

EXPLORING EMOTION REGULATION AND TRAIT MINDFULNESS WITHIN  
THE RELATIONSHIP BETWEEN RACIAL DISCRIMINATION AND EMOTIONAL  
EATING AMONG BLACK WOMEN

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## DEDICATION

Dedicated to Esther R. Whitt

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Obesity is more prevalent among Black adults, particularly Black women, compared to other minority groups. Emotional eating has been identified as a potential modifiable behavior that has been linked to increased rates of obesity for Black women. Stress resulting from racial discrimination, also known as race-related stress, is as a potential risk factor for emotional eating. However, research has yet to examine the mechanisms by which race-related stress may impact emotional eating among Black women, as well as factors that may moderate these relationships. Therefore, the current aim of this study was to examine whether emotional regulation strategies mediate the relationship between race-related stress and emotional eating, and whether mindfulness may moderate these mediational pathways, among Black women. Black women across the United States ( $n=558$ ,  $M_{age}= 39.88$ ,  $SD =13.47$ ) completed an online survey. Results found that race-related stress was significantly associated with emotional eating ( $\beta = 0.151$ ;  $p < .001$ ). Rumination was found to be the only emotional regulation strategy to significantly mediate the relationship between race-related stress and emotional eating ( $\beta = .035$ ; 95%CI [.018, .055]). Trait mindfulness moderated one path; at higher levels there was an inverse relationship between race-related stress and emotional suppression ( $\beta = -1.110$ ; 95%CI [-2.101, -.119]). This extends previous literature suggesting a relationship between race-related stress and emotional eating through rumination beyond emerging adulthood. These findings serve as a foundation for future researchers to investigate the

impacts of specific race-related stressors on emotional eating through rumination and avoidant emotional regulation strategies for Black women. The long-term impacts of this body of research are to reduce disparities in obesity for black women within the broader context of systemic, cultural, intervention and policy changes.

*Keywords:* obesity, race-related stress, emotional eating, emotional regulation strategies

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## INTRODUCTION

Obesity increases the risk of serious health problems like cardiovascular disease, diabetes, cancer, and early death (Dixon, 2010). Obesity is more common among Black adults, especially Black Women, compared to White adults (Center for Disease Control, 2021; Kenney et al., 2014; Ogden et al., 2014), and compared to other minority groups in the United States (Hales et al., 2017; Yosuke et al., 2018). Black women, in particular, are more vulnerable to higher rates of obesity due to phenotypic differences in fat oxidation rates (Berk et al., 2006; Lee & Arslanian, 2008; Sutherland, 2013). Emotional eating (Longmire-Avital & McQueen, 2019), or eating in response negative emotions (van Strien et al., 2016), is one modifiable eating behavior linked to weight gain and obesity among Black women (Pickett, Burchenal, et al., 2020). Stress, especially stress related to racial discrimination, contributes to emotional eating among Black women (Hill & Hoggard, 2018; Hoggard et al., 2023; Longmire-Avital & McQueen, 2019; Pickett, McCoy, et al., 2020; Pickett & McCoy, 2018; Sims et al., 2008). The overarching aims of this study are 1) to examine whether the use of emotional regulation strategies mediates the relationship between race-related stress and emotional eating, and 2) to examine whether trait mindfulness moderates this mediational pathway. Understanding these connections could help address obesity disparities and reduce associated health risks.

### **Stress and Emotional Eating in Black Women**

Research has established a robust relationship between stress and emotional eating among Black women. Women who report more stress also report higher rates of emotional eating behavior (Finch & Tomiyama, 2015; Pickett & McCoy, 2018; Sims et

al., 2008). Pickett and McCoy (2018) found that depression and stress predicted increased emotional eating behaviors in Black women. Sims and colleagues (2008) found that Black adults who experienced elevated levels of stress were less likely to plan meals and more likely to eat emotionally. Similarly, a separate study found a positive association between perceived stress and emotional eating among a sample of women, half of whom identified as Black (Finch & Tomiyama, 2015). Diggins and colleagues (2015) found that stress was significantly correlated with higher body mass index in college-aged Black women who engaged in emotional eating.

Race-related stress may be a particularly important type of stress influencing emotional eating for Black women. Racial discrimination is a common psychosocial stressor reported by Black populations and has shown to negatively impact psychological well-being (Hill & Hoggard, 2018; Pittman & Kaur, 2018). Meyer's Minority Stress Model (2003) suggests that racial and ethnic minority groups face additional chronic stress in the form of discrimination and prejudice, which subsequently leads to poor mental health outcomes. Race-related stress, as defined in this thesis, is stress that is a result of experiencing racism or racial discrimination (Harrell, 2000). Research shows that race-related stress influences weight gain and eating behaviors in Black women (Johnson et al., 2012; Longmire-Avital & McQueen, 2019; Manns-James et al., 2021; Salami et al., 2019; Volpe et al., 2024; Woods-Giscombe et al., 2021). For example, race-related stress is associated with more emotional eating behaviors (Johnson et al., 2012; Longmire-Avital & McQueen, 2019) and with higher body mass index (BMI) among Black college-aged women, even after accounting for the effects of income and adverse life events (Manns-James et al., 2021). Among Black women with a BMI greater than 22,

race-related stress was associated with emotional eating after adjusting for income and employment status, and those who experienced race-related stress were more likely to consume foods with higher fat and sugar content (Johnson et al., 2012). Additionally, greater race-related stress is associated with more eating disorder symptoms through, in part, greater depressive symptoms (Salami et al., 2019). While these studies suggest a connection between race-related stress and eating behaviors, more research is needed to understand the underlying mechanisms and moderators of this relationship.

### **Emotion Regulation as a Mediator of the Relationship between Stress and Emotional Eating**

Emotion regulation is defined as a person's ability to alter the intensity, duration, and/or expression of an emotional experience through the use of various strategies (Gross, 1998). According to Gross (2014), the process of engaging in emotion regulation consists of three primary characteristics – the objective to reduce the intensity and/or duration of an emotion, the strategy used to accomplish the objective, and the consequence that follows. Emotional regulation can be conceptualized as a collection of strategies that individuals engage in to modify their emotional reactions (Gross, 2014). However, emotional regulation is also multifaceted and can be conceptualized as a state or trait (Gratz & Roemer, 2004; Kraiss et al., 2020; Lavender et al., 2017a). For instance, some researchers conceptualize emotional regulation as a trait indicating an individual's dispositional inclination to respond to emotional distress in adaptive ways (Gratz & Roemer, 2004; Lavender et al., 2017a), while others characterize it as a momentary state influenced by environment (Lavender et al., 2017a). While these various conceptualizations of emotional regulation are equally important, they do not capture the

specific use of emotional regulation strategies themselves (Bardeen & Fergus, 2014; Kraiss et al., 2020). For the purpose of this thesis, I will be conceptualizing emotional regulation as a collection of strategies that individuals engage in to alter their emotional experience (Gross, 1998).

There are several types of strategies for regulating emotions (Gross, 1998, 2014; McRae & Gross, 2020). 1) Situational selection involves making a conscious decision to engage in a particular situation that could evoke desirable emotional reactions or aversive emotional reactions (Gross, 2014; McRae & Gross, 2020; Thuillard & Dan-Glauser, 2021). 2) Situational modification involves attending to and modifying a specific situation to reduce the emotional impact (Gross, 2014; McRae & Gross, 2020). 3) Attentional deployment involves diverting attention to a separate stimulus to reduce the emotional response (Gross, 2014; McRae & Gross, 2020). 4) Cognitive change involves changing how one thinks about and appraises an emotional situation (Gross, 2014; McRae & Gross, 2020). Examples of cognitive change strategies include rumination, which is repeatedly thinking about negative events and feelings (Nolen-Hoeksema, 1991; J. M. Smith & Alloy, 2009); cognitive reappraisal, which is changing how one thinks about a situation in order to alter the emotion response (McRae et al., 2012); and problem solving, which is actively addressing and resolving stressful situations to reduce their emotional impact (Aldao et al., 2010). According to Gross' Process Model of emotion regulation (1998), these four families of emotional regulation strategies are described as antecedents and occur before the onset of a behavioral response (Gross, 2014; McRae & Gross, 2020). 5) Response modulation involves using behavioral coping strategies to attenuate emotions (Gross, 2014; McRae & Gross, 2020). An example of response

modulation is emotional suppression, which involves deliberately restricting or hiding an emotional expression (Gross & Levenson, 1993). This family of emotional regulation strategies tends to occur after the onset of a particular emotion (Gross, 2014; McRae & Gross, 2020).

Individuals engage in various emotion regulation strategies to manage negative affect (Aldao et al., 2010; Aldao & Nolen-Hoeksema, 2010). However, some may be more effective than others (Aldao & Nolen-Hoeksema, 2010). For instance, reappraisal and problem solving techniques have been effective in helping those with depressive symptoms manage their emotions (Chen et al., 2006; Troy et al., 2010). Conversely, rumination and emotional suppression can increase risk for depressive symptoms (Beblo et al., 2012; Whisman et al., 2020). While there are certain social contexts in which rumination and emotional suppression may help to temporarily reduce expression of aversive emotional experiences (Dunn et al., 2009; Nolen-Hoeksema et al., 2008), these strategies have often been shown to promote and maintain psychopathology when used habitually (Aldao & Nolen-Hoeksema, 2012; Everaert & Joormann, 2020). According to meta-analyses, rumination and emotional suppression have been shown to have stronger correlations with psychopathology than problem solving and cognitive reappraisal (Aldao et al., 2010; Aldao & Nolen-Hoeksema, 2012). In contrast, problem solving, and cognitive reappraisal have been shown to reduce the severity of symptoms from psychopathology with habitual use (Aldao & Nolen-Hoeksema, 2012; Argus & Thompson, 2008; Ciharova et al., 2021). In this way, cognitive reappraisal and problem solving can be thought of as “adaptive” emotion regulation strategies that help to alleviate symptoms of psychopathology, while rumination and emotional suppression can

be thought of as “maladaptive” emotion regulation strategies that maintain and promote symptoms of psychopathology.

Theory suggests that stress decreases the use of adaptive emotion regulation strategies and increases the use of maladaptive strategies, such as rumination and emotional suppression. According to Lazarus and Folkman’s (1984) model, stress depletes a person’s coping resources, and if the stress continues, there is increased likelihood of engaging in maladaptive emotional regulation strategies. Research has provided evidence of significant positive relationships between stress, including stress-related symptoms, and rumination among adults (Polanco-Roman et al., 2016; Willis & Harvey J. Burnett, 2016). Literature has also documented some evidence of significant positive relationships between stress and emotional suppression among adults (Caramanica et al., 2023; Raymond et al., 2019). There is some experimental research to further support this theory, finding that increased stress is related to interference with frontal brain regions that underlie decision making and executive functioning (Liston et al., 2009; Raio et al., 2013). These frontal cortical regions of the brain are involved in cognitive reappraisal and problem-solving strategies (Kleibecker et al., 2013; Ragen et al., 2016). As a result, stress can make it more difficult for people to engage in adaptive emotion regulation strategies and more likely to resort to maladaptive emotional regulation strategies, which are governed by different brain regions (Ragen et al., 2016).

Race-related stress might similarly impact how people use emotion regulation strategies. While Meyer’s Minority Stress (2003) model details how experiences of chronic stress resulting from racial discrimination and prejudice may lead to subsequent negative health outcomes, Hatzenbuehler’s theory elaborates on this model by

incorporating the role of emotional regulation strategies (Hatzenbuehler, 2009).

Hatzenbuehler's (2009) Psychological Mediation Model, originally developed for sexual minority populations, posits that chronic stress resulting from experiences of discrimination may lead to the use of maladaptive emotional regulation strategies that contribute to psychopathology in stigmatized groups. Research has found significant positive associations between experiences of racial discrimination and maladaptive emotional regulation strategies like emotional suppression and rumination (Brondolo et al., 2009; Keum & Cano, 2021). There is neurobiological research that could partially explain relationships between race-related stress and maladaptive emotional regulation strategies, showing that prolonged race-related stress was associated with deficits in core executive functioning, which may contribute to emotional regulation difficulties (Berger & Sarnyai, 2015).

The use of emotion regulation strategies is related to eating pathology (Herren et al., 2021; Kelly et al., 2012; Lavender et al., 2009; Prefit et al., 2019). Overall, out of emotion regulation strategies, cognitive change strategies (i.e., rumination, cognitive reappraisal, and problem solving) and response modulation (e.g., emotional suppression) have the most empirical evidence linking them with eating pathology, especially in women (Aldao & Nolen-Hoeksema, 2010; Holt & Espelage, 2002; Kemp et al., 2011; Vuillier et al., 2021). Rumination is positively associated with high levels of emotional eating (Kemp et al., 2011). Cognitive reappraisal is negatively associated with binge eating behavior in women (Kelly et al., 2012) and with eating pathology severity in a sample primarily comprised of women (Vuillier et al., 2021). Lower problem solving is associated with elevated eating pathology symptoms (Holt & Espelage, 2002). Emotional

suppression is positively linked with emotional eating behaviors in a sample comprised mostly of women (Herren et al., 2021).

The relationship between emotion regulation strategies and eating behaviors has also been observed among Black women (Harrington et al., 2010; Kemp et al., 2011; Mason & Lewis, 2017). Research has documented significant positive associations between rumination and emotional eating in women, half of whom were Black (Kemp et al., 2011), and between rumination and binge eating behavior specifically in Black women (Mason & Lewis, 2017). Harrington and colleagues (2010) found a positive association between emotional suppression and binge eating in Black women.

### **Trait Mindfulness as a Moderator of the Relationship between Stress and Emotional Eating**

Mindfulness, which is defined as awareness that occurs through both purposeful and nonjudgmental attention to the present moment (Kabat-Zinn, 2003), might moderate the indirect relationship between race-related stress and emotional eating through the use of emotion regulation strategies among Black women. Mindfulness can be conceptualized as both a state (Kiken et al., 2015; Lau et al., 2006) or trait (Baer et al., 2006; Kiken et al., 2015). State mindfulness can be characterized as a temporary state of being (Kiken et al., 2015), while trait mindfulness can be used to characterize individuals' stable inclinations to engage in mindfulness behavior throughout their lives (Baer et al., 2006; Bravo et al., 2018; Kiken et al., 2015). The current literature remains undecided on whether or not trait mindfulness may be considered multifaceted or one-dimensional (Baer et al., 2008; Osman et al., 2016; Polizzi et al., 2018). While multidimensional conceptualizations may capture other aspects of mindfulness beyond purely immediate awareness of an

individual's environment and internal thoughts (Hülshager & Alberts, 2021), they often lack construct validity, and the facets themselves appear to be highly correlated with one another (Altgassen et al., 2024). For these reasons, I will be utilizing the unidimensional definition of trait mindfulness as presented above for this thesis project.

Recent studies have demonstrated that trait mindfulness can act as a protective factor against stress and negative health outcomes, including emotional eating (Finkelstein-Fox et al., 2020; Roberts & Danoff-Burg, 2010; Watford et al., 2019). For example, Roberts and Danoff (2010) found that, in a mostly female college sample, trait mindfulness was associated with lower perceived stress. Finkelstein-Fox and colleagues (2020) found, in a mostly female adult sample, a significant negative relationship between stress and emotional eating as mindfulness increased. A significant positive relationship was found between stress and emotional eating as mindfulness decreased (Finkelstein-Fox et al., 2020).

Furthermore, there is evidence to suggest that trait mindfulness may improve emotion regulation (MacDonald, 2021; Parsons et al., 2019). For example, MacDonald (2021) found that higher trait mindfulness was associated with less difficulty in identifying and modulating emotions (MacDonald, 2021). Literature also has documented some evidence that those with high trait mindfulness are more likely to engage in adaptive emotional regulation strategies, such as cognitive reappraisal (Iani et al., 2019), and less likely to engage in maladaptive emotional regulation strategies, such as emotional suppression (Iani et al., 2019; Reber et al., 2013). It could be possible that through the modification of emotional regulation strategies, trait mindfulness may attenuate the impact of stress on emotional eating in Black women and strengthen the

relationship between adaptive emotional regulation strategies and reduced emotional eating (Chiesa et al., 2013). Chiesa et al. (2013) theorizes that certain adaptive emotional regulation strategies, such as cognitive reappraisal, may be facilitated through the use of mindfulness because of increased attention and cognitive flexibility.

### **Current Study**

To summarize, studies have shown that stress is positively related with the use of maladaptive, and negatively related to the use of adaptive, emotion regulation strategies and that the use of maladaptive emotion regulation strategies is positively, and the use of adaptive emotion regulation strategies is negatively, related with eating pathology (Herren et al., 2021; Kemp et al., 2011; Liston et al., 2009; Raio et al., 2013). Some empirical work suggests that trait mindfulness might moderate the relationship between race-related stress and emotional eating among Black women (Finkelstein-Fox et al., 2020). Unfortunately, few studies have examined a relationship between race-related stress and emotional eating among Black women (Hill & Hoggard, 2018; Hoggard et al., 2023; Johnson et al., 2012; Longmire-Avital & McQueen, 2019). It is imperative that research further investigates these relationships among Black women in the United States to reduce racial health disparities in obesity (Berk et al., 2006; Lee & Arslanian, 2008; Sutherland, 2013).

Thus, the current study seeks to examine the relationship between race-related stress and emotional eating behaviors among a sample of Black women. The current study will examine the potential mediating role of emotional regulation strategies within the relationship, as well as the potential moderating role of trait mindfulness. The conceptual models underlying my study are shown in Figure 1. As is depicted in the top

panel, I theorize that race-related stress leads to decreased use of adaptive emotion strategies, which leads to higher emotional eating, as well as that race-related stress leads to increased use of maladaptive emotion regulation strategies, which leads to higher emotional eating. Although emotional eating may occur temporally before stress in some cases (Raspopow et al., 2014), I chose to model race-related stress as an antecedent of emotional eating because of Meyer's Minority Stress Model (2003), which models race-related stress as the precursor to mental health problems, and given the wealth of literature that provide evidence that emotional eating is influenced by stress (Diggins et al., 2015; Finch & Tomiyama, 2015; Johnson et al., 2012; Longmire-Avital & McQueen, 2019; Sims et al., 2008). I chose emotion regulation strategies as the intermediary in this relationship due to evidence that the choice of strategies is influenced by stress (Caramanica et al., 2023; Kleibeuker et al., 2013; Liston et al., 2009; Ragen et al., 2016; Raio et al., 2013; Raymond et al., 2019) and that strategy use can increase or decrease emotional eating behaviors (Aldao et al., 2010; Herren et al., 2021; Holt & Espelage, 2002; Kelly et al., 2012; Kemp et al., 2011; Vuillier et al., 2021). The use of emotion regulation strategies also likely feeds back to influence stress responses (Thomas & Zolkoski, 2020; Zoccola & Dickerson, 2012), and the reliance on emotional eating as a coping behavior can reduce one's repertoire of effective emotion regulation strategies (Spoor et al., 2007). However, the temporal ordering of the variables in my model relies heavily on Hatzenbuehler's (2009) Psychological Mediation Model, which views stress as a main factor influencing both the use of emotion regulation strategies and emotional eating.

My conceptual model also proposes that these mediational pathways are moderated by trait mindfulness, such that, for those high in trait mindfulness, the impact of race-related stress on maladaptive emotional regulation strategies (i.e., emotional suppression and rumination) will be reduced and the impact on adaptive emotional regulation strategies (i.e., problem solving and cognitive reappraisal) will be strengthened. Additionally, I expect that for those high in trait mindfulness, the positive relationship between maladaptive emotional regulation strategies and emotional eating will be weakened and that the negative relationship between adaptive emotional regulation strategies and emotional eating will be strengthened (Figure 1, bottom panel). The treatment of trait mindfulness as a moderator is supported by evidence that trait mindfulness might moderate all three pathways in the mediational model: the a path, reflecting the relationship between stress and emotion regulation strategies (Iani et al., 2019; MacDonald, 2021; Parsons et al., 2019; Reber et al., 2013), the b path, reflecting the relationship between emotion regulation strategies and emotional eating (Chiesa et al., 2013; Finkelstein-Fox et al., 2020), and the c path, reflecting the relationship between stress and emotional eating (Finkelstein-Fox et al., 2020; Roberts & Danoff-Burg, 2010; Watford et al., 2019).

My study tests three hypotheses informed by my conceptual model. For my first hypothesis, I hypothesize that greater reports of race-related stress will be associated with greater reports of emotional eating among Black women (Figure 1, top panel). Second, I hypothesize that the positive relationship between race-related stress and emotional eating will be mediated through maladaptive emotional regulation strategies and adaptive emotion regulation strategies. Specifically, I hypothesize that greater reports of race-

related stress will be associated with more emotional suppression and rumination and with less cognitive appraisal and problem solving, all of which will be associated with more emotional eating. Third, I hypothesize that trait mindfulness will moderate the indirect pathways between race-related stress and emotional eating through emotional regulation strategies such that the indirect pathway through maladaptive emotional regulation strategies will be attenuated at higher levels of trait mindfulness and the indirect pathway through adaptive emotional regulation strategies will be strengthened at higher levels of trait mindfulness.

## **METHODS**

### **Participants**

Participant inclusion criteria were United States residence, 18+ years of age, identification as Black and/or African American, and identification as a cisgender woman. Participants were recruited through several avenues: Thirteen participants were recruited through an online survey distributed to students within the Introduction to Psychology course at Indiana University – Indianapolis during the Spring semester of 2024. Two hundred twenty-three participants were recruited through similar surveys on Amazon’s Mechanical Turk (MTurk) and Prolific. Mturk is an online platform where participants are able to register themselves as workers and are instructed to complete an assortment of research-based tasks for a fixed compensation (Follmer et al., 2017). It has been shown to be an effective tool for directly collecting data from diverse samples of participants compared to alternative university sampling methods (Aguinis et al., 2021; Follmer et al., 2017). Prolific is a separate online crowdsourcing platform where participants can enroll for a range of online tasks and offers researchers access to a more diverse population of potential research participants at the cost of longer times for data collection (Palan & Schitter, 2018; Peer et al., 2017). The remaining 319 participants were recruited through community flyers that were posted online through social media platforms including Facebook and Instagram.

### **Measures**

Measures used in the current study may be found in Appendix A.

**Demographics.** Participants self-reported their age, race, ethnicity, gender, education level, country of residency, employment status, and annual income.

**Attention Check.** Participants were required to answer the question, “I haven’t eaten in the past year” (Fredrick et al., 2023). Responses options were “True” or “False.” This attention check was located toward the beginning of the survey within the emotional eating measure.

**Race-Related Stress.** Race-related stress was measured with the Index of Race-Related Stress-Brief Version (IRRS-B; Utsey, 1999). The IRRS-B was a 22-item measure that assessed individual self-reported experiences of race-related stressors based on lifetime experiences. The scale included items covering different facets of racism, specifically cultural racism, institutional racism, and individual racism. For the purpose of this study, I utilized the total score from this measure. Higher scores on this scale indicated overall increased self-reported experiences of race-related stress. Example items included: “You have been threatened with physical violence by an individual or groups of Whites” and “You seldom hear or read anything positive about members of your own ethnic group on radio, TV, newspapers, or in history books.” Participant responses were reported on a 5-point Likert scale ranging from 0 (This has never happened to me) to 4 (This event happened to me, and I was extremely upset). The internal consistency of the measure has been found to be high among Black women (Cronbach alpha = .91; Salami et al., 2019). The internal consistency of this measure within the current sample was high (Cronbach alpha = .92).

**Emotional Eating.** Emotional eating was measured with a subscale from the Eating Behavior Patterns Questionnaire (EBPQ; Schlundt et al., 2003). The EBPQ is a 30-item measure that evaluate six facets of self-reported eating behavior including emotion eating. The emotional eating subscale is a 10-item measure that evaluates current

self-reported emotional eating behavior every day. One item in the measure was reversed scored such that higher scores on the emotional eating subscale represents higher emotional eating. Example items from the subscale include: “I eat for comfort,” “I eat when I’m upset,” and “When I am in a bad mood, I eat whatever I feel like eating”. Participant responses were reported on a 5-point Likert scale ranging from 1 (Strongly agree) to 5 (Strongly disagree). The internal consistency of the measure has been found to be adequate among Black women (Cronbach alpha = .77; Schlundt et al., 2003). The internal consistency for this measure in the current sample was adequate (Cronbach alpha = .84).

**Trait Mindfulness.** Trait mindfulness was measured with the Mindfulness Attention Awareness Scale (MAAS; Brown & Ryan, 2003). The MAAS was a 15-item measure that assesses individual differences in the frequency of self-reported states of mindful attention every day. Example items on the measure include: “I find it difficult to stay focused on what’s happening in the present” and “I do jobs automatically without being aware of what I’m doing.” Individual responses are reported on a 6-point Likert scale ranging from 1 (almost always) to 6 (almost never). The internal consistency of the measure has been found to be high among Black men and women (Cronbach alpha = .88; Masuda et al., 2009). The internal consistency for the measure was high in the current sample (Cronbach alpha = .91).

**Emotion Regulation Strategies.** Cognitive reappraisal and emotional suppression were measured with the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003). The ERQ is a 10-item measure used to assess the use of emotion regulation strategies across two dimensions - cognitive reappraisal and emotional suppression. The

cognitive reappraisal subscale consists of 6 items that evaluate the usage of cognitive reappraisal as an emotion regulation strategy. The expressive emotion subscale consisted of 4 items that evaluate the usage of emotional suppression as an emotion regulation strategy. An example item for cognitive reappraisal included: “When I want to feel more positive emotions (such as joy or amusement) I change what I’m thinking about.” For emotional suppression, an example item included: “I control my emotions by not expressing them.” Individual responses were recorded on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). This measure has been used within a sample of 843 adults that included 144 Black adults, with Cronbach alphas for cognitive reappraisal and emotional suppression being .89 and .77, respectively (Sörman et al., 2022). The subscales showed adequate internal consistency in the current sample, with values of .88 for cognitive reappraisal and .82 for emotional suppression.

Rumination was measured with the Ruminative Responses Scale, a subscale from the Response Style Questionnaire (RSQ; Nolen-Hoeksema & Morrow, 1991). The RSQ is a 22-item scale that evaluate the usage of ruminative coping responses. An example item from the scale included: “Think about a recent situation, wishing it had gone better,” and “Go away by yourself and think about why you feel this way.” Individual responses were recorded on a 4-point Likert scale ranging from 1 (almost never) to 4 (almost always). The internal consistency of this measure has been shown to be high among Black women (Cronbach alpha = .94; Hill & Hoggard, 2018). This measure showed high internal consistency for the current sample (Cronbach alpha = .95).

Problem solving was measured with the Personal Problem-Solving Inventory (PSI; Heppner & Petersen, 1982). The PSI is a 32-item measure that evaluates the usage

of problem-solving behavior across three separate dimensions, including problem solving confidence, approach-avoidance style, and personal control. For the purpose of this study, I used the total score from this measure. Lower scores on this measure were indicative of successful problem-solving behaviors among participants (Heppner & Petersen, 1982). Eighteen items were reversed scored, so that higher scores are indicative of successfully problem solving. Example items from this measure included: “When a solution to a problem was unsuccessful, I do not examine why it didn’t work,” and “When my first efforts to solve a problem fail, I become uneasy about my ability to handle the situation.” Participant responses were recorded on a 6-point Likert scale ranging from 1 (strongly agree) to 6 (strongly disagree). The internal consistency of this measure was shown to be high among black men and women (Cronbach alpha = .90; Bagley & Copeland, 1994). This measure showed high internal consistency in the current sample (Cronbach alpha = .93).

### **Procedures**

Interested participants responded to study advertisements and were directed to an online Qualtrics survey. Participants first read a study information sheet and those that were interested in participating provided their informed consent. Next, participants answered questions related to inclusion criteria; the survey ended for those who did not meet the criteria for eligibility. Participants were prevented from taking the survey multiple times through Qualtrics “Prevent Multiple Submissions” security options. In the circumstance that an individual bypasses this security option, Qualtrics is capable of detecting participants with multiple submissions by providing them a duplicate ID. Duplicate responses were removed before data analyses. After successful screening,

participants completed the above surveys, which took approximately 30-minutes. Survey questions were presented in a fixed order for all participants. Survey questions were presented in the following order: race-related stress, emotional eating, trait mindfulness, emotional suppression, rumination, problem solving. An attention check was implemented in the survey to ensure that participants were carefully reading the questions. Participants in the study who answered “True” to the statement “I have not eaten in the past year” were removed before data analysis (Fredrick et al., 2023). Additionally, the survey contained several ReCaptcha verification checks, which is an automated service through Qualtrics that detects potential bots throughout the survey and permits valid participants. Individuals that failed the ReCaptcha verification checks were removed from data analysis. Upon completion, participants from the introductory psychology course were compensated with course credit, participants from Mturk were compensated \$2.00, participants from Prolific and were compensated \$5.00, and participants who recruited through the community flyer were enrolled into a drawing for a \$50 Amazon gift card.

### **Data Analysis Approach**

All statistical analyses were performed in R studio (Version 2024.04). First, the variables were inspected for outliers, skewness, kurtosis, and missingness. In cases of outliers, sensitivity analyses were run to evaluate whether the presence of outliers contributed to significant changes in the findings. Kurtosis between -7 and +7 and skewness between -2 and +2 was deemed within normal limits (Curran, West, & Finch, 1996). Missing data was dealt with by utilizing a hybrid approach. First, for individuals missing less than 50% of the items on a given measure, mean replacement was used to

impute missing values before calculating scale scores. For individuals missing more than 50% of the items on a given measure, full information maximum likelihood (FIML) via the R lavaan package was used. This approach is considered a good alternative when data at item level is missing and it is randomly spread out through the dataset (Wu et al., 2022). Bivariate correlations were examined to inspect the relationships among study variables. Research suggests that there may be age-related differences in the specific use of emotional regulation strategies, with older adults using less maladaptive emotional regulation strategies, including rumination and emotional suppression, compared to younger adults (Schirda et al., 2016). Therefore, age was included as a covariate for all analyses.

To test Hypothesis One, that higher scores on race-related stress will be associated with higher scores on emotional eating, a linear regression analysis was conducted utilizing the Lavaan package in R with race-related stress entered as the independent variable and emotional eating entered as the dependent variable. Support for this hypothesis was determined by a p-value of  $<.05$  for the regression coefficient. Standardized coefficients were reported.

To test Hypothesis Two, that the relationship between race-related stress and emotional eating will be mediated through higher maladaptive emotion regulation strategies (rumination and emotional suppression) and lower adaptive emotional regulation strategies (cognitive reappraisal and problem-solving), a parallel mediation analysis was conducted utilizing the Lavaan package in R (see Figure 2). Race-related stress was entered as the independent variable, emotional eating was entered as the dependent variable, and the four separate emotion regulation strategies were entered as

parallel mediators. Race-related stress, emotional eating, emotional regulation strategies were designated as manifest variables. Standardized coefficients were reported. Indirect effects were tested for significance at a p-value of  $<.05$  using 10,000 bootstrapped samples.

To test Hypothesis Three, that trait mindfulness would moderate the indirect effects, a moderated parallel mediation analysis was conducted (See Figure 3). Trait mindfulness was entered as the moderating variable for each pathway in the parallel mediation model (described for Hypothesis Two). Trait mindfulness was designated as a manifest variable. A p-value of  $<.05$  for the interaction coefficient was used to evaluate this hypothesis. Significant interactions were probed and the corresponding effect was graphed at one standard deviation below the mean, at the mean, and at one standard deviation above the mean of trait mindfulness.

### **Power Considerations**

A power analysis was executed in G\*Power to ascertain the appropriate number of participants needed for the study. For Hypothesis One, a power analysis in G\*Power suggested a sample size of 56 for a regression analysis with two predictors (age and race-related stress) on emotional eating using power of .80 and effect size of .32, as found in previous work (Longmire-Avital & McQueen, 2019). For the Hypothesis Two, power was calculated for mediated effects by utilizing Fritz & MacKinnon (2007) simulation analysis for percentile bootstrapping and a power of .80. I used Cohen's (1992) effect size guidelines, where effect sizes of .10, .30, and .50 represent small, medium, and large effects. Previous research found that elevated levels of racial discrimination were negatively associated with reappraisal ( $r = -.16$ ) among a sample of 419 Black adults

including 318 Black women (Riley et al., 2021). Additionally, a separate study found a positive relationship between elevated levels of emotional suppression and increased emotional eating behaviors ( $r = .11$ ) among a sample of 1674 adults, including 262 Black women (Herren et al., 2021). Therefore, according to Fritz & MacKinnon (2007), when both the a-path and b-path are small, the estimated sample size required to detect mediated effects for a power of .80 is  $N = 558$ . Unfortunately, due to limitations in the G\*power program, I was unable to include the effect for the moderated indirect mediation pathways. As such, for my Hypothesis Three, an additional a priori power analysis was conducted using G\*power to investigate the sample size requirement for an interaction effect in linear regression for 7 predictor variables (i.e., age, race-related stress, rumination, emotional suppression, cognitive reappraisal, problem solving, trait mindfulness, race-related stress x mindfulness, and rumination x mindfulness, cognitive reappraisal x mindfulness, emotional suppression x mindfulness, problem solving x mindfulness) at an  $\alpha = .05$  and power = .80, the projected sample size required to detect a small effect ( $f = .02$ ) was  $N = 311$ .

## **RESULTS**

### **Data Cleaning, Missingness, and Checks**

A total of 558 Black women completed the study survey. Participants who failed the attention check or ReCaptcha checks (n=6) were removed from data analysis. Participants who were detected as having duplicate data were removed from data analysis (n=25). This left a final sample size of 527 for study analyses. The entire data set consisted of 662 total missing data or 1.05%, with much of the missing data coming from the trait mindfulness questionnaire. All variables fell into normal ranges of skewness and kurtosis. The means, standard deviations, and kurtosis for the variables of interest can be found in Table 1. There were some outliers among the variables of interest in the study: race-related stress consisted of two outliers, problem solving consisted of one outlier, emotional eating consisted of three outliers, and trait mindfulness consisted of two outliers. Outliers in the current study were defined as any points that fell outside of the interquartile range or more specifically any point that lies outside of the 25th and 75th percentile using the boxplot method (Schwertman et al., 2004). To preserve participant data and power, a sensitivity analysis was run for the same variables of interest to determine whether these outliers contributed to significant changes in the findings. This method removes the extreme outliers from the dataset that could impact the upper and lower quartile ranges and mask other outliers from being detected (Schwertman et al., 2004) The removal of outliers did not contribute to significant changes in the findings of the data; thus, findings reported below include the original variables, including outliers.

### **Sample Characteristics**

A final sample of 527 Black women between the ages of 18 to 79 years old (M =

39.88, SD =13.47) were included in study analyses. Participant sample characteristics are shown in Table 2. Of the total sample, 26 .00% reported completing at least a bachelor's degree (or another 4 year degree), 21.44 % completed a master's degree, 13.47% completed some college or trade school but are not currently attending, 11.38% were currently enrolled in their undergraduate year of college, 8.34% earned an associate's degree, 7.77% earned a high school diploma or equivalent, 6.45% completed a PhD, medical, law, or other professional degree, and 3.79% completed some post graduate program. Regarding income, 30.36% reported earning < than \$25,000 a year, 22.77% earned between \$50,000 to \$74,999 annually, 15.74% earned \$35,000 to \$49,999 annually, 11% earned \$25,000 to \$34,999 annually, 10.05% earned \$75,000 to \$99,999, 7.77% earned \$100,000 to \$149,000 annually, 2% earned >\$150,000 annually, and one participant did not disclose their income. Results from chi-square analyses revealed that income ( $\chi^2(21)= 43.25, p<.01$ ) and education ( $\chi^2(33)= 255.49, p<.001$ ) significantly differed across recruitment sources. Participants from SONA reported having the lowest income, while prolific reported the highest. Regarding education, the community recruitment source reported having the highest education, while Mturk had the lowest. Results from ANOVA revealed significant differences in age across recruitment sources [ $F(3, 523) = 8.15, p<.001$ ]. Post hoc comparisons utilizing Tukey's HSD indicated that there were significant differences across all recruitment sources on age.

### **Relationships Among Study Variables**

Bivariate correlations were run to inspect relationships among the variables of interest (Table 3). Significant associations were found. Experiences of race-related stress were significantly and positively associated with emotional eating ( $r(519) = .354, p$

<.001). Race-related stress was positively associated with rumination ( $r(525) = .325$ ,  $p < .001$ ). Correlations between race-related stress and cognitive reappraisal ( $r(525) = -.062$ ,  $p = .153$ ), problem solving ( $r(525) = -.050$ ,  $p = .249$ ), and emotional suppression ( $r(525) = .070$ ,  $p = .100$ ) were nonsignificant. Emotional eating was significantly negatively associated with cognitive reappraisal ( $r(525) = -.115$ ,  $p < .01$ ) and problem solving ( $r(525) = -.248$ ,  $p < .001$ ). Emotional eating was significantly positively associated with rumination ( $r(525) = .353$ ,  $p < .001$ ) and emotional suppression ( $r(525) = .095$ ,  $p < .05$ ). Trait mindfulness was significantly negatively associated with race-related stress ( $r(525) = -.404$ ,  $p < .001$ ), emotional eating ( $r(525) = -.465$ ,  $p < .001$ ), rumination ( $r(525) = -.549$ ,  $p < .001$ ), and emotional suppression ( $r(525) = -.272$ ,  $p < .001$ ). However, trait mindfulness was significantly positively associated with problem solving ( $r(525) = .417$ ,  $p < .001$ ) and cognitive reappraisal ( $r(525) = .262$ ,  $p < .001$ ).

### **Hypothesis Testing**

#### ***Hypothesis 1: Race-Related Stress and Emotional Eating***

This hypothesis was supported (see Table 4). There was a significant and positive association between race-related stress and emotional eating behaviors ( $\beta = .363$ ;  $p < .001$ ; 95% CI [.284, .442]), after controlling for age. There was no association between age and emotional eating ( $\beta = -.064$ ;  $p = .112$ ; 95% CI [-.144, .017]).

#### ***Hypothesis 2: Mediation by Emotional Regulation Strategies***

There was partial support for this hypothesis (see Table 5, Figure 2): The path analysis found that the relationship between race-related stress and emotional eating behavior was significantly mediated by rumination ( $\beta = .084$ ; 95%CI [.039, .128]). There was a significant and positive association between race-related stress and rumination ( $\beta =$

.375; 95%CI [.298, .452]) and a significant and positive association between rumination and emotional eating ( $\beta = .223$ ; 95%CI [.120, .326]). There was a significant total indirect effect ( $\beta = .094$ ; 95%CI [.049, .139]) and a significant direct effect between race-related stress and emotional eating ( $\beta = .269$ ; 95%CI [.183, .355]).

The relationship between race-related stress and emotional eating behaviors was not mediated by cognitive reappraisal ( $\beta = -.001$ ; 95%CI [-.009, .007]), emotional suppression ( $\beta = -.002$ ; 95%CI [-.009, .006]), or problem solving ( $\beta = .013$ ; 95%CI [-.003, .030]). There was a significant negative association between problem solving and emotional eating ( $\beta = -.164$ ; 95%CI [-.262, -.067]), after controlling for age, but no other significant paths emerged. Age was significantly negatively associated with emotional suppression ( $\beta = -.088$ ; 95%CI [-.175, -.001]) and rumination ( $\beta = -.379$ ; 95%CI [-.449, -.309]). Age was significantly positively associated with problem solving ( $\beta = .239$ ; 95%CI [.154, .324]) and cognitive reappraisal ( $\beta = .133$ ; 95%CI [.054, .213]).

### ***Hypothesis 3: Moderation by Trait Mindfulness***

There was partial support for this hypothesis (see Table 6, Figure 3). Trait mindfulness moderated the relationship between race-related stress and emotional suppression ( $\beta = -.281$ ; 95%CI [-.540, -.023]), such that, at the high level of trait mindfulness, there was a stronger negative association between race-related stress and emotional suppression ( $\beta = -1.110$ ; 95%CI [-2.101, -.119]). However, at low level of mindfulness ( $\beta = -.558$ ; 95%CI [-1.052, .064]) and medium level of mindfulness ( $\beta = -.834$ ; 95%CI [-1.583, .085]), the relationship between race-related stress and emotional suppression was non-significant (see Figure 4).

Trait mindfulness did not significantly moderate any of the other paths for the relationships between race-related stress and the mediators within the model: cognitive reappraisal ( $\beta = -.229$ ; 95%CI [-.565, .108]), problem solving, ( $\beta = -.099$ ; 95%CI [-.366, .168]), and rumination ( $\beta = -.014$ ; 95%CI [-.287, .258]). Trait mindfulness did not moderate any of the paths for the relationships between the mediators and emotional eating: emotional suppression ( $\beta = -.054$ ; 95%CI [-.341, .232]), cognitive reappraisal ( $\beta = -.300$ ; 95%CI [-.730, .130]), problem solving ( $\beta = .672$ ; 95%CI [.080, 1.265]), rumination ( $\beta = .105$ ; 95%CI [-.130, .341]).

### **Sensitivity Analysis**

Since the only significant mediator was rumination, a post-hoc moderated-mediation analysis was conducted with race-related stress as the independent variable, emotional eating as the dependent variable, rumination as the mediator, and trait mindfulness as the moderator of the indirect path, controlling for age. The result for the sensitivity analysis can be found in Table 7. Results indicated that trait mindfulness did not significantly moderate the path between race-related stress and rumination ( $\beta = -.014$ ; 95%CI [-.289, .261]) and the path between rumination and emotional eating ( $\beta = .013$ ; 95%CI [-.211, .236]). There was a significant positive association between age and emotional eating ( $\beta = .083$ ;  $p < .05$ ; 95%CI [-.211, .236]). Age was significantly and negatively associated with rumination ( $\beta = -.083$ ;  $p < .05$ ; 95%CI [-.211, .236]).

## **DISCUSSION**

The current study aimed to investigate the relationship between race-related stress and emotional eating behavior among Black women and to determine the potential mediating role of emotional regulation strategies, and the moderating role of trait mindfulness, within the risk pathway. Overall, there was mixed support for study hypotheses: race-related stress was positively related to emotional eating through higher use of rumination. However, no other significant mediators emerged. Trait mindfulness moderated only the relationship between race-related stress and emotional suppression. Experiences with racial discrimination are a more common occurrence for Black adults compared to other ethnic minorities (Borrell et al., 2010) and are associated with weight gain, increased waist circumference, and class 3-high risk obesity (Manns-James et al., 2021; Stepanikova et al., 2017), as well as additional behavioral risk factors for obesity, including increases in tobacco and alcohol use (Bush et al., 2016; Nguyen et al., 2012; Pittman & Kaur, 2018; Yeomans, 2010). Although this work can help to build the literature on one modifiable eating behavior that may contribute to obesity in Black women, this research in its early stages, and findings should be understood within the existing literature and the context of the current study design.

### **Race-Related Stress and Emotional Eating**

The current results supported the first hypothesis that greater reports of race-related stress would be associated with greater reports of emotional eating behaviors among Black women. These findings replicate similar results found in other studies that examined the relationship between race-related stress and eating pathology among Black women (Harrington et al., 2010; Hill & Hoggard, 2018; Hoggard et al., 2023; Longmire-

Avital & McQueen, 2019; Salami et al., 2019), but contrast with one study that found a negative relationship between experiences of cultural racism and emotional eating (Hoggard et al., 2023). Previous work has primarily studied young adults; the current study extends existing evidence, suggesting that this relationship may also exist for Black women in middle and late adulthood. The current study also provides support for Meyer's Minority Stress Model (2003), extending evidence that chronic stressors in the form of racial discrimination impact emotional eating, in addition to multiple other aversive mental health outcomes (Hill & Hoggard, 2018; Hoggard et al., 2023; Hudson et al., 2016; Johnson et al., 2012; Longmire-Avital & McQueen, 2019).

The current work examined race-related stress broadly, collapsing across stress related to cultural racism, institutional racism, and individual racism. Thus, based solely on the current study, it remains unclear whether or how stress due to each type of racial discrimination relates to emotional eating. Limited research suggests that experiences of institutionalized racism and individual racism are significantly positively associated with emotional eating, while experiences with cultural racism are significantly negatively associated with emotional eating (Hill & Hoggard, 2018; Hoggard et al., 2023).

Inconsistencies across studies, especially with regards to Hoggard and colleagues (2023), may be due to differences in the type of racism assessed. In addition, stress due to other forms of racism, such as vicarious racism and microaggressions, were not examined in the current study. Although there is signal that stress related to a broad definition of racism is positively related to emotional eating, it is possible that relationships vary across different types of racism-related stress.

## **Emotional Regulation Strategies**

The current results partially supported the second hypothesis, showing that higher race-related stress is linked to increased emotional eating mediated by higher use of rumination. This finding extends the limited research on racial discrimination and rumination among Black adults. This study supports earlier research that found discrimination increases rumination (Brondolo et al., 2009; Hatzenbuehler, 2009; Hatzenbuehler et al., 2009; Hill & Hoggard, 2018) and extends this work to include the impact on emotional eating. Additionally, it provides empirical support for Hatzenbuehler's (2009) model, suggesting that ongoing experiences of discrimination may lead to psychopathology through rumination. Other models have proposed that maladaptive coping strategies in response to stigma or discrimination may increase emotional distress, which subsequently leads to emotional eating (Mason et al., 2019). This work supports this model and identifies rumination as a specific type of coping strategy that may explain this relationship. Women tend to ruminate more than men (Opwis et al., 2017), and rumination is linked to various forms of psychopathology, including eating pathology (Aldao & Nolen-Hoeksema, 2012; Kemp et al., 2011; K. E. Smith et al., 2018), which may make these findings particularly relevant for Black women.

No other emotion regulation strategies emerged as significant mediators of the relationship between race-related stress and emotional eating. This is somewhat surprising, as cognitive reappraisal and problem solving are two well-supported coping strategies for successfully managing general stressors and aversive emotions (Chen et al., 2006; Gaab et al., 2003; McRae & Gross, 2020; Troy et al., 2010). In addition, some

research suggests that Black women engage in overly controlled emotional regulation strategies, such as emotional suppression (Kashdan et al., 2006), to adapt to a society in which racial discrimination is prevalent (Brownlow, 2023; Brownlow et al., 2024). However, the current findings suggest that problem solving, cognitive reappraisal, and emotional suppression may be less relevant for Black women in coping with race-related stress and emotional eating. This is supported by literature showing that Black adults are more likely to engage in ruminative and avoidant coping strategies to handle experiences of racial discrimination, while cognitive reappraisal and problem solving strategies appear to be reserved for general stressors (T. L. Brown et al., 2011; Hoggard et al., 2012). Thus, inconsistencies with previous work may have arisen because the use of specific emotion regulation strategies differs by type of stressor and because the current work measures only race-related stress.

The current study found that problem solving was significantly and negatively associated with emotional eating. This finding is consistent with previous literature that documents negative associations between problem solving and eating pathology symptoms among White women (Aldao et al., 2010; Holt & Espelage, 2002). The findings from this study extend previous literature by suggesting that problem solving may be associated with lower emotional eating symptoms among Black women. Some researchers ascribe lower levels of problem-solving strategies to deficits in executive functioning among individuals with eating pathology symptoms (Manasse et al., 2015). However, more research must be done investigating the mechanisms for the relationship between problem solving strategies and emotional eating among Black women.

## **Trait Mindfulness**

Trait mindfulness moderated the relationship between race-related stress and emotional suppression, such that, at high levels of trait mindfulness, there was a negative relationship between race-related stress and emotional suppression, but that, at average and low levels of trait mindfulness, there was no relationship between race-related stress and emotional suppression. This finding was somewhat consistent with my third hypothesis that trait mindfulness would improve emotional regulation strategies; however, it did not attenuate the indirect pathway between race-related stress and emotional suppression as hypothesized. These findings are consistent with previous literature that suggests that trait mindfulness may improve emotional regulation and that those with high levels of trait mindfulness may be less likely to use maladaptive emotional regulation strategies such as emotional suppression (Iani et al., 2019; Reber et al., 2013).

Results did not support the hypothesis that trait mindfulness would moderate the mediational relationships, either across all mediators studied, or for rumination alone. This suggests that the path from race-related stress to rumination to emotional eating occurs regardless of one's level of trait mindfulness. Although it is quite possible that mindfulness may not impact the variables studied, it is also possible that mindfulness may play a different role in this risk process. For example, mindfulness may lead one to use more adaptive emotion regulation strategies (Chiesa et al., 2013; Iani et al., 2019), which can then reduce the risk of emotional eating. In this case, maybe mindfulness is a serial mediator, explaining the relationship between race-related stress and the type of emotion regulation strategy chosen, rather than a moderator of the mediational pathway.

Additionally, significant correlations between mindfulness and both race-related stress and rumination may have reduced power to detect a significant moderator if one exists. Overall, the current study does not support any moderation by mindfulness, although given the nascent stage of this research, this question may need to be continued to be studied to rule out the risk of a Type II error, and additional studies to examine mindfulness at different points of the risk process should be conducted.

An important context for the current study is that the data are cross-sectional; thus, the present study alone does not answer whether race-related stressors occur temporally before the onset of emotional eating or whether the use of emotional regulation strategies occur as a response to race-related stress. There is some literature to suggest that stress is increased by the use of rumination (McCullough et al., 2007; Schepers & Markus, 2015), making it plausible that rumination may be both an outcome of experiences of race-related discrimination and a cause of increased stress due to experiences of discrimination. In addition, there is also some evidence that would suggest that emotional eating may increase ruminative thinking (Kornacka et al., 2021). The cross-sectional nature of the current study precludes full interpretation of the temporal ordering of both emotional eating and rumination as well. I chose and tested a causal model to guide my current work based on Hatzenbuehler's (2009) Psychological Mediation Model, and I found partial support. However, more research must be done to further examine this relationship between race-related stress and emotional eating among Black women in a prospective design to test whether the causal directions chosen are supported.

## **Racial Disparities in Obesity**

While the current findings studied one behavioral risk factor, emotional eating, that may contribute to higher rates of obesity for some women, there are numerous additional structural and biological factors that must be considered to explain and reduce this disparity. Black communities often face structural inequalities in the form of income, access to nutritious foods, and health insurance, which may inflate rates of obesity (Hernandez et al., 2017; Lofton et al., 2023). In addition, Black women may live within residentially segregated areas in which high poverty rates contribute to lower of fruit and vegetable consumption (Agyemang & Powell-Wiley, 2013; Corral et al., 2012) as well as inadequate access to educational resources (Hernandez et al., 2017). These residentially segregated areas also often have lower access to safe environments to exercise (Hernandez et al., 2017). Regarding biological risk factors, there is evidence to suggest that Black women are at higher risk for obesity due to biological vulnerabilities, such as a genetic predisposition to lower fat oxidation rates, which may make weight loss more difficult (Berk et al., 2006; Lee & Arslanian, 2008; Sutherland, 2013). Cultural norms regarding greater acceptance of larger body sizes may also influence Black women to disregard sound knowledge of health risks in obesity (Agyemang & Powell-Wiley, 2013; Lofton et al., 2023).

In order to fully address racial disparities in obesity among Black women, it is important to implement changes across policy, prevention, and intervention efforts. Policies that support or advocate for expanding affordable health care insurance to individuals living in low-income residential environments may help to reduce obesity disparities; however, evidence suggests that such health care plans often do not cover

obesity pharmacotherapy (Hernandez et al., 2017). Incentives for purchasing healthy foods and vegetables through the supplemental nutrition assistance program (SNAP) have also been explored as prevention efforts (Wallace, 2019). Importantly, Black women are underrepresented in obesity intervention trials for both weight loss interventions and pharmacological interventions (Agyemang & Powell-Wiley, 2013; Byrd et al., 2018). Researchers have investigated the efficacy of standard behavioral weight loss programs and found that Black adults on average lost less weight than White adults (Byrd et al., 2018; Goode et al., 2017), which may be driven, in part, by low quality food access (Byrd et al., 2018). Therefore, behavioral interventions need to be tested specifically in Black women, and such interventions need to be implemented within the context of structural inequalities that Black women face in order to improve effectiveness.

### **Considerations**

The long-term goal of this program of research is to identify and intervene upon novel treatment targets to reduce obesity in Black women. The current study is one of few to examine the relationships between race-related stress and emotional eating among a sample of Black women (Harrington et al., 2010; Longmire-Avital & McQueen, 2019; Salami et al., 2019). However, the context of these findings is important to consider, leading to four next steps in this program of research. First, the larger conceptual model of this research relies on the evidence linking emotional eating and weight gain among Black women (Pickett, Burchenal, et al., 2020). However, weight gain was not measured here, leaving it unclear whether this relationship extends to weight gain. Establishing whether this risk process extends to weight gain is important in order to determine if

rumination and emotional eating should be explored as modifiable risk factors to reduce obesity risk in Black women.

Second, the current study was cross-sectional, precluding the establishment of temporal precedence. The measures of race-related stress, emotion regulation strategies, and emotional eating used in the current study had overlapping assessment time points (i.e., asked either about lifetime prevalence or providing no specific time period), further complicating the temporal ordering. The temporal ordering was chosen based on theory but cannot not be fully evaluated in the current test. Since the model was supported in this cross-sectional test, the next step in this program of research would be to temporally study race-related stress, rumination, and emotional eating over time, evaluating changes in these constructs, including a weight-related end point. This work would build further evidence concerning the viability of causal roles of the studied variables in the obesity risk pathway.

Third, studying specificity in the types of discrimination impacting emotional eating and rumination among Black women on a daily level will offer further clarification of risk models of race-related stress. Even if longitudinal studies document differential relationship between types of racism experiences and stress, coping, and eating (Hill & Hoggard, 2018; Hoggard et al., 2023), it remains unclear whether engaging in rumination and emotional eating are directly linked in time and place to experiences of race-related stress or if they covary due to the presence of a third, unmeasured variable. Diary studies, where participants document their experiences with race-related stress, emotional eating, and rumination over a period of time, may better allow for directly linking race-related

stress and maladaptive coping behaviors and would clarify whether certain types of racism are more strongly linked to such behaviors.

Fourth, studies examining mindfulness and emotion regulation in a multidimensional manner will better rule out if null results were driven by failure to capture the full content domain of these constructs. Both mindfulness (Baer et al., 2008; Hülshager & Alberts, 2021; Kiken et al., 2015; Lau et al., 2006) and emotional regulation (Gratz & Roemer, 2004; Kraiss et al., 2020; Lavender et al., 2017b) are multidimensional, spanning both trait and state forms. The current study used a unidimensional measure of trait mindfulness, representing primarily attention to the present moment. If other aspects of mindfulness, or if state mindfulness, are implicated in this relationship, I could not detect those relationships here. The current study examined the use of four types of emotional regulation strategies, but did not capture avoidance, which may be frequently utilized by Black adults in response to experiences of racial discrimination (T. L. Brown et al., 2011; Hoggard et al., 2012). Thus, I may have missed a particularly important emotion regulation strategy in this risk process.

### **Implications**

This research does not yet directly impact treatment and intervention. While the program of research continues, it may be important for clinicians to consider discussing the impact of race-related stress on rumination and emotional eating. This will help to further guide clinicians to develop specific treatment recommendations or considerations when working with Black women. Once the program of research has progressed and if it is found that race-related stress causally increases emotional eating through rumination, it may be beneficial to intervene at rumination. Racial discrimination is systemic and

pervasive (Banaji et al., 2021); therefore, it is imperative to develop strategies to mitigate the impact of race-related stress. There is research to suggest that cognitive behavioral therapy is effective for reducing rumination in adults with psychopathology (Querstret & Cropley, 2013). Although not developed for obesity in particular, a pilot study investigated the effectiveness of a race-based stress reduction intervention program for women at risk of cardiovascular disease (Saban et al., 2021). This program is an 8-week intervention that incorporates features from both cognitive behavioral therapy and mindfulness to increase the use of adaptive coping strategies and reduce stress-related symptoms from experiences with racial discrimination (Saban et al., 2021). Results from the pilot study found reductions in the use of avoidant coping strategies and blood inflammatory markers for stress (Saban et al., 2021). This intervention pilot study provided preliminary evidence that intervening at the coping strategies themselves may reduce distress resulting from racial discrimination among Black women.

If this work further supports that this risk process extends to weight gain and obesity, it may also be beneficial to intervene at emotional eating. Previous research has shown that mindfulness-based interventions reduce emotional eating and binge eating among adults (Katterman et al., 2014; Levoy et al., 2017). For instance, Levoy et al. (2017) found that Mindfulness-Based Stress Reduction reduced emotional eating and was associated with higher self-reported levels of mindfulness. Notably, this intervention was not designed for participants who were seeking weight loss and did not test whether reductions in emotional eating led to subsequent weight loss (Levoy et al., 2017). To my knowledge, contemporary literature has yet to include specific samples of Black women

within these interventions, and none have specifically addressed stress resulting from experiences with racial discrimination.

### **Limitations**

The present study comes with several other limitations that influence interpretation of the results. First, the present study relies on self-report data, collected via online survey measures. Research suggests that women may underreport their symptoms in fear of social judgement and to align with societal norms on self-report measures of eating pathology (Ambwani & Chmielewski, 2013). Additionally, self-report data are heavily influenced by the participant's desire and awareness to share about themselves, which may lead to overreporting or underreporting symptoms (Donaldson & Grant-Vallone, 2002; Tourangeau & Yan, 2007). If participants under-reported or over-reported symptoms, this would introduce error into the measurement and could increase the risk of a Type II error, making it less likely to detect a relationship. The current study only included one attention check, which limits the ability to detect inattentive participants and impacts the accuracy of the data collected from the study. This complicates interpretations drawn from the study, as some measures may be compromised for certain participants and may not accurately reflect their underlying construct. Furthermore, while online data may be efficient at collection and provides access to older and more diverse samples (Turner et al., 2021), it comes at the expense of potential inaccurate and dishonest reporting from participants (Chmielewski & Kucker, 2020). Therefore, a single attention check on online crowdsourcing database alone may not have been sufficient ensure valid and reliable results. Inaccurate reporting in self-report data in addition to the

limited attention checks could introduce error into the study's measurements and diminish associations.

Second, the present study did not control for whether participants had symptoms of pre-existing eating disorders, which may further influence results on the emotional eating measure or other measures within the study. Research suggests that those with eating disorders, such as bulimia and binge eating, are more likely to engage in emotional eating (Reichenberger et al., 2021; Stark, 2001). The relationships discussed in the current study may look different for those with different types of eating pathology as it introduces an additional confounding factor that may impact the effect of the measures in the current study and their emotional eating may be the result of a factor beyond race-related stress. Therefore, this could attenuate the observed effects among the measures in the study and make it less likely to find a significant result and reduce generalizability to the general population of Black women.

Third, although using three methods of recruitment may have increased diversity of participants, especially across age, education, and socioeconomic status, this could have introduced differences across samples that would increase error variance and make the finding of effects more challenging. Additionally, participants were compensated differing amounts depending on the recruitment source. Research has shown that compensation impacts response completion rates, as well as reliability of the survey data (Abdelazeem et al., 2023; Kost & Rosa, 2018). Therefore, it could be that those recruited through MTurk may have less reliable responses due to lower compensation rates. However, MTurk only accounted for 29% of the participants within the study, compared to over the majority of participants coming from community recruitment. While this may

be less of a problem, it should be noted that it has the potential to decrease generalizability of the results in the study to the general population of Black women.

## CONCLUSIONS

The present study is one few to examine the relationships between race-related stress and emotional eating among Black women. The current body of work extends previous literature suggesting a relationship between race-related stress and emotional eating through rumination that extends to those beyond emerging adulthood. Study limitations, including reliance on cross sectional self-report data, limited investigation of emotional regulation strategies, a broad definition of race-related stress, a lack of control for pre-existing eating disorders, and recruitment source bias, should be addressed in future research. This can be done by incorporating objective longitudinal measures, examining avoidance as an additional emotional regulation strategy, investigating more specific forms of race-related stress, screening participants for pre-existing eating disorders, and multilevel modeling to control for group differences between recruitment sources. The long-term goal of this work is to reduce racial disparities in obesity among Black women within the broader context of systemic, cultural, policy, and prevention changes.

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**Table 1.**

*Means, Standard Deviations, Skewness and Kurtosis for Variables of Interest*

Scale	M	SD	Skewness	Kurtosis
Race-related Stress	48.78	17.76	-0.02	-0.22
Emotional Eating	34.88	7.39	-0.25	-0.46
Cognitive Reappraisal	30.16	7.09	-0.43	-0.1
Problem Solving	152.31	24.56	-0.07	-0.37
Emotional Suppression	15.7	5.92	-0.06	-0.81
Rumination	50.28	15.19	0.33	-0.69
Trait Mindfulness	3.79	0.98	0.02	-0.28

**Table 2.***Sample Characteristics for Total Sample and Across Recruitment Methods*

Demographics	Mturk(n)	Prolific (n)	Intro to Psych (n)	Community (n)	Total	Chi Square(X)
<b>Education</b>						255.49
Completed a bachelors degree (or another 4 year degree)	33	34	1	69	137	
Completed a high school diploma or equivalent	14	13	0	14	41	
Completed a Master's degree	13	18	0	82	113	
Completed a PhD, Medical, law, or other professional degree	1	2	0	31	34	
Completed associates degree	15	9	0	20	44	

Completed some college or trade school (not

currently in college) 22 12 0 37 71

Completed some highschool 0 1 0 6 7

Completed some post graduate program 3 1 0 16 20

Currently a college first year 2 1 8 4 15

Currently a college fourth year 4 2 0 10 16

Currently a college second year 6 2 2 7 17

Currently a college third year 5 1 1 5 12

**Income** 43.25

\$100,000 to \$149,998 6 12 0 23 41

\$25,000 to \$34,998 21 6 3 28 58

\$35,000 to \$49,998 25 15 1 42 83

\$50,000 to \$74,998 20 15 0 85 120

\$75,000 to \$99,998 8 10 0 35 53

Less than \$25,001 38 35 8 79 160

More than \$150,001	0	3	0	8	11
Did not disclose	0	0	0	1	1
<b>Age (M)</b>	40.43	38.76	21.9	40.73	39.88
<b>Total (n)</b>	118	96	12	301	527

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**Table 3.***Bivariate Correlations for Study Variables*

Variable	1	2	3	4	5	6	7	8
1. Race-related Stress	-							
2. Emotional Eating	0.35***	-						
3. Cognitive Reappraisal	-0.06	-0.12	-					
4. Problem solving	-0.05	-0.25***	0.46***	-				
5. Emotional Suppression	0.07	0.10*	0.03	-0.24***	-			
6. Rumination	0.33***	0.35***	-0.19 ***	-0.42 ***	0.27***	-		
7. Trait Mindfulness	-0.40 ***	-0.47***	0.26 ***	0.42 ***	-0.27***	-0.55***	-	
8. Age	0.13***	-0.02	0.12***	0.23***	-0.08	-0.33***	0.21***	-

Note: \* =  $p < .05$ , \*\* =  $p < .01$ , \*\*\* =  $p < .001$

**Table 4.**

*Results of the Linear Regression Analysis*

Regressions	$\beta$	<i>SE</i>	CI [Lower, Upper] 95%
Race-related Stress → Emotional Eating	0.363***	0.017	[ 0.288, 0.438]
Age → Emotional Eating	-0.064	0.023	[ -0.144, 0.017]

Note:  $\beta$  = Standardized coefficients

**Table 5.***Results of the Parallel Mediation Analysis*

<i>Path</i>	$\beta$	<i>SE</i>	<i>CI [Lower, Upper]</i> 95%
<i>Race-related Stress</i>	0.082	0.014	[-0.003, 0.167]
<i>→Emotional Suppression (a1)</i>			
<i>Race-related Stress →</i>	0.375***	0.003	[ 0.298, 0.452]
<i>Rumination (a2)</i>			
<i>Race-related Stress</i>	-0.081	0.006	[-0.171, 0.009]
<i>→Problem solving (a3)</i>			
<i>Race-related stress</i>	-0.080	0.018	[-0.169, 0.010]
<i>→Cognitive reappraisal (a4)</i>			
<i>Emotional Suppression</i>	-0.019	0.054	[-0.103, 0.066]
<i>→Emotional eating (b1)</i>			
<i>Rumination → Emotional</i>	0.223***	0.257	[ 0.120, 0.326]
<i>eating (b2)</i>			
<i>Problem solving → Emotional</i>	-0.164	0.159	[-0.267, -0.062]
<i>eating (b3)</i>			
<i>Cognitive reappraisal →</i>	0.012***	0.053	[ -0.087, 0.111]
<i>Emotional eating (b4)</i>			
<i>Race-related stress →</i>	0.269	0.018	[0.183, 0.355]
<i>Emotional eating (cp)</i>			

<i>a1*b1</i>	-0.002	0.002	[-0.009, 0.005]
<i>a2*b2</i>	0.084	0.009	[0.041, 0.126]
<i>a3*b3</i>	0.013	0.004	[-0.004, 0.031]
<i>a4*b4</i>	-0.001	0.002	[-0.009, 0.007]
<i>Total Indirect Effect</i>	0.094	0.009	[0.051, 0.137]
<i>Total Effect</i>	0.363	0.017	[0.285, 0.441]

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*Note: \* =  $p < .05$ , \*\* =  $p < .01$ , \*\*\* =  $p < .001$ .  $\beta$  = Standardized coefficients*

**Table 6.***Results of the Moderation Effects of Mindfulness in the Parallel Mediation Analysis*

<i>Moderation effect</i>	$\beta$	<i>SE</i>	CI [Lower, Upper] 95%
<i>Moderation effect on Race-related Stress → Emotional Suppression (a1)</i>	-0.281*	0.012	[-0.546, -0.017]
<i>Moderation effect on Race-related Stress → Ruminations (a2)</i>	-0.014	0.003	[-0.284, 0.256]
<i>Moderation effect on Race-related Stress → Problem solving (a3)</i>	-0.099	0.005	[-0.365, 0.167]
<i>Moderation effect on Race-related stress → Cognitive reappraisal (a4)</i>	-0.229	0.018	[-0.570, 0.113]
<i>Moderation effect on Emotional Suppression → Emotional eating (b1)</i>	-0.056	0.051	[-0.352, 0.240]
<i>Moderation effect on Ruminations → Emotional eating (b2)</i>	0.109	0.190	[-0.128, 0.345]
<i>Moderation effect on Problem solving → Emotional eating (b3)</i>	0.692	0.139	[0.070, 1.315]
<i>Moderation effect Cognitive reappraisal → Emotional eating (b4)</i>	-0.309	0.042	[-0.750, 0.133]
<i>Race-related stress → Emotional eating (cp)</i>	0.151	0.019	[0.069, 0.233]

Note: \* =  $p < .05$ , \*\* =  $p < .01$ , \*\*\* =  $p < .001$ .  $\beta$  = Standardized coefficients

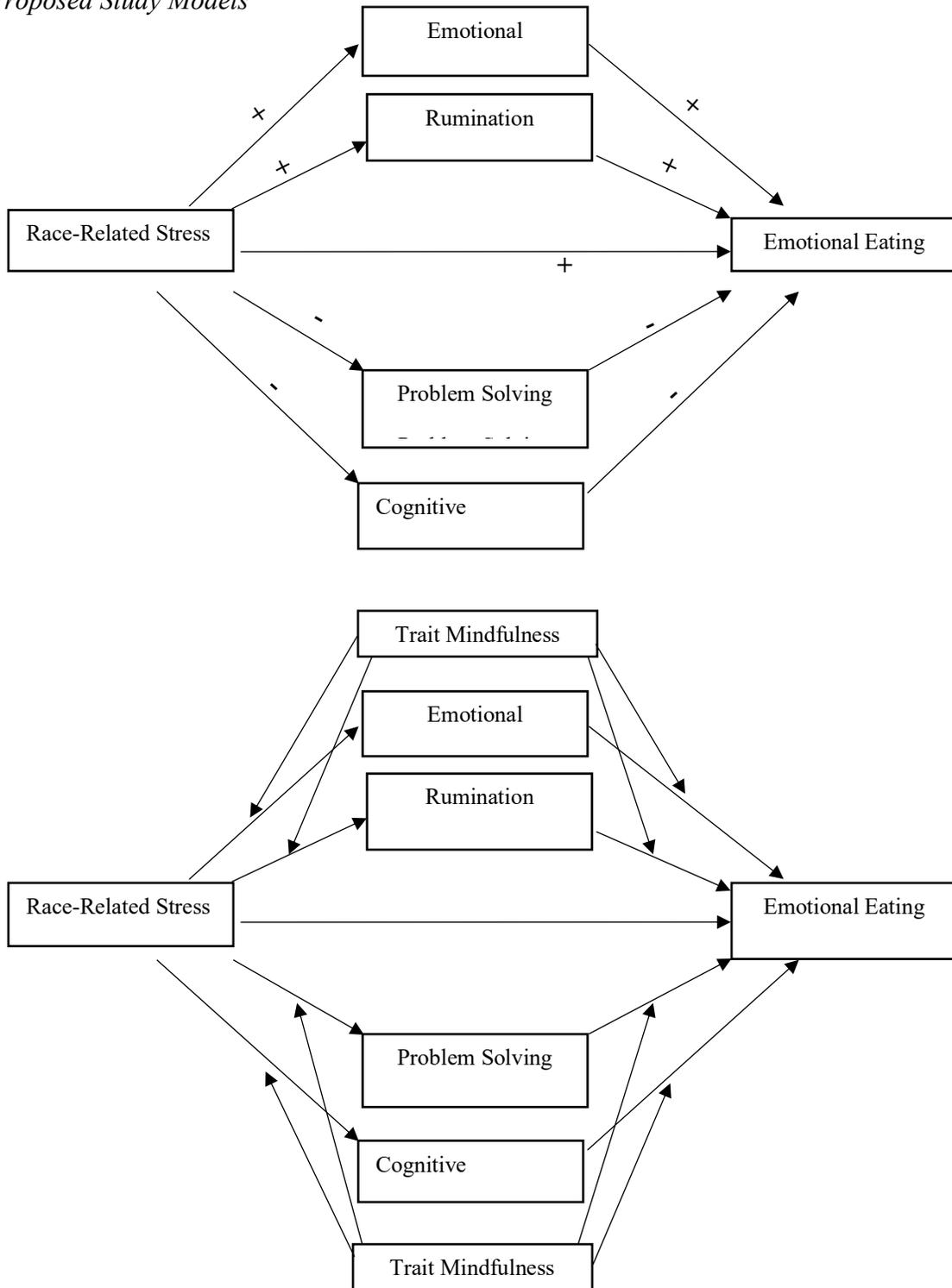
**Table 7.***Sensitivity Analysis*

Path	$\beta$	SE	CI [Lower, Upper] 95%
Race-related Stress → Ruminations (a)	0.207	0.013	[-0.090, 0.503]
Ruminations → Emotional eating (b)	0.127	0.577	[-0.103, 0.358]
ab	0.027	0.011	[-0.004, 0.040]
<i>Moderation</i> effect on Race-related Stress → Emotional Suppression	-0.014	0.003	[-0.289, 0.261]
<i>Moderation</i> effect on Emotional Suppression → Emotional Eating	0.013	0.161	[-0.211, 0.236]
Race-related stress → Emotional eating (cp)	0.161	0.018	[0.075, 0.246]
Age → Emotional eating	0.083	0.042	[0.001, 0.165]
Age → Ruminations	-0.266	0.036	[-0.336, -0.197]

Note: \* =  $p < .05$ , \*\* =  $p < .01$ , \*\*\* =  $p < .001$ .  $\beta$  = Standardized coefficients

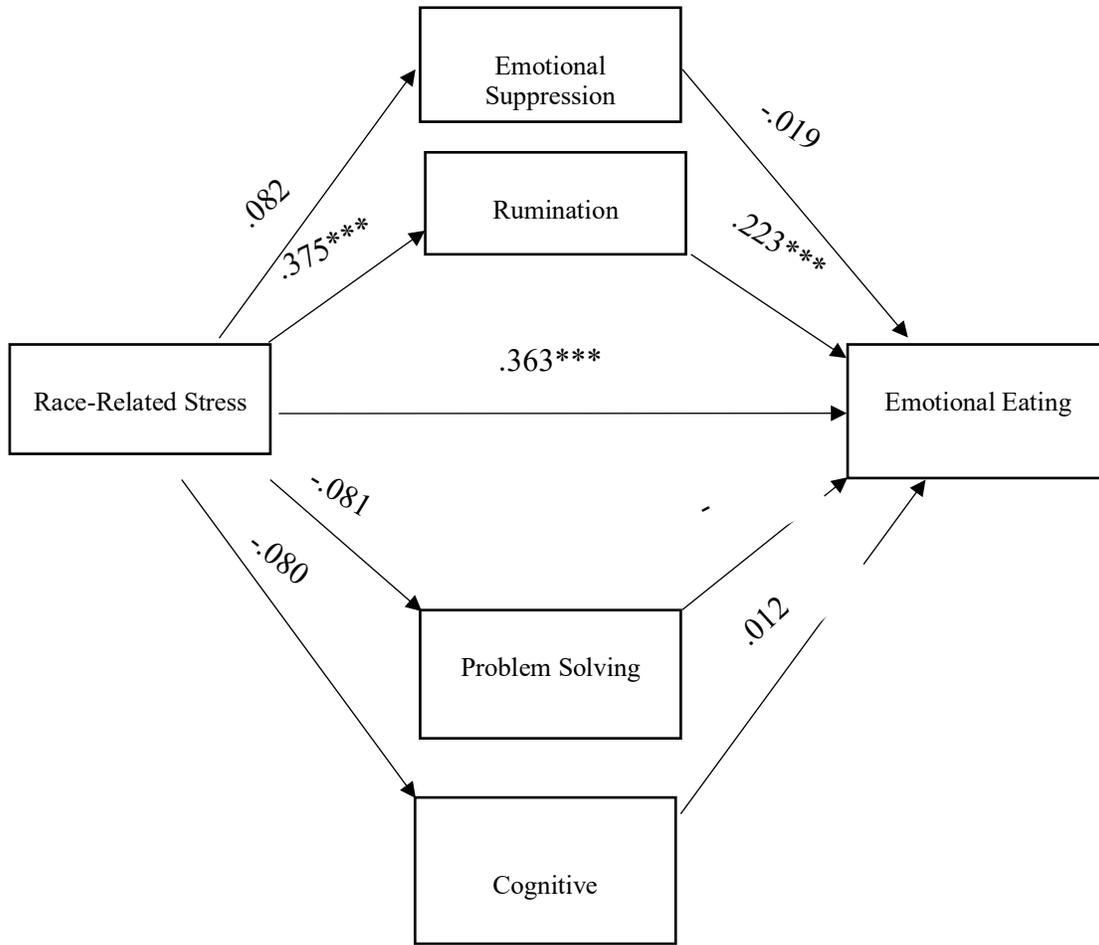
**Figure 1.**

*Proposed Study Models*



**Figure 2.**

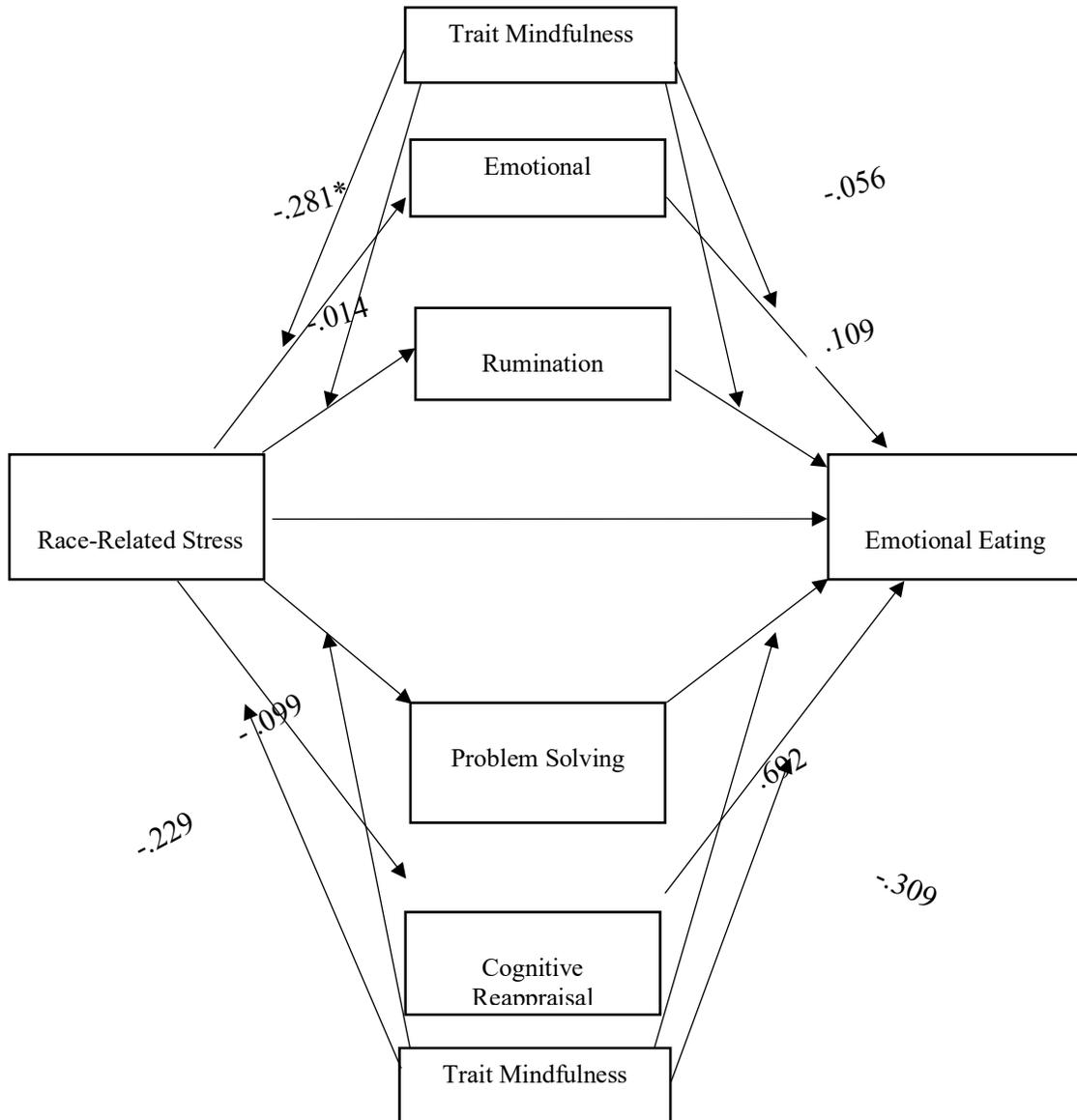
*Parallel Mediation Model*



Note: \* =  $p < .05$ , \*\* =  $p < .01$ , \*\*\* =  $p < .001$ . Standardized regression coefficients were reported in the present figure.

**Figure 3.**

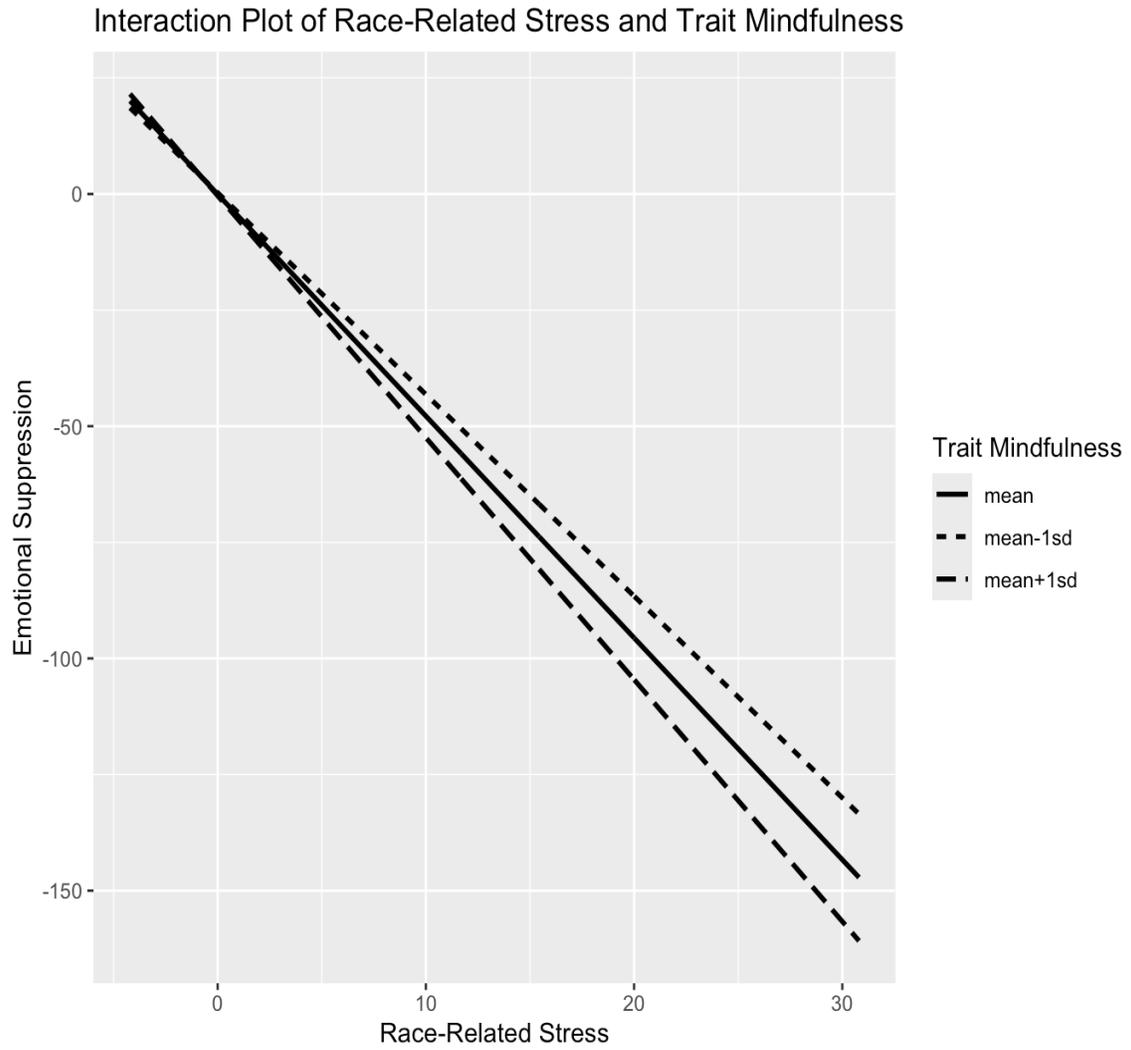
*Moderated Parallel Mediation Model.*



Note: \* =  $p < .05$ , \*\* =  $p < .01$ , \*\*\* =  $p < .001$ . Standardized coefficients were reported in the present figure.

**Figure 4.**

*Interaction Plot of Race-Related Stress and Trait Mindfulness*



## APPENDIX. A SURVEY

1. Please enter your age in years.
2. Do you currently reside outside of the United States?
3. Where did you hear about this study?
  - a. Email
  - b. A friend
  - c. A flyer
  - d. Mturk Posting
  - e. SONA
  - f. Prolific
4. Please select the option(s) that best match your gender. Please select all that apply.
  - a. Man
  - b. Woman
  - c. Genderqueer
  - d. Genderfluid
  - e. Two-spirit
  - f. Agender
  - g. Intersex
  - h. Unsure
  - i. My gender isn't listed (please describe)
5. Please enter your Prolific ID number.
6. Please describe your current education status.
  - a. Completed some high school.
  - b. Completed a high school diploma or equivalent.
  - c. Currently a college first year
  - d. Currently a college second year
  - e. Currently a college third year
  - f. Currently a college fourth year
  - g. Completed some college or trade school (not currently in college)
  - h. Completed associate degree
  - i. Completed Bachelor's degree (or another 4 year degree)
  - j. Completed some postgraduate program
  - k. Completed a Master's degree
  - l. Completed a PhD, Medical, law, or other professional degree.

7. Please select the option that best reflects your yearly personal (only including you) income.
- Less than \$25,000
  - \$25,000 to \$34,999
  - \$35,000 to \$49,999
  - \$50,000 to \$74,999
  - \$75,000 to \$99,999
  - \$100,000 to \$149,999
  - More than \$150,000
8. Please select the options that best match your race and or ethnicity.
- Caucasian/White/Angelo/European American
  - Middle Eastern or North African
  - African American/Black
  - Asian American/Pacific Islander
  - American Indian/Native American
  - Eskimo/Alaskan Native/Aleut
  - Hispanic/Latinx/a/o
  - My race is not listed here (please describe)
9. When thinking about your gender, which category do you feel best fits you?
- Transgender
  - Cisgender
  - Unsure
  - A category not listed here (please describe)
10. If you feel comfortable disclosing so, what is your sex assigned at birth?
- Male
  - Female
  - Intersex
  - Unsure
  - I don't feel comfortable disclosing.

#### Race-Related Stress Brief

Indicate your response to each of the following questions.

- 0 This has never happened to me
- 1 This event happened, but it did not bother me
- 2 This event happened and I was slightly upset
- 3 This event happened and I was upset
- 4 This event happened and I was extremely upset

11. You notice that crimes committed by White people tend to be romanticized, whereas the same crime committed by a member of your ethnic group is portrayed as savagery, and the Black person who committed it, as an animal.
12. Sales people/clerks did not say thank you or show other forms of courtesy and respect (i.e. put your things in a bag) when you shopped at some White owned businesses.
13. You notice that when members of your ethnic group are killed by the police, the media informs the public of the victim's criminal record or negative information in their background, suggesting they got what they deserved.
14. You have been threatened with physical violence by an individual or group of Whites.
15. You have observed that White kids who commit violent crimes are portrayed as "boys being boys," while kids in your ethnic group who commit similar crimes are wild animals
16. You seldom hear or read anything positive about members of your ethnic group on radio, TV, newspapers, or in history books.
17. While shopping at a store, the sales clerk assumed that you couldn't afford certain items (i.e., you were directed toward the items on sale).
18. You were the victim of a crime and the police treated you as if you should just accept it as part of being a member of your ethnic group.
19. You were treated with less respect and courtesy than Whites while in a store, restaurant, or other business establishment.
20. You were passed over for an important project although you were more qualified and competent than the White person given the task.

21. Whites have stared at you as if you didn't belong in the same place with them, whether it was a restaurant, theater, or other place of business.
22. You have observed the police treat White with more respect and dignity than they do members of your ethnic group.
23. You have been subjected to racist jokes by Whites in positions of authority, and you did not protest for fear they might have held it against you.
24. While shopping at a store or when attempting to make a purchase, you were ignored as if you were not a serious customer or didn't have any money.
25. You have observed situations where other members of your ethnic group were treated harshly or unfairly by Whites because of their race.
26. You have heard reports of White people who have committed crimes, and in an effort to cover up their deeds falsely reported that a member of your ethnic group was responsible for the crime.
27. You notice that the media plays up those stories that cast members of your ethnic group in negative ways (child abusers, rapists, muggers, etc. [or as savages] Wild Man of 96th St., Wolf Pack, etc.) usually accompanied by a large picture of a member of your ethnic group looking angry or disturbed.
28. You have heard racist remarks or comments about members of your ethnic group spoken with impunity by White public officials or other influential White people.
29. You have been given more work or the most undesirable jobs at your place of employment, whereas the White of equal or less seniority and credentials is given less work and more desirable tasks.

30. You have heard or seen other members of your ethnic group express the desire to be White or to have White physical characteristics because they disliked being a member of your ethnic group or thought it was ugly.
31. White people or other people not in your ethnic group have treated you as if you were unintelligent and needed things explained to you slowly or numerous times.
32. You were refused an apartment or other housing; you suspect it was because of your ethnicity.

**Eating Behaviors Pattern Questionnaire (emotional eating)**

33. I eat when I'm upset.
- a. Strongly Disagree
  - b. Disagree
  - c. Neutral
  - d. Agree
  - e. Strongly Agree
34. When I am in a bad mood, I eat whatever I feel like eating.
- a. Strongly disagree.
  - b. Disagree
  - c. Neutral
  - d. Agree
  - e. Strongly Agree
35. I eat for comfort.
- a. Strongly disagree.
  - b. Disagree
  - c. Neutral
  - d. Agree
  - e. Strongly Agree

36. My emotions affect what and how much I eat.

- a. Strongly disagree.
- b. Disagree
- c. Neutral
- d. Agree
- e. Strongly Agree

37. If I'm bored, I'll snack more.

- a. Strongly disagree.
- b. Disagree
- c. Neutral
- d. Agree
- e. Strongly agree

38. I sometimes snack even when I'm not hungry.

- a. Strongly disagree
- b. Disagree
- c. Neutral
- d. Agree
- e. Strongly Agree

39. I am a snacker.

- a. Strongly disagree
- b. Disagree
- c. Neutral
- d. Agree
- e. Strongly Agree

**40. Validity Check**

“I have not eaten in the past year.”

- a. True
- b. False

41. I snack more at night.
- a. Strongly disagree
  - b. Disagree
  - c. Neutral
  - d. Agree
  - e. Strongly Agree
42. When I buy snack foods, I eat until I have finished the whole package.
- a. Strongly disagree
  - b. Disagree
  - c. Neutral
  - d. Agree
  - e. Strongly Agree
43. When I am upset, I tend to stop eating
- a. Strongly disagree
  - b. Disagree
  - c. Neutral
  - d. Agree
  - e. Strongly Agree

#### Emotion Regulation Questionnaire (ERQ)

For each item, please answer using the following scale:

1= Strongly disagree, 2 3 4= Neutral 5 6 7= Strongly agree

44. When I want to feel more *positive* emotion (such as joy or amusement), I *change what I'm thinking about*.
45. I keep my emotions to myself.
46. When I want to feel less negative emotion such as sadness or anger, I change what I'm thinking about.

47. When I am feeling positive emotions, I am careful not to express them.
48. When I'm faced with a stressful situation, I make myself think about it in a way that helps me stay calm.
49. I control my emotions by not expressing them.
50. When I want to feel more positive emotion, I change the way I'm thinking about the situation.
51. I control my emotions by changing the way I think about the situation I'm in.
52. When I am feeling negative emotions, I make sure not to express them.
53. When I want to feel less negative emotions, I change the way I'm thinking about the situation.

#### Mindfulness Attention Awareness Scale (MAAS)

Instructions: Below is a collection of statements about your everyday experience. Using the 1-6 scale below, please indicate how frequently or infrequently you currently have each experience. Please answer according to what really reflects your experience rather than what you think your experience should be. Please treat each item separately from every other item.

1= almost always, 2= very frequently, 3=somewhat frequently, 4= somewhat infrequently, 5= very infrequently, 6= almost never.

54. I could be experiencing some emotion and not be conscious of it until some time later.
55. I break or spill things because of carelessness, not paying attention, or thinking of something else.
56. I find it difficult to stay focused on what's happening in the present.
57. I tend to walk quickly to get where I'm going without paying attention to what I experience along the way.
58. I tend not to notice feelings of physical tension or discomfort until they really grab my attention.
59. I forget a person's name almost as soon as I've been told it for the first time.
60. It seems I am "running on automatic," without much awareness of what I'm doing. I rush through activities without being really attentive to them.
61. I get so focused on the goal I want to achieve that I lose touch with what I'm doing right now to get there.
1. I do jobs or tasks automatically, without being aware of what I'm doing.
  2. I find myself listening to someone with one ear, doing something else at the same time.
  3. I drive places on 'automatic pilot' and then wonder why I went there.
  4. I find myself preoccupied with the future or the past.

5. I find myself doing things without paying attention.
6. I snack without being aware that I'm eating.

Please read each of the items below and indicate whether you almost never, sometimes, often, or almost always think or do each one when you feel down, sad, or depressed.

Please indicate what you *generally* do, not what you think you should do.

1= almost never, 2= sometimes, 3=often 4= almost always

7. think about how alone you feel
8. think "I won't be able to do my job if I don't snap out of this"
9. think about your feelings of fatigue and achiness
10. think about how hard it is to concentrate
11. think "What am I doing to deserve this?"
12. think about how passive and unmotivated you feel.
13. analyze recent events to try to understand why you are depressed
14. think about how you don't seem to feel anything anymore
15. think "Why can't I get going?"

16. think "Why do I always react this way?"
17. go away by yourself and think about why you feel this way
18. write down what you are thinking about and analyze it
19. think about a recent situation, wishing it had gone better
20. think "I won't be able to concentrate if I keep feeling this way."
21. think "Why do I have problems other people don't have?"
22. think "Why can't I handle things better?"
23. think about how sad you feel.
24. think about all your shortcomings, failings, faults, mistakes
25. think about how you don't feel up to doing anything
26. analyze your personality to try to understand why you are depressed.
27. go someplace alone to think about your feelings
28. think about how angry you are with yourself.

## Personal Problem Solving- Inventory

1= Strongly agree, 2= Moderately Agree, 3= Slightly Agree, 4= Slightly Disagree, 5=

Moderately Disagree, 6= Strongly Disagree

29. When a solution to a problem has failed, I do not examine why it didn't work.
30. When I am confronted with a complex problem, I don't take the time to develop a strategy for collecting information that will help define the nature of the problem.
31. When my first efforts to solve a problem fail, I become uneasy about my ability to handle the situation.
32. After I solve a problem, I do not analyze what went right and what went wrong.
33. I am usually able to think of creative and effective alternatives to my problems.
34. After following a course of action to solve a problem, I compare the actual outcome with the one I had anticipated.
35. When I have a problem, I think of as many possible ways to handle it as I can until I can't come up with any more ideas.
36. When confronted with a problem, I consistently examine my feelings to find out what is going on in a problem situation.

37. When confused about a problem, I don't clarify vague ideas or feelings by thinking of them in concrete terms.
38. I have the ability to solve most problems even though initially no solution is immediately apparent. 11. Many of the problems I face are too complex for me to solve.
39. When solving a problem, I make decisions that I am happy with later.
40. When confronted with a problem, I tend to do the first thing that I can think of to solve it.
41. Sometimes I do not stop and take time to deal with my problems, but just kind of muddle ahead.
42. When considering solutions to a problem, I do not take the time to assess the potential success of each alternative.
43. When confronted with a problem, I stop and think about it before deciding on a next step.
44. I generally act on the first idea that comes to mind in solving a problem.
45. When making a decision, I compare alternatives and weigh the consequences of one against the other.

46. When I make plans to solve a problem, I am almost certain that I can make them work.
47. I try to predict the result of a particular course of action.
48. When I try to think of possible solutions to a problem, I do not come up with very many alternatives.
49. When trying to solve a problem, one strategy I often use is to think of past problems that have been similar.
110. Given enough time and effort, I believe I can solve most problems that confront me.
111. When faced with a novel situation, I have confidence that I can handle problems that may arise.
112. Even though I work on a problem, sometimes I feel like I'm groping or wandering and not getting down to the real issue.
113. I make snap judgments and later regret them.
114. I trust my ability to solve new and difficult problems.
115. I use a systematic method to compare alternatives and make decisions.
116. When thinking of ways to handle a problem, I seldom combine ideas from various alternatives to arrive at a workable solution.

117. When faced with a problem, I seldom assess the external forces that may be contributing to the problem.
118. When confronted with a problem, I usually first survey the situation to determine the relevant information.
119. There are times when I become so emotionally charged that I can no longer see the alternatives for solving a particular problem.
120. After making a decision, the actual outcome is usually similar to what I had anticipated.
121. When confronted with a problem, I am unsure of whether I can handle the situation.
122. When I become aware of a problem, one of the first things I do is try to find out exactly what the problem is.

## **CURRICULUM VITAE**

### **Devin M. Whitt**

Indiana University Indianapolis (IUI), 2021- Present

Ph.D. expected 2026, Clinical Psychology

Faculty Mentor: Melissa Cyders

### **Bachelor of Science – May 2021**

Major: Psychology

Central Michigan University

Cyber-victimization and Addictive Phone Usage: Adapting Coping as a Protective Factor

### **Master of Science—March 2025**

Clinical Psychology

Indiana University Indianapolis

Exploring Emotional Regulation and Trait Mindfulness in the Relationship Between Racial Discrimination and Emotional Eating Among Black Women

### **RESEARCH**

Research Assistant, 2019 – 2021

Central Michigan University

Assisted Prof. Reid Skeel in running participants for data analysis to analyze the correlational effect of phone usage and delayed gratification, specifically, impulsivity.

Research Assistant, 2019- 2021

Central Michigan University

Assisted Prof. Sarah Domoff in developing healthy social media usage strategies for at risk high school students. Specifically, developed strategies for recognition and reduction of hate speech through use of counter speech behaviors and recognizing fake social media including fake news and

McNair Scholar, 2020 – 2021

Cyber-victimization and Addictive Phone Usage: Adaptive Coping as a protective factor  
Conducted analysis of cyber-victimization, within college student populations, and regression analysis of the variable addictive phone use. analyzed positive coping styles as a moderator variable for the correlation using Hayes Macro.

Research Assistant, 2021 – 2023

Indiana University- Indianapolis

Assisted Prof. Tamika Zapolski in running participants for data analysis to understand the role of inflammation between racial discrimination and drug use among at risk African American youth.

Research Assistant 2024-2024

Indiana University Indianapolis

Assisted Prof. Tamika Zapolski with the Youth Coalition (YoCo) initiative by helping with participant recruitment, organization, and task management. Conducted intake interviews for prospective participants.

Research Assistant/Clinician, January 2023 – March 2023

Supervisor: Tamika C.B. Zapolski, Ph.D. (Principal Investigator)

Responsibilities: Test the preliminary effectiveness of a modified Dialectical Behavior Therapy for Adolescents (DBT-A) within the juvenile justice system to increase emotion regulation and distress tolerance skills and reduce the likelihood of risky behavior, including substance use in a group of adolescents over 11 weekly sessions.

## **RESEARCH PRESENTATIONS**

McNair Illinois Trio, Summer 2020

Presented McNair Thesis and findings in front of an online lay audience within the McNair program using a voiced Power point presentation format with question and answering section.

McNair Research Symposium, 2020

Presented McNair Thesis and findings in front of an online lay audience at Central Michigan University using WebEx with Power Point presentation format with question and answering section.

Midwestern Psychological Association, 2023

Presented poster presentation at Midwestern Psychological Association in Chicago II on

Understanding Gender Discrimination on Healthy Eating Behaviors among Women.