace is by replying to the questions below in 1-2 sentences.

1. Recall three different occasions when you experienced peace as it's defined above. What were you doing?
2. What about these activities brings you peace? What were you thinking and/or feeling during this activity?

After posting your reply, make a friendly and supportive response to at least two of your fellow peers' posts, at least 1-2 sentences long.  
This topic was edited by Mayme D

Search entries or author Unread [?] [?]

Reply

Replies are only visible to those who have posted at least one reply.

Previous Next

63 You are currently logged into Student View  
Resetting the test student will clear all history for this student, allowing you to view the course as a brand new student.  
Reset Student Leave Student View

Type here to search



10:02 PM 5/5/2019

Mindful Breathing Exercise: Breathe & Chill

Home

## Mindful Breathing Exercise: Breathe & Chill

Click the audio track below to begin the mindful breathing exercise.

63 You are currently logged into Student View

Resetting the test student will clear all history for this student, allowing you to view the course as a brand new student.

Reset Student Leave Student View

10:02 PM 5/5/2019

Survey: Mindful Breathing Journal

Home

## Mindful Breathing Journal

Started: May 5 at 10:03pm

### Quiz Instructions

After practicing Mindful Breathing, reply to the questions in this survey. Responses should be a minimum of 1-2 sentences each.

#### Questions

- Question 1
- Question 2
- Question 3
- Question 4

Time Elapsed: Hide  
0 Minutes, 3 Seconds

Question 1 1 pts

Were you able to find a comfortable posture? What worked best for you?

HTML Editor

63 You are currently logged into Student View

Resetting the test student will clear all history for this student, allowing you to view the course as a brand new student.

Reset Student Leave Student View

10:03 PM 5/5/2019

## APPENDIX B

### Week 1: What is Peace?

#### 1. Video 1: Intro, Check in & Gratitude

#### 2. Check-In

How are you?

Take a deep breath and think about how your mind and body feel.

1. I'm mentally....

Great

Good

Meh

Poor

Rough

2. I'm physically...

Great

Good

Meh

Poor

Rough

3. I'm Emotionally...

Choose any emotion words from the sections below. Pick 3 total.



- Hyper
- Hysterical
- Super Excited
- Wild



- Cheerful
- Happy
- Excited
- Great
- Proud



- Appreciative

- Caring
- Cozy
- Loving
- Peaceful



- Nervous
- Restless
- Uncomfortable
- Worried



- Curious
- Quiet
- On my own
- Shy



- Disappointed
- Hurt
- Lonely
- Sad
- Sorry



- Cranky

- Impatient
- Jealous
- Mad
- Mean

### 3. Gratitude Journal

Gratitude is the feeling of being thankful and appreciative. Reflect on gratitude and reply to the questions below. Responses should be at least 1-2 sentences long.

1. What are three material things are you grateful for? (Example: things you use everyday like running water or your bed.)
2. Why are they important to you, and how do they make you feel?

After posting your reply, make a friendly and supportive response on at least two of your fellow participants' posts. Responses should be at least 1-2 sentences long.

### 4. Video 2: What is Peace? Part 2

#### 5. What is peace to you?

Write three words that relate to peace. Example, "calm".

### 6. Video 4: Experience of peace: Part 1

#### 8. Experience of Peace Journal

What is peace?

"Peace is an internal state of calmness and openness, an Inner sense of wellbeing that exists regardless of what is going on around us."

Reflect on what peace is by replying to the questions below in 1-2 sentences.

- 1.) Recall three different occasions when you experienced peace as it's defined above. What were you doing?
- 2.) What about these activities brings you peace? What were you thinking and / or feeling during this activity?

After posting your reply, make a friendly and supportive response to at least two of your fellow participants' posts, at least 1-2 sentences long.

### 9. Video 5: What is Mindfulness?

#### 10. Mindful Breathing

**Press Play: Mindful Breathing (insert track here)**

Now that you are present and connected to your body and breathe, begin the mindful breathing exercise.

#### 11. Mindful Breathing Journal



After practicing Mindful Breathing reply to the questions below. Responses should be a minimum of 1-2 sentences each.

1. Were you able to find a comfortable posture? What worked best for you?
2. Were you able to keep your attention on your breathing?
3. While you were breathing mindfully, what thoughts, emotions or physical sensations came up for you?
4. What challenges did you experience while practicing mindful breathing?

### Week 2: Reflective Vs. Reactive

#### 1. Video 1: Intro, Check in & Gratitude

#### 2. Check-In

How are you?

Take a deep breath and think about how your mind and body feel.

1. I'm mentally...

Great

Good

Meh

Poor

Rough

2. I'm physically...

Great

Good

Meh

Poor

Rough

3. I'm Emotionally...

Choose any emotion words from the sections below. Pick 3 total.



- Hyper
- Hysterical
- Super Excited
- Wild



- Cheerful
- Happy
- Excited
- Great
- Proud



- Appreciative
- Caring
- Cozy
- Loving
- Peaceful



- Nervous
- Restless
- Uncomfortable
- Worried



- Curious
- Quiet
- On my own
- Shy



- Disappointed
- Hurt
- Lonely
- Sad
- Sorry



- Cranky
- Impatient
- Jealous
- Mad
- Mean

### 3. Gratitude Journal

Gratitude is the feeling of being thankful and appreciative. Reflect on gratitude and reply to the questions below. Responses should be at least 1-2 sentences long.

1. What opportunities do you have that you are grateful for? Describe why you are grateful for them and how they make you feel. Example: Performing in a school play is an opportunity to connect with my peers.
2. Though it might be challenging, try to find something you are grateful for about a limitation you have. For example, math is a difficult subject for me, but i'm learning to try hard and apply myself everyday, practicing good study habits.

After posting your reply, make a friendly and supportive response on at least two of your fellow participants' posts. Responses should be at least 1-2 sentences long.

### 4. Video 2: Settled or Stirred / Reflective VS. Reactive

#### 5. Reflective vs. Reactive Journal

##### Reflective:

Feeling calm and settled.

##### Reactive:

Feeling stressed, threatened, or stirred  
Up

What are you like when you are reflective? What are you like when you are reactive? Reply to the questions below. Responses should be at least 1-2 sentences long.

1. What is your tone of voice like when you are reflective? (Happy, calm, settled etc.)
2. What is your tone of voice like when you are reactive? (Angry, irritated, stirred up etc.)
3. What kind of words do you use when you are reflective? (Happy, calm, settled etc.)
4. What kind of words do you use when you are reactive? (Angry, irritated, stirred up etc.)
5. What do people say that makes you reflective? (Happy, calm, settled etc.)
6. What do people say that makes you reactive? (Angry, irritated, stirred up etc.)
7. What do you notice about your answers, are there similarities? Are the same things you do when you're reactive the same things that other people do or say that make you reactive?

After posting your reply, make a friendly and supportive response on at least two of your fellow participants' posts. Responses should be at least 1-2 sentences long.

## 6. Video 3: Stress & Calm

### 7. Even Breathing

**Press Play: Even Breathing (insert track here)**

Now that you are present and connected to your body and breathe, begin the even breathing exercise.

### 8. Even Breathing Journal

Reflect on Even Breathing. Reply to the questions below. Responses should be at least 1-2 sentences long.

1. Were you able to keep your attention on your breathing?
2. While you were breathing mindfully, what thoughts, emotions or physical sensations came up for you?
3. What challenges did you experience while practicing even breathing?
4. How did you feel after the even breathing exercise?

## Week 3: Emotions and the Body

### 1. Video 1: Check in & Gratitude

#### 2. Check-In

How are you?

Take a deep breath and think about how your mind and body feel.

1. I'm mentally....

Great

Good

Meh

Poor

Rough

2. I'm physically...

Great

Good

Meh

Poor

Rough

3. I'm Emotionally...

Choose any emotion words from the sections below. Pick 3 total.



- Hyper
- Hysterical
- Super Excited
- Wild



- Cheerful
- Happy
- Excited
- Great
- Proud



- Appreciative
- Caring
- Cozy
- Loving
- Peaceful



- Nervous
- Restless
- Uncomfortable
- Worried



- Curious
- Quiet
- On my own
- Shy



- Disappointed
- Hurt
- Lonely
- Sad

- Sorry



- Cranky
- Impatient
- Jealous
- Mad
- Mean

### 3. Gratitude Journal

Gratitude is the feeling of being thankful and appreciative. Reflect on gratitude and reply to the questions below. Responses should be at least 1-2 sentences long.

1. What freedoms do you have that you are grateful for? Choose one or multiple freedoms in your life, and describe why you are grateful for them and how they make you feel. For example, freedom of speech allows me the chance to share my ideas, hopes and beliefs.

After posting your reply, make a friendly and supportive response on at least two of your fellow participants' posts. Responses should be at least 1-2 sentences long.

### 4. Video 2: Emotions in the Body: Part 1

#### 5. Emotions and the Body Journal

Reply to the questions below. Responses should be at least 1-2 sentences long.

1. Recall a few emotions you are familiar with, where do you feel those emotions in your body? What do those emotions feel like? For example, when I am nervous, It feels like I have butterflies in my stomach.

### 6. Video 3: Emotions in the Body: Part 2

#### 7. Body Scan

Press Play: Body Scan (insert track here)

#### 8. Body Scan Journal

Reflect on the 'Body Scan Meditation'. Reply to the questions below. Responses should be at least 1-2 sentences long.

1. What did you notice while practicing the Body Scan?
2. Did you notice any sensations in the different areas of your body? If so, what kind and where?
3. What thoughts or emotions did you notice while practicing the Body Scan?
4. Were those thoughts and emotions connected to any specific parts of your body?
5. What else did you notice?

#### Week 4: Becoming Aware of Labels

##### 1. Video 1: Check in & Gratitude

##### 2. Check-In

How are you?

Take a deep breath and think about how your mind and body feel.

1. I'm mentally...

Great                      Good                      Meh                      Poor                      Rough

2. I'm physically...

Great                      Good                      Meh                      Poor                      Rough

3. I'm Emotionally...

Choose any emotion words from the sections below. Pick 3 total.



- Hyper
- Hysterical
- Super Excited
- Wild



- Cheerful
- Happy
- Excited
- Great
- Proud



- Appreciative
- Caring
- Cozy
- Loving
- Peaceful



- Nervous
- Restless
- Uncomfortable
- Worried



- Curious
- Quiet
- On my own
- Shy



- Disappointed
- Hurt
- Lonely
- Sad
- Sorry





- Cranky
- Impatient
- Jealous
- Mad
- Mean

### 3. Gratitude Journal

Gratitude is the feeling of being thankful and appreciative. Reflect on gratitude and reply to the question below. Responses should be at least 1-2 sentences long.

1. Focus on your five senses (smell, hearing, taste, touch & sight). Pick three of your senses and describe why you are grateful for them and how they make you feel. Example: I'm grateful for my sense of sight so I can see movement and color around me when I am in nature, it makes me feel inspired.

After posting your reply, make a friendly and supportive response on at least two of your fellow participants' posts. Responses should be at least 1-2 sentences long.

### 4. Video 1: Becoming Aware of Labels

### 5. Becoming Aware of Labels Journal

During the exercise, you will be asked to describe what you see, hear, smell, taste, and touch, with judgmental adjectives and with observational adjectives. Reply to each question below.

#### Judgmental Adjectives

When we encounter a person, a situation, or a thing, we make a judgment and assign a label to it, either positive or negative: "that chair is nice," or "that table is ugly," "I like this person," or "I don't like that person." Then we have an emotional reaction, which causes us either to want more of what we like or to avoid what we don't like. In other words, we start to become stirred up.

#### Observation Adjectives

When we encounter a person, a situation, or a thing, we are non-judgmental and assign a label that's neither positive or negative, describing what you see, hear, smell, taste, and touch, without judgment: "that chair is empty," or "that table is made of wood," "the sky is blue," or "that's a human being."

1.) Select all of the judgmental adjectives

- Ugly
- Large
- Pretty
- Stupid
- Small
- Color (Red, Yellow, Green, Blue)
- Good
- Soft
- Hard
- Bad
- Smelly
- Bland
- Annoying
- Loud
- Quiet

2.) Select all of the observational adjectives

- Hot
- Normal
- Cold
- Weird
- Delicious
- Sweet
- Sour
- Rough
- Smooth
- Scary
- Gross
- Shiny
- Wet
- Dry
- Light
- Heavy

3.) Pick something you see or hear and describe it using observational adjectives.

### **7. Engaging your Senses**

**Press Play: Engaging your senses (insert track here)**

### **8. Engaging your Senses Journal**

Reflect on “Engaging Your Senses.” Reply to the question below. Responses should be at least 1-2 sentences long.

1. Did you notice any tendencies to ascribe positive or negative labels to your sensory experiences and environment?

2. Were you able to focus your attention on your sensory experience with presence, gentleness, open curiosity and non-judgment?
3. Was it easier to focus on certain senses over others?
4. Pick one of the senses and describe what it was like to mindfully engage that sense.

**Week 5: Relax Ground & Clear**

**1. Video 1: Check in & Gratitude**

**2. Check-In**

How are you?

Take a deep breath and think about how your mind and body feel.

1. I'm mentally....

Great                  Good                  Meh                  Poor                  Rough

2. I'm physically...

Great                  Good                  Meh                  Poor                  Rough

3. I'm Emotionally...

*Choose any emotion words from the sections below. Pick 3 total.*



- Hyper
- Hysterical
- Super Excited
- Wild



- Cheerful
- Happy
- Excited
- Great
- Proud



- Appreciative
- Caring
- Cozy
- Loving
- Peaceful



- Nervous
- Restless
- Uncomfortable
- Worried



- Curious
- Quiet
- On my own
- Shy



- Disappointed
- Hurt
- Lonely
- Sad
- Sorry



- Cranky
- Impatient
- Jealous
- Mad
- Mean

### 3. Gratitude Journal

Gratitude is the feeling of being thankful and appreciative. Reflect on gratitude and reply to the questions below. Responses should be at least 1-2 sentences long.

1. Recall an experience or situation in your past, even your recent past that you are grateful for, why do you appreciate that experience?
2. What vacations or field trips have you taken that you appreciate and why?
3. Recall a conversation you had with a family member, a teacher or a friend that you appreciate and why?

After posting your reply, make a friendly and supportive response on at least two of your fellow participants' posts. Responses should be at least 1-2 sentences long.

### 4. Video 3: Practicing Meditation 1

### 5. Video 4: Practicing Meditation 2

### 6. Relax Ground & Clear

Press Play: Relax Ground & Clear (insert track here)

### 7. Relax Ground & Clear Journal

Reflect on Relax, Ground and Clear. Reply to the questions below. Responses should be at least 1-2 sentences long.

1. What was it like to imagine feeling a sense of peace and calm?
2. What was it like to imagine feeling grounded and stable?
3. What was it like to imagine the vastness of the sky?
4. Did any challenges arise while doing this meditation?
5. What else did you notice?

## Week 6: Self Compassion

### 1. Video 1: Introduction

### 2. Video 2: Check in & Gratitude

### 3. Check-In

How are you?

Take a deep breathe and think about how your mind and body feel.

1. I'm mentally....

Great

Good

Meh

Poor

Rough

2. I'm physically...

Great

Good

Meh

Poor

Rough

3. I'm Emotionally...

*Choose any three emotion words from the sections below. Pick 3 total.*



- Hyper
- Hysterical
- Super Excited
- Wild



- Cheerful
- Happy
- Excited
- Great
- Proud



- Appreciative
- Caring
- Cozy
- Loving
- Peaceful



- Nervous
- Restless
- Uncomfortable
- Worried



- Curious
- Quiet
- On my own
- Shy



- Disappointed
- Hurt
- Lonely
- Sad
- Sorry



- Cranky
- Impatient
- Jealous
- Mad
- Mean

#### 4. Gratitude Journal

Gratitude is the feeling of being thankful and appreciative. Reflect on why you are grateful for yourself and reply to the questions below. Responses should be at least 1-2 sentences long.

1. What basic abilities do you have that you appreciate and why? For example, your ability to learn new things.
2. What unique skills and talents do you have that you appreciate and why? Like your ability to draw, write, or play sports.

3. What personal qualities do you have that you are grateful for and why? Such as being a good listener or a caring friend?

After posting your reply, make a friendly and supportive response on at least two of your fellow participants' posts. Responses should be at least 1-2 sentences long.

**5. Video 3: The Inner Critic**

**6. Video 4: The Inner Ally**

**7. Self Compassion**

Press Play: Self Compassion (insert track here)

**8. Self-Compassion Journal**

Reflect on Self-Compassion. Reply to the questions below. Responses should be at least 1-2 sentences long.

1. What did you notice while practicing self-compassion?
2. Did you call to mind a situation in your life right now that is challenging or difficult? What was it the situation and how did it make you feel?
3. What was the kind wish you made for yourself?
4. Did any thoughts and emotions come up for you during the self-compassion meditation? Where did you feel them in your body?
5. What did you tell yourself that you needed to hear? For example, "It's going to be okay".
6. What else did you notice?

**Week 7: Kindness**

**1. Video 1: Check in & Gratitude**

**2. Check-In**

How are you?

Take a deep breath and think about how your mind and body feel.

1. I'm mentally....
 

Great	Good	Meh	Poor	Rough
-------	------	-----	------	-------
2. I'm physically...
 

Great	Good	Meh	Poor	Rough
-------	------	-----	------	-------
3. I'm Emotionally...

Choose any emotion words from the sections below. Pick 3 total.





- Hyper
- Hysterical
- Super Excited
- Wild



- Cheerful
- Happy
- Excited
- Great
- Proud



- Appreciative
- Caring
- Cozy
- Loving
- Peaceful



- Nervous
- Restless
- Uncomfortable
- Worried



- Curious
- Quiet
- On my own
- Shy



- Disappointed
- Hurt
- Lonely
- Sad
- Sorry



- Cranky
- Impatient
- Jealous
- Mad
- Mean

### 3. Gratitude Journal

Gratitude is the feeling of being thankful and appreciative. Reflect on gratitude and reply to the questions below. Responses should be at least 1-2 sentences long.

1. Choose one person or multiple people in your life, and describe why you are grateful for them and how they make you feel. For example, my best friend because they make me laugh.
2. Though it might be challenging, try to find something you are grateful for in a person that you might find difficult to be around. For example, even though my teacher challenges me, they have taught me a lot.

After posting your reply, make a friendly and supportive response on at least two of your fellow participants' posts. Responses should be at least 1-2 sentences long.

#### 4. Video 2: What is Kindness? Part 1

#### 5. What is kindness?

Write three words that relate to kindness.

#### 6. Video 3: What is Kindness? Part 2

#### 7. Kindness

Press Play: Kindness (insert track here)

#### 8. Kindness Journal

Reflect on Kindness. Reply to the questions below. Responses should be at least 1-2 sentences long.

1. What was it like to extend Kindness to yourself?
2. As you practiced the Kindness meditation, did it influence how you view other people?
3. Did it change the way you respond to other people?
4. What gets in the way of Kindness? Think about what gets in the way of Kindness for you, and list them here.

### Week 8: Change

#### 1. Video 1: Check in & Gratitude

#### 2. Check-In

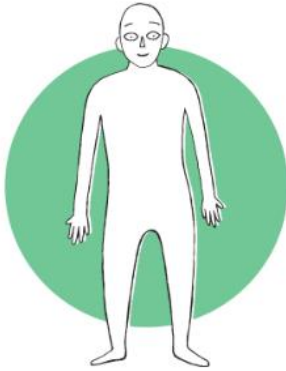
How are you?

Take a deep breath and think about how your mind and body feel.



1. I'm mentally....

Great    Good    Meh    Poor    Rough



2. I'm physically...

Great    Good    Meh    Poor    Rough

3. I'm Emotionally...

*Choose any emotion words from the sections below. Pick 3 total.*



- Hyper
- Hysterical
- Super Excited
- Wild



- Cheerful
- Happy

- Excited
- Great
- Proud



- Appreciative
- Caring
- Cozy
- Loving
- Peaceful



- Nervous
- Restless
- Uncomfortable
- Worried



- Curious
- Quiet
- On my own
- Shy



- Disappointed
- Hurt
- Lonely
- Sad
- Sorry



- Cranky
- Impatient
- Jealous
- Mad
- Mean

### 3. Gratitude Journal

Gratitude is the feeling of being thankful and appreciative. Reflect on gratitude and reply to the questions below. Responses should be at least 1-2 sentences long.

1. What are three changes that you experienced or three types of change that you are grateful for? (Example: When the leaves on the trees change color in the autumn)
2. Why are these changes important to you, and how do they make you feel?

After posting your reply, make a friendly and supportive response on at least two of your fellow participants' posts. Responses should be at least 1-2 sentences long.

### 4. Video 2: Change

#### 5. Journal: How Have I Experienced Change?

Reflect on the ways you have experienced change by replying to the questions below in 1-2 sentences.

- 1.) How have you experienced change personally?
- 2.) How have you experienced change among your family?
- 3.) How have you experienced change among your friends?
- 4.) How have you experienced change at school?

After posting your reply, make a friendly and supportive response to at least two of your fellow participants' posts, at least 1-2 sentences long.



**10. Audio: Change Meditation**

**Press Play: Change (insert track here)**

To strengthen your awareness of change, practice the Change meditation.

**11. Journal: Change Meditation**

After practicing the meditation on Change reply to the questions below. Responses should be a minimum of 1-2 sentences each.

1. What would life be like if nothing changed?
2. Why take the time to notice that everything is changing all of the time?

# APPENDIX C

## Week 1: North America

### 1. Video 1: Intro, Check in & Journal

#### 2. Check-In

How are you?

Take a deep breath and think about how your mind and body feel.

1. I'm mentally....

Great                      Good                      Meh                      Poor                      Rough

2. I'm physically...

Great                      Good                      Meh                      Poor                      Rough

3. I'm Emotionally...

Choose any emotion words from the sections below. Pick 3 total.



- Hyper
- Hysterical
- Super Excited
- Wild



- Cheerful
- Happy
- Excited
- Great
- Proud



- Appreciative
- Caring

- Cozy
- Loving
- Peaceful



- Nervous
- Restless
- Uncomfortable
- Worried



- Curious
- Quiet
- On my own
- Shy





- Disappointed
- Hurt
- Lonely
- Sad
- Sorry



- Cranky
- Impatient
- Jealous
- Mad
- Mean

### 3. Journal

What did you eat today? What different types of food did you eat for breakfast, lunch, and dinner?  
Responses should be at least 1-2 sentences long.

1. What different types of food did you eat for breakfast, lunch, and dinner? (Example: I had an apple for breakfast, and a Peanut butter and jelly sandwich for lunch)
2. What is your favorite meal of the day?

After posting your reply, make a friendly and supportive response on at least two of your fellow participants' posts. Responses should be at least 1-2 sentences long.

### 4. Video 2: North America – History & Geography

#### 5. What is North America to you?

Write three words that remind you of North America.

### 6. Video 3: North America: Food & Activities

#### 8. North America: Food and Activities Journal

What did you learn about North American foods and activities?

Reflect on what you learned about North America by replying to the questions below in 1-2 sentences.

- 1.) Recall three different foods that North Americans eat?
- 2.) Recall different activities that North Americans typically engage in?

After posting your reply, make a friendly and supportive response to at least two of your fellow participants' posts, at least 1-2 sentences long.

### 9. Video 4: North America Review

#### 10. Reflect on what you learned about North America

##### Press Play: Listen about North America (insert track here)

Now that you have learned about the geography, history, food, and activities of North America, begin the North America listening exercise.

### 11. Listen about North American Journal

After listening about North America, reply to the questions below. Responses should be a minimum of 1-2 sentences each.

1. What did you learn about the geography of North America?
2. What did you learn about the history of North America?
3. What did you learn about the different foods native to the area?
4. What did you learn about the different activities of the area?

### Week 2: South America

#### 1. Video 1: Intro, Check in & Journal

#### 2. Check-In

How are you?

Take a deep breath and think about how your mind and body feel.

1. I'm mentally....

Great

Good

Meh

Poor

Rough

2. I'm physically...

Great

Good

Meh

Poor

Rough

3. I'm Emotionally...

Choose any emotion words from the sections below. Pick 3 total.



- Hyper
- Hysterical
- Super Excited
- Wild



- Appreciative
- Caring
- Cozy
- Loving
- Peaceful



- Cheerful
- Happy
- Excited
- Great
- Proud



- Nervous
- Restless
- Uncomfortable
- Worried



- Curious
- Quiet
- On my own
- Shy

- Disappointed
- Hurt
- Lonely
- Sad
- Sorry



- Cranky
- Impatient
- Jealous
- Mad
- Mean



### 3. Journal

Who did you see today? Reflect on the people you saw today and reply to the questions below. Responses should be at least 1-2 sentences long.

1. Who did you see today? Did you see your family?
2. Did you see anyone outside of your immediate family? (e.g., friends, teachers)

After posting your reply, make a friendly and supportive response on at least two of your fellow participants' posts. Responses should be at least 1-2 sentences long.

### 4. Video 2: South America – History & Geography

#### 5. South America – History & Geography Journal

What do you remember from the video about the history and geography of South America? Where is South America geographically located? Reply to the questions below. Responses should be at least 1-2 sentences long.

1. What is the weather like in South America?
2. Who lived in South America before it was colonized?
3. What was the first country in South America?
4. What is the name of the biggest forest in South America?
5. What is the name of the longest river in South America?
6. What oceans surround South America?
7. Is South America located above or below the equator?

After posting your reply, make a friendly and supportive response on at least two of your fellow participants' posts. Responses should be at least 1-2 sentences long.

### 6. Video 3: South America – Food & Activities

#### 7. Listen about South America

Press Play: Listen about South America (insert track here)

Now that you have learned about South America, begin the Listen about South America exercise.

### 8. Listen about South America Journal

Reflect on what you learned about South America.

Reply to the questions below. Responses should be at least 1-2 sentences long.

1. What did you learn about the geography of South America?
2. What did you learn about the history of South America?
3. What did you learn about the different foods native to the area?
4. What did you learn about the different activities of the area?

### Week 3: Asia

#### 1. Video 1: Check in & Journal

#### 2. Check-In

How are you?

Take a deep breath and think about how your mind and body feel.

1. I'm mentally....

Great

Good

Meh

Poor

Rough

2. I'm physically...

Great

Good

Meh

Poor

Rough

3. I'm Emotionally...

Choose any emotion words from the sections below. Pick 3 total.



- Hyper
- Hysterical
- Super Excited
- Wild



- Appreciative
- Caring
- Cozy
- Loving
- Peaceful



- Cheerful
- Happy
- Excited
- Great
- Proud



- Nervous
- Restless
- Uncomfortable
- Worried



- Curious
- Quiet
- On my own
- Shy

- Disappointed
- Hurt
- Lonely
- Sad
- Sorry



- Cranky
- Impatient
- Jealous
- Mad
- Mean



### 3. Journal

What play activities did you do today? Reflect on these activities and reply to the questions below. Responses should be at least 1-2 sentences long.

1. What activities did you do today for fun? Did you play a sport? Did you participate in arts and crafts? Did you play with a pet?

After posting your reply, make a friendly and supportive response on at least two of your fellow participants' posts. Responses should be at least 1-2 sentences long.

### 4. Video 2: Asia – History & Geography

#### 5. Asia – History & Geography Journal

Reply to the questions below. Responses should be at least 1-2 sentences long.

1. Where geographically is Asia located? What is unique about this continent's geographical location? What is the weather like? Are there seasons?

### 6. Video 3: Asia – Food & Activities

#### 7. Listen about Asia

Press Play: Listen about Asia (insert track here)

#### 8. Listen about Asia Journal

Reflect on the 'Listen about Asia' audio track. Reply to the questions below. Responses should be at least 1-2 sentences long.

1. What did you learn about the geography of Asia?

2. What did you learn about the history of Asia?
3. What did you learn about the different foods native to the area?
4. What did you learn about the different activities of the area?

**Week 4: Africa**

**1. Video 1: Check in & Journal**

**2. Check-In**

How are you?

Take a deep breath and think about how your mind and body feel.

1. I'm mentally....

Great                      Good                      Meh                      Poor                      Rough

2. I'm physically...

Great                      Good                      Meh                      Poor                      Rough

3. I'm Emotionally...

Choose any emotion words from the sections below. Pick 3 total.



- Hyper
- Hysterical
- Super Excited
- Wild



- Nervous
- Restless
- Uncomfortable
- Worried



- Cheerful
- Happy
- Excited
- Great
- Proud



- Curious
- Quiet
- On my own
- Shy



- Appreciative
- Caring
- Cozy
- Loving
- Peaceful



- Disappointed
- Hurt

- Lonely
- Sad
- Sorry



- Cranky
- Impatient
- Jealous
- Mad
- Mean

### 3. Journal

Where did you go today? Reflect on gratitude and reply to the question below. Responses should be at least 1-2 sentences long.

1. Where did you go today? Did you go to school? Did you go to a restaurant? How did you get there? By bicycle?

After posting your reply, make a friendly and supportive response on at least two of your fellow participants' posts. Responses should be at least 1-2 sentences long.

### 4. Video 1: Africa – History, Geography, Food, & Activities

### 5. Africa – History, Geography, Food, & Activities Journal

During the exercise, you will be asked to describe what you remember about the history, geography, food, and activities of Africa. Reply to each question below.

- 1.) Select all the types of foods they eat in Africa

- Grain
- Honey
- Yogurt
- Cheese
- Yams
- Palm Oil
- Millet
- Wheat
- Lentils
- Chickpeas
- Rice
- Tropical Fruits
- Sheep
- Pacific Salmon
- Sweet Potato

- 2.) Select all the types of activities they do in Africa

- Mancala boards
- Soccer
- Basketball
- Mahjang
- Diketo
- Nguni
- Morabaraba
- Kho-kho
- Kgati
- Ping-pong
- Ice-skating
- Monopoly
- Football
- Chess
- Hopscotch
- Cards

- 3.) Pick something you remember about Africa's geography and write about it using observational adjectives.

### 7. Listen about Africa

Press Play: 'Listen about Africa' audio track

**8. 'Listen about Africa' Journal**

Reflect on 'Listen about Africa' Reply to the question below. Responses should be at least 1-2 sentences long.

1. What did you learn about the geography of Africa?
2. What did you learn about the history of Africa?
3. What did you learn about the different foods native to the area?
4. What did you learn about the different activities of the area?

**Week 5: Antarctica**

**1. Video 1: Check in & Journal**

**2. Check-In**

How are you?

Take a deep breath and think about how your mind and body feel.

1. I'm mentally....

Great                      Good                      Meh                      Poor                      Rough

2. I'm physically...

Great                      Good                      Meh                      Poor                      Rough

3. I'm Emotionally...

Choose any emotion words from the sections below. Pick 3 total.



- Hyper
- Hysterical
- Super Excited
- Wild



- Appreciative
- Caring
- Cozy
- Loving
- Peaceful



- Cheerful
- Happy
- Excited
- Great
- Proud



- Nervous
- Restless
- Uncomfortable
- Worried





- Disappointed
- Hurt
- Lonely
- Sad
- Sorry

- Curious
- Quiet
- On my own
- Shy



- Cranky
- Impatient
- Jealous
- Mad
- Mean

### 3. Journal

Where have you gone on vacation? Reflect on your vacations and reply to the questions below. Responses should be at least 1-2 sentences long.

1. Recall an experience or situation in your past
2. What vacations or field trips have you taken?
3. Recall a conversation you had with a family member, a teacher or a friend?

After posting your reply, make a friendly and supportive response on at least two of your fellow participants' posts. Responses should be at least 1-2 sentences long.

### 4. Video 2: Antarctica – History & Geography

### 5. Video 3: Antarctica – Food & Activities

### 6. Listen about Antarctica

Press Play: 'Listen about Antarctica' audio track

### 7. 'Listen about Antarctica' Journal

Reflect on what you learned about Antarctica. Reply to the questions below. Responses should be at least 1-2 sentences long.

1. What did you learn about the geography of Antarctica?
2. What did you learn about the history of Antarctica?
3. What did you learn about the different foods native to the area?
4. What did you learn about the different activities of the area?

## Week 6: Europe

1. Video 1: Introduction
2. Video 2: Check in & Journal
3. Check-In

How are you?

Take a deep breathe and think about how your mind and body feel.

1. I'm mentally....

Great                      Good                      Meh                      Poor                      Rough

2. I'm physically...

Great                      Good                      Meh                      Poor                      Rough

3. I'm Emotionally...

Choose any three emotion words from the sections below. Pick 3 total.



- Hyper
- Hysterical
- Super Excited
- Wild



- Nervous
- Restless
- Uncomfortable
- Worried



- Cheerful
- Happy
- Excited
- Great
- Proud



- Curious
- Quiet
- On my own
- Shy



- Appreciative
- Caring
- Cozy
- Loving
- Peaceful



- Disappointed
- Hurt
- Lonely
- Sad
- Sorry



- Cranky
- Impatient
- Jealous
- Mad
- Mean

**4. Journal**

What is your favorite subject in school? Reflect on your favorite subject and reply to the questions below. Responses should be at least 1-2 sentences long.

1. What is your favorite subject and why? For example, math because you like to count.
2. What is your least favorite subject and why? Like your ability to draw, write, or play sports.
3. Do you want to learn another language? Why or why not?

After posting your reply, make a friendly and supportive response on at least two of your fellow participants' posts. Responses should be at least 1-2 sentences long.

**5. Video 3: Europe – History & Geography**

**6. Video 4: Europe – Food & Activities**

**7. Listen about Europe**

Press Play: 'Listen about Europe' audio track

**8. 'Listen about Europe' Journal**

Reflect on what you learned about Europe. Reply to the questions below. Responses should be at least 1-2 sentences long.

1. What did you learn about the geography of Europe?
2. What did you learn about the history of Europe?
3. What did you learn about the different foods native to the area?
4. What did you learn about the different activities of the area?

**Week 7: Oceania**

**1. Video 1: Check in & Journal**

**2. Check-In**

How are you?

Take a deep breath and think about how your mind and body feel.

1. I'm mentally....
 

Great	Good	Meh	Poor	Rough
-------	------	-----	------	-------
2. I'm physically...
 

Great	Good	Meh	Poor	Rough
-------	------	-----	------	-------
3. I'm Emotionally...

Choose any emotion words from the sections below. Pick 3 total.



- Hyper
- Hysterical
- Super Excited
- Wild

- Curious
- Quiet
- On my own
- Shy



- Disappointed
- Hurt
- Lonely
- Sad
- Sorry



- Cheerful
- Happy
- Excited
- Great
- Proud



- Cranky
- Impatient
- Jealous
- Mad
- Mean



- Appreciative
- Caring
- Cozy
- Loving
- Peaceful



- Nervous
- Restless
- Uncomfortable
- Worried



### **3. Journal**

How many siblings do you have? Reflect on your siblings and pets and reply to the questions below. Responses should be at least 1-2 sentences long.

1. How many siblings do you have? Are you an only child, the oldest child, the middle child, or the youngest child? Describe your siblings are if you have any. If you have no siblings, describe a pet or another family member. For example, my older sister has long hair.

2. What do your siblings like to do for fun? If you have no siblings, describe a pet or another family member. For example, my dog likes to chew his toy.

After posting your reply, make a friendly and supportive response on at least two of your fellow participants' posts. Responses should be at least 1-2 sentences long.

### **4. Video 2: Oceania – History & Geography**

#### **5. Oceania – History & Geography Discussion**

Write three words that remind you of Oceania?

### **6. Video 3: Oceania – Food & Activities**

#### **7. Listen about Oceania**

Press Play: 'Listen about Oceania' audio track

#### **8. 'Listen about Oceania' Journal**

Reflect on what you learned about Oceania. Reply to the questions below. Responses should be at least 1-2 sentences long.

1. What did you learn about the geography of Oceania?
2. What did you learn about the history of Oceania?
3. What did you learn about the different foods native to the area?
4. What did you learn about the different activities of the area?

APPENDIX D

ID Number \_\_\_\_\_

Date of Birth (Month/Day/Year): \_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_

Ethnicity: (please circle)

Hispanic                      Non-Hispanic                      Other (please describe): \_\_\_\_\_

Race: (circle ALL that apply)

Caucasian/white

African-American

Asian/ Pacific Islander

Please describe:

\_\_\_\_\_

Latino/Chicano

Middle Eastern

Native American

Other (please describe): \_\_\_\_\_

Gender: (please circle)

Male

Transgender

Female

## DERS

Directions: Please indicate how often the following statements apply to you by writing the appropriate number from the scale below on the line beside each item:

For each item, please **circle** your answer for each item using the following scale:

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>5</b>			
Almost never	Sometimes	About half the time	Most of the time
Almost always			
(0-10%)	(11-35%)	(36-65%)	(66-90%)
(91-100%)			

	<i>Almost Almost Never</i>	<i>Some- times</i>	<i>About half</i>	<i>Most times</i>
1. I am clear about my feelings.	1	2	3	4 5
2. I pay attention to how I feel.	1	2	3	4 5
3. I experience my emotions as overwhelming and out of control.	1	2	3	4 5
4. I have no idea how I am feeling.	1	2	3	4 5
5. I have difficulty making sense out of my feelings.	1	2	3	4 5
6. I am attentive to my feelings.	1	2	3	4 5
7. I know exactly how I am feeling.	1	2	3	4 5
8. I care about what I am feeling.	1	2	3	4 5
9. I am confused about how I feel.	1	2	3	4 5
10. When I am upset, I acknowledge my emotions.	1	2	3	4 5
11. When I'm upset, I become angry with myself for feeling that way.	1	2	3	4 5

12. When I'm upset, I become embarrassed for feeling that way.	1	2	3	4	5
13. When I'm upset, I have difficulty getting work done.	1	2	3	4	5
14. When I'm upset, I become out of control.	1	2	3	4	5
15. When I'm upset, I believe that I will remain that way for a long time.	1	2	3	4	5
16. When I'm upset, I believe that I'll end up feeling very depressed.	1	2	3	4	5
17. When I'm upset, I believe that my feelings are valid and important.	1	2	3	4	5
18. When I'm upset, I have difficulty focusing on other things.	1	2	3	4	5
19. When I'm upset, I feel out of control.	1	2	3	4	5
20. When I'm upset, I can still get things done.	1	2	3	4	5
21. When I'm upset, I feel ashamed with myself for feeling that way.	1	2	3	4	5
22. When I'm upset, I know that I can find a way to eventually feel better.	1	2	3	4	5
23. When I'm upset, I feel like I am weak.	1	2	3	4	5
24. When I'm upset, I feel like I can remain in control of my behaviors.	1	2	3	4	5
25. When I'm upset, I feel guilty for feeling that way.	1	2	3	4	5
26. When I'm upset, I have difficulty concentrating.	1	2	3	4	5
27. When I'm upset, I have difficulty controlling my behaviors.	1	2	3	4	5
28. When I'm upset, I believe that there is nothing I can do to make myself feel better.	1	2	3	4	5



29. When I'm upset, I become irritated with myself for feeling that way.	1	2	3	4	5
30. When I'm upset, I start to feel very bad about myself.	1	2	3	4	5
31. When I'm upset, I believe that wallowing in it is all I can do.	1	2	3	4	5
32. When I'm upset, I lose control over my behaviors.	1	2	3	4	5
33. When I'm upset, I have difficulty thinking about anything else.	1	2	3	4	5
34. When I'm upset, I take time to figure out what I'm really feeling.	1	2	3	4	5
35. When I'm upset, it takes me a long time to feel better.	1	2	3	4	5
36. When I'm upset, my emotions feel overwhelming.	1	2	3	4	5

## ERQ

Directions: We would like to ask you some questions about your emotional life, in particular, how you control (that is, regulate and manage) your emotions. The questions below involve two distinct aspects of your emotional life. One is your emotional experience, or what you feel like inside. The other is your emotional expression, or how you show your emotions in the way you talk, gesture, or behave. Although some of the following questions may seem similar to one another, they differ in important ways.

For each item, please **circle** your answer for each item using the following scale:

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
Strongly Strongly <b><u>Disagree</u></b>			Neutral			<b><u>Agree</u></b>

		<i>Strongly Strongly <b><u>Disagree</u></b></i>																		
1. When I want to feel more <i>positive</i> emotion (such as joy or amusement), I <i>change what I'm thinking</i>	1	2	3	4	5	6	7													
2. I keep my emotions to myself.	1	2	3	4	5	6	7													
3. When I want to feel less <i>negative</i> emotion (such as sadness or anger), I <i>change what I'm thinking</i>	1	2	3	4	5	6	7													
4. When I am feeling <i>positive</i> emotions, I am careful not to express them.	1	2	3	4	5	6	7													
5. When I'm faced with a stressful situation, I make myself <i>think about it</i> in a way that helps me stay	1	2	3	4	5	6	7													
6. I control my emotions by <i>not expressing them</i> .	1	2	3	4	5	6	7													
7. When I want to feel more <i>positive</i> emotion, I <i>change the way I'm thinking</i> about the situation.	1	2	3	4	5	6	7													
8. I control my emotions by <i>changing the way I think</i> about the situation I'm in.	1	2	3	4	5	6	7													

9. When I am feeling <i>negative</i> emotions, I make sure not to express them.	1	2	3	4	5	6	7
10. When I want to feel less <i>negative</i> emotion, I change the way I'm thinking about the situation.	1	2	3	4	5	6	7

## COMPASSION FOR SELF

Directions Please read each statement carefully before answering. To the right of each item, indicate how often you behave in the stated manner, using the following scale:

For each item, please **circle** your answer for each item using the following scale:

1
2
3
4
5  
 Almost Never Almost Always

	<i>Almost Never</i>					<i>Almost Always</i>				
1. I'm disapproving and judgmental about my own flaws and inadequacies.	1	2	3	4	5					
2. When I'm feeling down I tend to obsess and fixate on everything that's wrong.	1	2	3	4	5					
3. When things are going badly for me, I see the difficulties as part of life that everyone goes through.	1	2	3	4	5					
4. When I think about my inadequacies, it tends to make me feel more separate and cut off from the rest of the world.	1	2	3	4	5					
5. I try to be loving towards myself when I'm feeling emotional pain.	1	2	3	4	5					
6. When I fail at something important to me I become consumed by feelings of inadequacy.	1	2	3	4	5					
7. When I'm down and out, I remind myself that there are lots of other people in the world feeling like I am.	1	2	3	4	5					
8. When times are really difficult, I tend to be tough on myself.	1	2	3	4	5					
9. When something upsets me I try to keep my emotions in balance.	1	2	3	4	5					

10. When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.	1	2	3	4	5
11. I'm intolerant and impatient towards those aspects of my personality I don't like.	1	2	3	4	5
12. When I'm going through a very hard time, I give myself the caring and tenderness I need.	1	2	3	4	5
13. When I'm feeling down, I tend to feel like most other people are probably happier than I am.	1	2	3	4	5
14. When something painful happens I try to take a balanced view of the situation.	1	2	3	4	5
15. I try to see my failings as part of the human condition.	1	2	3	4	5
16. When I see aspects of myself that I don't like, I get down on myself.	1	2	3	4	5
17. When I fail at something important to me I try to keep things in perspective.	1	2	3	4	5
18. When I'm really struggling, I tend to feel like other people must be having an easier time of it.	1	2	3	4	5
19. I'm kind to myself when I'm experiencing suffering.	1	2	3	4	5
20. When something upsets me I get carried away with my feelings.	1	2	3	4	5
21. I can be a bit cold-hearted towards myself when I'm experiencing suffering.	1	2	3	4	5
22. When I'm feeling down I try to approach my feelings with curiosity and openness.	1	2	3	4	5
23. I'm tolerant of my own flaws and inadequacies.	1	2	3	4	5
24. When something painful happens I tend to blow the incident out of proportion.	1	2	3	4	5

25. When I fail at something that's important to me, I tend to feel alone in my failure.	1	2	3	4	5
26. I try to be understanding and patient towards those aspects of my personality I don't like.	1	2	3	4	5

## COMPASSION FOR OTHERS

**Directions:** Please read each statement carefully before answering. To the right of each item, indicate how often you behave in the stated manner, using the following scale:

For each item, please **circle** your answer for each item using the following scale:

1
2
3
4
5  
 Almost Never Almost Always

	<i>Almost Never</i>					<i>Almost Always</i>				
1. When people cry in front of me, I often don't feel anything at all.	1	2	3	4	5					
2. Sometimes when people talk about their problems, I feel like I don't care.	1	2	3	4	5					
3. I don't feel emotionally connected to people in pain.	1	2	3	4	5					
4. I pay careful attention when other people talk to me.	1	2	3	4	5					
5. I feel detached from others when they tell me their tales of woe.	1	2	3	4	5					
6. If I see someone going through a difficult time, I try to be caring toward that person.	1	2	3	4	5					
7. I often tune out when people tell me about their troubles.	1	2	3	4	5					
8. I like to be there for others in times of difficulty.	1	2	3	4	5					
9. I notice when people are upset, even if they don't say anything.	1	2	3	4	5					

10. When I see someone feeling down, I feel like I can't relate to them.	1	2	3	4	5
11. Everyone feels down sometimes, it is part of being human.	1	2	3	4	5
12. Sometimes I am cold to others when they are down and out.	1	2	3	4	5
13. I tend to listen patiently when people tell me their problems.	1	2	3	4	5
14. I don't concern myself with other people's problems.	1	2	3	4	5
15. It's important to recognize that all people have weaknesses and no one's perfect.	1	2	3	4	5
16. My heart goes out to people who are unhappy.	1	2	3	4	5
17. Despite my differences with others, I know that everyone feels pain just like me.	1	2	3	4	5
18. When others are feeling troubled, I usually let someone else attend to them.	1	2	3	4	5
19. I don't think much about the concerns of others.	1	2	3	4	5
20. Suffering is just a part of the common human experience.	1	2	3	4	5
21. When people tell me about their problems, I try to keep a balanced perspective on the situation.	1	2	3	4	5
22. I can't really connect with other people when they're suffering.	1	2	3	4	5
23. I try to avoid people who are experiencing a lot of pain.	1	2	3	4	5
24. When others feel sadness, I try to comfort them.	1	2	3	4	5