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### INVESTIGATING THE ROLE OF DENIAL IN INTERPERSONAL FORMULATIONS

### OF BINGE EATING AMONG BLACK AND WHITE COLLEGE WOMEN:

### AN ECOLOGICAL MOMENTARY ASSESSMENT STUDY

by

Lindsay Marie Howard Bachelor of Arts, May 2012, Saint Olaf College Master of Science, December 2017, Old Dominion University

A Dissertation Submitted to the Faculties of Old Dominion University Eastern Virginia Medical School Norfolk State University In Partial Fulfillment of the Requirements for the Degree of

### DOCTOR OF PHILOSOPHY

### CLINICAL PSYCHOLOGY

### VIRGINIA CONSORTIUM PROGRAM IN CLINICAL PSYCHOLOGY AUGUST 2021

Approved by:

Kristin E. Heron (Chair)

Jennifer M. Flaherty (Member)

Robin J. Lewis (Member)

James M. Henson (Member)

### ABSTRACT

### INVESTIGATING THE ROLE OF DENIAL IN INTERPERSONAL FORMULATIONS OF BINGE EATING AMONG BLACK AND WHITE COLLEGE WOMEN: AN ECOLOGICAL MOMENTARY ASSESSMENT STUDY

### Lindsay Marie Howard Virginia Consortium Program in Clinical Psychology, 2021 Director: Dr. Kristin Heron

Binge eating is a prominent concern with 2.8 million Americans meeting criteria for binge eating disorder and an additional 10-15% reporting loss of control and overeating behaviors that fail to meet diagnostic criteria. Despite the risk associated with binge eating in emerging adulthood, studies exploring differences in binge eating between Black and White college women have been limited. Black women may be more likely than White women to deny disordered eating behaviors, such as binge eating, due to pressure to reflect historical bodypositive ideals and heightened stigma regarding mental health issues in Black communities. Denial is worthy of attention because, according to an interpersonal formulation of eating disorder maintenance and etiology, engaging in binge eating increases interpersonal problems; in turn, these interpersonal problems are believed to intensify disordered eating. The primary goal of this study was to offer insight into similarities or differences in binge eating between Black and White college women, and whether denial of disordered eating can assist in explaining interpersonal formulations of disordered eating. The current research study included a baseline survey and 14 days of ecological momentary assessment (EMA). Three EMA assessments were completed each day. Black (n=35) and White (n=37) college women in young adulthood that were screened for engagement in denial of disordered eating reported on interpersonal factors, denial, engagement in binge eating, and help-seeking attitudes. There were no significant differences between races on attitudes towards help-seeking and denial of disordered eating at

baseline. EMA results suggested that denial of disordered eating during the day was negatively associated with positive social interactions during the day and positive social interactions during the day were negatively associated with overeating at night. In addition, occurrence of social interaction and more positive social interactions during the day were negatively associated with negative affect during the day. Denial of disordered during the day was also positively associated with the occurrence of social interactions during the day and loss of control eating at night. Race moderated a relation between valence of social interactions and negative affect, such that this negative association was stronger for Black women. This study may contribute to the goal of understanding the impacts of denial in daily life and the development of prevention and intervention programs better suited to address disordered eating in young women; for example, future treatment may contain psychoeducation on the effects of denial or the importance of honest communication. Copyright, 2021, by Lindsay Marie Howard, All Rights Reserved.

This dissertation is dedicated to my parents (Scott and Pam Howard), my brother (Chad Howard), and my husband (Charles Freligh); thanks for making my life full of light and love.

#### ACKNOWLEDGEMENTS

There are so many people that I would like to thank for their support in my pursuit of my doctorate degree. First, I would like to thank my dissertation committee, Dr. Kristin Heron, Dr. Robin Lewis, Dr. Jennifer Flaherty, and Dr. James Henson for their investment in this project and willingness to provide constructive feedback. Special thanks to my primary research mentor Dr. Kristin Heron, who never fails to lend a listening ear and impeccable guidance. Dr. Heron has been fiercely supportive of me over the past six years and I am eternally grateful to have her in my corner.

To my best friend, Stacy (Miorana) Turnbull, your unconditional love and support in the pursuit of my passions since the age of 13 does not go unrecognized and I could not have a better lifelong confidant. In addition, I count myself among the lucky to have an intensely loyal group of girlfriends: life would not be this beautiful without you. To Kelly Phillips, Kylie Grayden, and Siri (Thompson) Raskob, recognizing your own mortality at 17 and again at 27 impacts a person in profound ways. If not for you three and the lessons you've taught me, I would not have had the courage to take the risks that I have taken in pursuit of a purposeful life.

To my family, you love me without bounds, which is the greatest gift of all. Dad, you will forever be my greatest role model, thank you for teaching me how to "tell the truth with love". Mom, you are my greatest support and have lifted me up more than words can express gratitude for. Chad, thank God you are my sibling; I can count on you to make me laugh and be there for me when I cry. Charles, thank you for showing me what selfless love looks like. Grandma Myrna, you have shown me how to live a life of grace, love, and dependability. Grandma Pearl and Grandpa Duane, I hope you are proud of the ways I am carrying on your legacies. Last but certainly not least, to my Grandpa Ken, everything I do is in your memory.

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### **CHAPTER I**

### **INTRODUCTION**

Eating disorders continue to be a pervasive mental health concern in the United States, with the second highest mortality rate of any psychiatric illness and approximately 20 million women suffering from an eating disorder at some point in their lifetime (Arcelus, Mitchell, Wales, & Nielsen, 2011; Eating Disorders Coalition, 2016; Stice, 2002). The most recent Diagnostic and Statistical Manual of Mental Disorders (DSM-5) recognizes three primary eating disorder diagnoses: Anorexia Nervosa (AN), Bulimia nervosa (BN), and Binge Eating Disorder (BED; American Psychiatric Association, 2013). A diagnosis of AN is categorized by restriction of food intake, an intense fear of weight gain, disturbance of body weight or shape, and low body mass index. A diagnosis of BN is categorized by recurrent episodes of binge eating and compensatory behaviors (e.g., self-induced vomiting, laxative or diuretic use, and over-exercise), and a self-evaluation unduly influenced by shape and weight. BED is categorized by recurrent episodes of binge eating without the compensatory behaviors seen with BN (American Psychiatric Association, 2013). These primary diagnoses are associated with a variety of negative health outcomes, including impairment in cognitive, emotional, and social functioning (American Psychiatric Association, 2013).

Eating disorders are an especially prominent concern for emerging adults given that 18-21 is the average age of onset for eating disorder development (Volpe et al., 2016). Prevalence estimates of clinical eating disorders on college campuses range from 8% to 17% (Eisenberg, Nicklett, Roeder, & Kirz, 2011), but the proportion of students engaging in disordered eating, that is, unhealthy eating patterns that reflect symptoms of eating disorder development, is much higher, especially for young women. In fact, nearly 50% of female college students report engagement in some type of disordered eating behavior in an attempt to control their weight (Fitzsimmons-Craft, 2011). This figure is staggering especially considering that subthreshold disordered eating is associated with similar levels of functional impairment and emotional distress as clinical eating disorders (Keel, Brown, Holm-Denoma, & Bodell, 2011; Stice, Marti, & Rohde, 2013). Every individual with an eating disorder engages in some type of disordered eating, but not all individuals who engage in disordered eating meet criteria for an eating disorder due to below threshold frequency and/or severity of the behaviors (Shisslak, Crago, & Estes, 1995). Disordered eating behaviors include binge eating, inappropriate compensatory behaviors (e.g., self-induced vomiting, excessive exercise), and dietary restriction that align with symptoms of BED, BN, and AN, respectively (American Psychiatric Association, 2013; Eisenberg et al., 2011; Lipson & Sonneville, 2017), with binge eating being the most frequently reported disordered eating behavior (Fitzsimmons-Craft, 2011). The DSM-5 defines binge eating as eating an objectively large amount of food in a short amount of time (i.e., within any two-hour period) while experiencing a sense of loss of control when eating (American Psychiatric Association, 2013). Binge eating deserves attention not only because of its pervasiveness, but also because of the associated health risks, such as obesity, heart disease, high blood pressure, and emotional distress (National Eating Disorder Association, 2013).

### **General Overview of the Present Study**

Although research on etiological and maintaining factors associated with disordered eating has come a long way since eating disturbances were first recognized (American Psychiatric Association, 1980), there is still a long way to go, particularly as it relates to understanding how disordered eating may differentially or similarly impact diverse populations (Sala, Reyes-Rodriguez, Bulik, & Bardone-Cone, 2013). Despite the risk associated with binge eating in emerging adulthood, studies exploring differences in binge eating between Black and White college women have been limited. A recent systematic review highlighted that relatively few studies have investigated correlates of binge eating between races (Goode et al., 2020). The research that does exist has focused on differences in broad cultural ideals at the cost of investigating other social and interpersonal factors, such as denial, that influence reported disordered eating rates (Crago & Shisslak, 2003; Wildes, Emery, & Simons, 2001). Black women may be more likely than White women to deny engagement in disordered eating due to pressure to reflect historical body-positive ideals and heightened stigma regarding mental health issues in Black communities, which may lead to lower levels of help-seeking (Lovejoy, 2001; Ward, Wiltshire, Detry, & Brown, 2013).

Denial of disordered eating may be a particularly maladaptive behavior to engage in because, according to an interpersonal formulation of the development and maintenance of eating disorders, engaging in disordered eating behaviors increases interpersonal problems; in turn, these interpersonal problems are believed to intensify eating disorder symptoms (Rieger et al., 2010). In the present study, denial of disordered eating was assessed broadly, using a measure designed to assess denial of various disordered eating behaviors (e.g., "Have you been dishonest about how much you ate?"). The impact of denial broadly was assessed in relation to binge eating specifically given previous research that suggests a link between interpersonal factors during the day and binge eating at night (Okon, Greene, & Smith, 2003; Steiger, Gauvin, Jabalpurwala, Seguin, & Stotland, 1999). Attempts to deny or conceal disordered eating behaviors likely leads to social isolation and/or negative social interactions, and subsequently, increases in negative affect and binge eating (Vandereycken & Van Humbeck, 2008). The present study used an ecological momentary assessment (EMA) approach to examine denial of disordered eating in daily life among a racially diverse sample of young women.

### **Influences of Binge Eating in College Women**

Past research consistently indicates that both biological and environmental influences contribute to binge eating symptoms among college women (Culbert, Racine, & Klump, 2015). Twin and adoption studies have found moderate-to-high heritability of disordered eating symptoms, such as binge eating, with environmental effects generally accounting for the remaining variance (Culbert et al., 2015). Models of risk factors for binge eating in young women have highlighted the roles of biological (e.g., genetics, brain structure), sociocultural (e.g., culture, family, media), and psychological (e.g., affect, stress) variables in the onset and maintenance of binge eating, with a few studies including all three of these components in comprehensive models (e.g., Rodgers, Paxton, & McClean, 2014). In the following sections, the biological, psychological, and sociocultural influences on binge eating will be briefly reviewed.

**Biological influences.** Prevailing biological models of eating disorders suggest that there may be a host of predisposing and perpetuating biological traits that trigger and maintain binge eating (Frank, 2016). From the biological perspective, it is suggested that individuals who binge eat later in life may be born with biological traits, such as increased sensitivity to food stimuli (Jappe et al., 2011) and/or abnormalities in the orbitofrontal cortex, hypothalamus, and dopamine circuits (Frank et al., 2012), which are factors involved in one's ability to control eating (Frank et al., 2012). The biological perspective is further supported by evidence that suggests disordered eating runs in families, with individuals who have a family member with an eating disorder being 7-12 times more likely to develop an eating disorder themselves (Thornton, Mazzeo, & Bulik, 2011). The development of binge eating is thought to follow a diathesis-stress model, meaning

that biological risk factors may be triggered by developmental changes, such as the onset of puberty or alterations in food intake during the college years (Asarian & Geary, 2013; Keel & Forney, 2013). Although the current study did not assess biological risk factors specifically, it did focus on sociocultural and psychological risk factors during the college years that intersect with the aforementioned biological variables, thus serving to inform future research that includes biological risk. The sociocultural and psychological risk factors pertinent to the present study will be discussed in the following sections.

**Sociocultural influences**. Social pressures from family, friends, and the media to engage in disordered eating behaviors often emerge or worsen during the college years (Eisenberg et al., 2011). It is hypothesized that the role of social pressures is greater during this time period due to heightened peer influence, particularly because college marks a transition to adulthood wherein peers become more important sources of influence (Duarte, Ferreira, Trindade, & Pinto-Gouveia, 2015). The numerous studies that have documented the emergence of disordered eating purport that friends' disordered eating behaviors are associated with an individual's own engagement in disordered eating (e.g., Eisenberg, Neumark-Sztainer, Story, & Perry, 2005; Keel, Forney, Brown, & Heatherton, 2013). The tendency to mimic friends' disordered eating behaviors may be, in part, due to increases in social comparisons (i.e., comparing one's physical appearance to the physical appearance of others; Duarte et al., 2015; Festinger, 1954).

It is suspected that social pressures among women on college campuses promote internalization of appearance ideals, which can be defined as the extent to which individuals endorse societally-sanctioned standards of attractiveness (Thompson & Stice, 2001). In the United States, the most sanctioned standard of attractiveness has been the "thin-ideal" (i.e., a slender physique with little body fat; Thompson & Stice, 2001). However, recent research suggests that the ideal female body type in westernized cultures is both "thin and toned" (i.e., an appearance of physical fitness via muscularity; Bozsik, Whisenhunt, Hudson, Bennett, & Lundgren, 2018). According to the socioculutural model, internalization of the appearance ideal leads to increases in body dissatisfaction and, subsequently, disordered eating behaviors emerge in an attempt to manage dissatisfaction by altering appearances aligned with the idealized physique (Berg, Frazier, & Sherr, 2009; Lipson & Sonneville, 2017).

Disordered eating behaviors may initially emerge as dietary restriction in an attempt to alter appearances aligned with societally sanctioned appearance ideals. However, many college students that attempt dieting and food restriction quickly find themselves in cycles of binge eating and starvation (Stice, 2002). Starvation or the threat of future starvation often triggers individuals to instinctively binge eat to increase chances of survival; this, coupled with the fact that college students face increased pressure from peers to consume alcohol, a natural disinhibitor, makes binge eating the most pervasive disordered eating behavior on college campuses (Fischer, Smith, & Cyders, 2008; Weeder, Jennings, & Wolfe, 2013). In fact, about 50% of college women who binge eat also abuse alcohol, coming as no surprise given that both behaviors are highly correlated with trait impulsivity (Nelson et al., 2009). Sociocultural influences are particularly relevant to college women as they transition into adulthood and become more susceptible to influences both inside and outside of the home environment (e.g., peers).

**Psychological influences.** Changes during the college years may further trigger binge eating because of psychological factors related to adjustment to and engagement in a new environment (Barker & Galambos, 2007). In fact, a recent prospective study of first year college women who completed assessments during the first and second semesters of college

demonstrated that increased perceived stress between their first and second semesters significantly enhanced the prediction of changes in disordered eating above and beyond the influence of sociocultural disordered eating risk factors (Howard, Romano, & Heron, 2020). It is possible that students who experience difficulties transitioning into college may engage in binge eating as a (maladaptive) way of coping. This is consistent with prevailing theories suggesting disordered eating behaviors provide an emotion regulation function, wherein disordered eating behaviors help distract from or mitigate negative feelings in the short-term (Lavender et al., 2015).

Individuals who regulate their emotions in an adaptive way are able to sit with, attenuate, and modulate their own affective states (Brockmeyer et al., 2014). However, individuals who have difficulty regulating emotions may turn to external influences of control (Aldao, Nolen-Hoeksema, & Schweizer, 2010). Research suggests that engagement in disordered eating is one such control strategy (Brockmeyer et al., 2014), in which engagement in disordered eating temporarily improves one's mood state (Deaver, Miltenberger, Smyth, Meidinger, & Crosby, 2003; Smyth et al., 2007). The research evidence suggests that engagement in disordered eating serves to regulate one's emotions by temporarily suppressing negative affect (Gross, 2002; Smyth et al., 2007), this is particularly true of binge eating given that binge eating has been linked to a hyper-responsiveness to rewards, such as food, and dopamine release (Davis et al., 2012). However, this strategy is likely to fail in the long run by preventing the individual from becoming accustomed to negative emotional states (Wenzlaff & Wegner, 2000). The present study combined research from sociocultural and psychological models of disordered eating by investigating roles of peer relations and negative affect on binge eating. **Considering influences of binge eating in the present study**. Sociocultural and psychological models of binge eating are both addressed in the present study by using an interpersonal formulation of disordered eating. Investigating interpersonal factors associated with binge eating may be particularly relevant for young women given the importance college women tend to place on interpersonal relationships (Fitzsimmons-Craft, 2011). In fact, past research suggests that women are more likely than men to believe something is wrong with their self-concept and experience significant increases in negative affect when difficulty arises in interpersonal relationships (Twenge, 1997). Thus, interpersonal formulations serve to combine the sociocultural and psychological fields by taking into account the influence of social interactions and the psychological impact that arise from these interactions. In the following sections, an interpersonal formulation of disordered eating will be discussed broadly as well as how interpersonal formulations might apply to binge eating more specifically, including existing research and gaps in the literature.

### **Interpersonal Formulations of Disordered Eating Behaviors**

According to an interpersonal formulation of disordered eating, engaging in disordered eating behaviors increases interpersonal problems, and in turn, these interpersonal problems are believed to intensify disordered eating behaviors (Rieger et al., 2010). An interpersonal conceptualization emphasizes the link between disturbances of the self and the individual's perception of her social world, such that, as disordered eating behaviors increase, the way an individual views her social world becomes distorted (Wilfley, Stein, & Welch, 2003). To date, interpersonal formulations postulate that disordered eating behaviors are ineffective strategies for regulating actual or perceived negative social evaluations (Rieger et al., 2010). For instance, the individual might attempt to escape from aversive affective states through binge eating (Heatherton & Baumeister, 1991). However, over time, binge eating might act as a de facto social agent (one typically achieved through successful interpersonal interactions; Rieger et al., 2010), such that individuals attempt to regulate their mood through binge eating as opposed to social engagement.

Research suggests that individuals who engage in disordered eating behaviors not only substitute healthy social interactions with disordered eating behaviors, but also contribute to interpersonal difficulties by intentionally misrepresenting, lying, or concealing their behaviors (Vandereycken & Van Humbeek, 2008). A 2013 systematic review of interpersonal functioning in the maintenance of eating psychopathology highlighted that factors associated with disordered eating, such as interpersonal sensitivity and social anxiety, lead to avoidance of emotional expression, interpersonal distrust, and conflict with others (Arcelus, Haslam, Farrow, & Meyer, 2013). As discussed in greater detail below, one specific way in which individuals that engage in disordered eating behaviors. In clinical settings, it is widely understood that individuals who engage in disordered eating behaviors often conceal these behaviors (Vandereycken & Van Humbeek, 2008), yet little is known about how denial may serve to increase interpersonal difficulties and ultimately maintain or exacerbate disordered eating behaviors.

**Denial of disordered eating behaviors**. There is reason to believe that individuals who engage in disordered eating behaviors are motivated to deny their behaviors, that denial can increase interpersonal problems, and, in turn, increase negative affect and disordered eating. Denial can be defined as either conscious or unconscious omissions, concealments, or misrepresentations of behaviors or internal experiences (Vitousek, Daly, & Heiser, 1991). Unintentional denial using a self-report measure is nearly impossible given that it takes awareness of a behavior to report on it. However, deliberate denial may be measurable. Expanding on Vitousek and colleague's (1991) definition of denial, deliberate denial of disordered eating behaviors might be defined as any conscious omission, concealment, or misrepresentation of behavior related to disordered eating.

Given the previous lack of a psychometrically valid measure that assesses denial of disordered eating, the doctoral candidate developed a reliable and valid self-report measure of deliberate denial of disordered eating behaviors with women who engage in subclinical levels of disordered eating (Howard, Heron, & Cramer, 2020). The unidimensional scale was developed to measure denial of disordered eating behaviors generally, such that the questions contained in the scale are applicable to denial of dietary restriction, binge eating, and compensatory behaviors; thus, tapping the one-dimensional aspect of denial underlying concealment of any one of these behaviors. The hope was that this scale would be used in studies such as the current one to examine the role deliberate denial of disordered eating plays in the onset and maintenance of disordered eating behaviors.

Attempts to deny disordered eating may arise from various motivations but, from an interpersonal standpoint, likely have similar deleterious impacts on relationships and eating behaviors. For some individuals who engage in disordered eating, their behaviors have become a part of their identity, a phenomenon known as egosyntonicity (Vandereycken, 2006), and a tendency to "fake good" is in defense of their sense of self. Others may deny disordered eating behaviors because engagement in disordered eating gives them a sense of self-efficacy or achievement, and they hide their behaviors out of fear of intervention (Vitousek et al., 1991). The majority of individuals likely conceal symptomatology because they do not want to be labeled as problematic and face stigmatization (Vandereycken, 2006). Fear of negative social

evaluation has consistently been shown as a motivating factor for intentionally concealing disordered eating behaviors (Petterson, Rosenvinge, & Ytterhus, 2008; Vandereycken, 2006; Vandereycken & Van Humbeek, 2008). However, those close to an individual who deliberately denies disordered eating behaviors may feel manipulated and deceived once he or she learns of the concealment. Consequently, attempts to deny or conceal disordered eating behaviors might lead to ruptures in social relationships, and as postulated in the interpersonal formulation of disordered eating, these ruptures in social relationships may subsequently lead to increases in negative affect and further disordered eating (Vandereycken & Van Humbeek, 2008).

**Considering the interpersonal formulation and denial of disordered eating in the present study**. There are several important ways in which the burgeoning literature on the interpersonal formulation of disordered eating can be expanded on. First, examining the role of denial as it relates to an interpersonal formulation of disordered eating could strengthen the current body of research. The current study was the first to examine whether denial of disordered eating behavior contributes to interpersonal challenges and whether these interpersonal difficulties contribute to increases in negative affect and binge eating in daily life. This research is particularly important to conduct with college women given the influence of relationships and interpersonal functioning in this population (Kong, Ding, & Zhao, 2015). Second, studies investigating interpersonal formulations of disordered eating have largely utilized White samples (Fitzsimmons-Craft, 2011; Rieger et al., 2010). These research designs limit abilities to generalize results to races other than White women, and thus, make it difficult to understand whether race differences in interpersonal formulations and binge eating exist.

It is understandable that concerns might arise about the ability of participants to honestly report on behaviors that they lie about; however, the majority of individuals deny disordered

eating in an attempt to avoid intervention or out of fear of shame and stigmatization (Vandereycken & Van Humbeek, 2008), and these motivations to deny are not present in a confidential research study. In addition, an underreporting of disordered eating behaviors scale modeled after the Minnesota Multiphasic Personality Inventory (MMPI) Lie (L) scales (Hathaway & McKinley, 1943; Butcher, Dahlstrom, Graham, Tellegen, & Kraemmer, 1989; Ben-Porath & Tellegen, 2011) was used to asses validity of responses (see method). With these precautions in place, the current study aimed to investigate the role of denial in differences in binge eating between Black and White college women as well as examine the influence of person-level differences in denial in the maintenance and exacerbation of binge eating behaviors. In the following sections, the current body of literature on disordered eating behaviors between races in college women will be discussed, and the way in which the study expanded on this literature by more narrowly examining influences of binge eating between races will be addressed.

### **Disordered Eating Between Races in College Women**

Early literature on disordered eating almost exclusively focused on young, non-Hispanic White women in the United States. Although past research on the prevalence of disordered eating in diverse populations is often disputed due to limited research, it was historically hypothesized that White women have more eating disturbances and more dissatisfaction with their bodies (Crago & Shisslak, 2003; Wildes et al., 2001). However, recent evidence suggests that there are increasing rates of disordered eating among non-White Americans (Pike, Hoek, & Dunne, 2014). Exploring the role of race in disordered eating behaviors is pressing given longstanding beliefs about the role of culture in disordered eating development (Stice, 1994). At the core of sociocultural models of disordered eating is the idea that cultural standards of beauty (i.e., appearance ideals) lead to the emergence of disordered eating in attempts to attain these standards (Stice, 1994; Stice, 2002). Therefore, some differences between races have been explained by investigating differences between westernized and non-westernized beauty standards, suggesting that there are higher rates of disordered eating in westernized cultures due to social pressure to conform to standards of beauty imposed by modern industrial society (Pike, Dohm, Streigel-Moore, Wilfley, & Fairburn, 2001). However, while both Black and White women in the United States largely identify as part of a westernized culture, differences in disordered eating between the two races remain a topic of debate, which makes investigating differences between the two races of particular interest.

Although both Black and White college women are known to engage in disordered eating behaviors, definitive prevalence rates remain unknown (Marques et al., 2011). The limited research that does exist purports that Black women may be less likely to develop traits associated with AN, such as a drive for thinness and dietary restriction (Franko, Becker, Thomas, & Herzog, 2007; Kronenfeld, Reba-Harrelson, Von Holle, Reyes, & Bulik, 2010). This research suggests that young Black women may be less likely to develop disordered eating associated with AN due to their ability to reject appearance ideals associated with western beauty (Crago & Shisslak, 2003; Wildes et al., 2001). Black women may be better positioned to reject the appearance ideal than White women for a few reasons. First, social comparison theory states that comparisons are made to "like others" (Festinger, 1954); historically, Black women may not have viewed images typically presented in the mainstream media as "like others" (i.e., thin White women), thus making it easier to reject this ideal (Milkie, 1999). Second, Black women may reject mainstream appearance ideals by obtaining a broader cultural understanding of "beauty" that includes more than physical body size (e.g., style; Duke, 2000).

Reported rates of binge eating and other symptoms of BN between races are more mixed than the data on AN rates, with some research finding similar or greater rates of binge eating and compensatory behaviors in Black women (Cachelin, Veisel, Barzegarnazari, & Striegel-Moore, 2000; Pike et al., 2001) and others findings lower rates (Abrams, Allen, & Gray, 1993; Franko et al., 2007). Various explanations are given for these conflicting findings but perhaps most notably are the divergent methods used for measuring binge eating behavior, with some researchers defining binge eating as eating a large amount of food in a short amount of time and others necessitating that the large amount of food be accompanied by a sense of loss of control when eating (Jennings, Kelly-Weeder, & Wolfe, 2015). In addition, examination of race differences in the binge eating literature has largely focused on whether or not Black and White women engage in binge eating behaviors at varying rates as opposed to examining why Black and White women engage in binge eating behaviors (Jennings et al., 2015). The current study assessed correlates of binge eating between races, and defined binge eating by asking questions that assess both eating an unusually large of amount of food and experiencing a sense of loss of control eating to differentially assess components of binge eating that may be indicative of future pathology (American Psychiatric Association, 2013).

There are a few critical limitations of existing research examining differences in binge eating between races. First, there are concerns pertaining to the measurement of race. In fact, there is often disagreement about what race means (Alba, 1992; Winant, 2001). In self-report surveys, to determine an individual's race, researchers may use one or more ancestorial or biological bases, phenotypic or physical characteristics, and cultural bases, such as ideology and language (Hutchinson & Smith, 1996). Although the conceptualization of race is often disputed and ever changing (as reflected in the constantly changing U.S. census racial categories; Blank, Dabady, & Citro, 2004), race within the context of this study refers to the subgroup within a larger society to which an individual self-identifies (e.g., Black, White, Asian). However, it is important to note how this differs from racial identity, which assesses the degree to which an individual identifies with and has interest in her own race (Phinney, 1992). This distinction is particularly important to note within the context of the current study because past research has indicated that Black women with higher levels of racial identity report lower levels of binge eating than those with lower levels of racial identity (Shuttlesworth & Zotter, 2011).

The second major concern with research examining differences in binge eating between races, is that as described above, it has almost exclusively focused on differences in cultural ideals represented in the mainstream media to understand reported differences between races, which may be at the cost of investigating other factors that influence disordered eating. Although investigating cultural ideals is useful, the narrow focus on beauty standards could be masking potential race differences that are critical to consider, especially taking into account that race differences in individual's seeking help for binge eating continue to exist despite the fact that more Black women are being represented in the mainstream media and there is a proliferation of social networking sites that promote unattainable standards of beauty regardless of race (Grabe, Ward, & Hyde, 2008). Two factors that may help explain influences of binge eating between races, which have previously been overlooked, are the roles of help-seeking attitudes and denial of disordered eating behaviors.

**Race differences in help-seeking attitudes.** Young Black women may be more likely than young White women to avoid seeking help for mental health concerns. Concerns about stigma and judgment pertaining to mental health issues continue to be pervasive in Black communities (Ward et al., 2013). Research indicates that Black adult mental health consumers

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self-report that they worry they would be considered "crazy" if they disclose mental health issues to friends, family, or health care providers; many report that they do not feel comfortable discussing mental health issues, even with their closest family members (Alvidrez, Snowden, & Kaiser, 2008). Concerns about seeking help for mental health issues in Black communities may be exacerbated by the fact that less than 2% of American Psychological Association members are Black (American Psychological Association, 2014) and Black individuals report worrying about the cultural competency of health care practitioners (Constantine, 2007). To illustrate, Black individuals may be more likely to avoid seeking treatment given past abuses by healthcare systems, such as common misdiagnoses of serious psychiatric illnesses like schizophrenia (Chou, Asnaani, & Hofmann, 2012). Research suggests that Black individuals seeking treatment for mental health concerns are diagnosed with severe mental health issues, such as schizophrenia, at a rate of 2 to 1 compared to White individuals, even when they report the same symptoms (Chou et al., 2012). Researchers posit that this is because health care practitioners who lack cultural competency may misinterpret symptoms such as strong religious beliefs as delusions due to cultural mistrust or unawareness of their biases regarding psychosis in Black communities (Barnes, 2008).

Race differences in denial of disordered eating. In relation to disordered eating, young Black women may be less likely than young White women to seek help for the above stated reasons but also due to pressure to reflect historical body-positive ideals and thus deny potential concerns (Lovejoy, 2001). Black women may have developed a healthy resistance to negative societal images of themselves, including a rejection of mainstream body ideals. However, this resultant pressure to project resiliency may also result in a tendency to deny vulnerabilities related to body image concerns and disordered eating behaviors (Hooks, 1993). Lovejoy (2001) suggests that self-reports of positive body image and denial of disordered eating among Black women in social science surveys should "be more closely examined if we are not to collude in the silencing of Black women's health problems" (p. 256).

A recent systematic review of barriers to help-seeking for eating disorders in women suggests that the most frequently mentioned barrier to help-seeking was shame and stigmatization (85%) followed closely by denial of and/or failure to perceive the severity of the disordered eating (69%; Ali et al., 2017). These barriers may be particularly salient for Black women given social stereotypes and a lack of trust in health care providers (Becker, Hadley, Perloe, Fay, & Striegel-Moore, 2010). Ultimately, denial of disordered eating may contribute to undetected and untreated disordered eating in Black women and continued health disparities for this population.

**Considering race differences in the current study.** The current study seeks to understand whether denial of disordered eating is more prevalent and help-seeking attitudes less prevalent among Black college women, and whether an interpersonal formulation of disordered eating can help explain binge-eating behaviors both between and within races. Thus far, studies investigating interpersonal formulations of disordered eating have largely been cross-sectional in design and utilized White samples (Fitzsimmons-Craft, 2011; Rieger et al., 2010). These research designs limit abilities to make inferences about the temporal role of negative social interactions and generalize results to races other than White. Thus, in the following sections, the benefits of using an ecological momentary assessment (EMA) approach for the current study will be discussed.

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#### **Ecological Momentary Assessment (EMA) Methods**

The current study utilized an ecological momentary assessment (EMA) approach, which involves collecting data from participants at multiple time points throughout the day over a specified period of time. EMA data collection occurs in everyday life through the use of small electronic devices, such as smart phones or palmtop computers (Smyth et al., 2009). This study utilized EMA for self-report data collection whereby people complete surveys/questionnaires multiple times each day.

The use of EMA has several advantages over cross-sectional and traditional longitudinal designs, including that it minimizes recall bias, maximizes ecological validity, and allows researchers to study the more immediate impact of thoughts, feelings, and behaviors in daily life (Smyth & Stone, 2003). EMA approaches allow researchers to collect data in real-time whilst the participants are experiencing the behaviors being analyzed. In this study, participants were sent a notification to fill out a survey on their smartphone device multiple time points throughout the day, thus the participant was asked to report on thoughts, feelings, and behaviors of interest close to or when they were occurring. A growing body of research suggests that people are not able to accurately recall past experiences (e.g., over the past month) but are better able to accurately report on a wide range of recent or current experiences (e.g., over the last hour; Robinson & Clore, 2002), proving that designs that minimize recall bias are in critical need.

In addition to minimizing recall bias, by capturing data in the moment, EMA allows for the study of constructs not attainable in a laboratory setting (e.g., in vivo social interactions), thus producing more accurate ratings and reports not influenced by a superficial laboratory setting. An EMA approach was particularly valuable for the current study because it allowed for study of the impact of dynamic events that would be difficult to reliably measure in a laboratory setting. For example, it is easy to imagine how one's reaction to a contrived negative social interaction in a "safe" laboratory environment may be different than a negative social interaction or rejection experienced in real life (Stone, Shiffman, Atienza, & Nebeling, 2007).

Lastly, by collecting data using EMA, it ensured that the processes measured are accurate reflections of daily life (Smyth & Heron, 2012). To illustrate, self-report questionnaires that ask participants to reflect on their experiences over the past month do not address how processes unfold over time (Stone et al., 2007). To understand how certain behaviors (e.g., denial, negative social interactions) precede other thoughts and behaviors (e.g., disordered eating), frequent temporal sampling is needed. EMA designs provide resolution to this dilemma by repeated and frequent sampling, which allows for dynamic temporal associations to be observed (Stone et al., 2007).

**EMA research and interpersonal formulations of eating disorders.** EMA methods have been used to study interpersonal processes in disordered eating, but there are only two known studies to date. These studies that have used EMA to investigate an interpersonal formulation of disordered eating suggest that negative social interactions during the day, such as perceived family conflict and negative experiences of daily social interactions, trigger binge eating and compensatory behaviors later that same day (Okon et al., 2003; Steiger et al., 1999). For example, Okon and colleagues' study used an EMA methodology to follow 20 predominately White adolescent girls (*M*age = 17) diagnosed with BN over a one-week period. Data were collected eight times daily on symptoms of BN, perceived family conflict, and emotional expressiveness. Results indicated that family conflicts were positive predictors of symptoms (i.e., binge eating and purging) later in the day. Similarly, Steiger and colleagues' (1999) conducted an EMA study that followed 55 women with BN, 18 women with a previous

(but not current) BN diagnosis, and 31 healthy control women (*Mage* = 27; race not reported) over a 6- to 22-day period in which data were collected on social experiences, self-concepts, and mood. Participants were instructed to report on their experiences after any social interaction lasting more than ten minutes. Results indicated that binge eating episodes were preceded by negative (below average) social interactions, self-concepts, and mood. Both of these studies provide evidence that negative social interactions precipitate disordered eating later that same day, and more specifically, binge eating and compensatory symptoms.

Using EMA in the present study. Although past research provides preliminary evidence for an association between negative social interactions and subsequent binge eating in daily life, little is known about the role of denial of disordered eating in these processes and whether these interpersonal processes play out differently between races. Exploring the influence of denial in interpersonal interactions can add to the extant literature by increasing insight into precipitants of disordered eating behaviors. It stands to reason that the process of hiding disordered eating behaviors, avoiding seeking help, and living a life shrouded in secrecy and deceit likely causes conflict in relationships and/or perpetuates social isolation, which may, in turn, increase negative affect and binge eating behaviors. These interpersonal processes have yet to be examined; thus, the current study was the first to address this gap in the literature. The present study additionally examined whether these processes vary by race in a sample of college women. Some research suggests that Black college women tend to place greater value on their interpersonal relationships than White women (Hurd, Stoddard, & Zimmerman, 2013; Kim & McKenry, 1998; McEwen, Roper, Bryant, & Langa, 1990; Seawell, Cutrona, & Russell, 2014); therefore, ruptures in relationships and interpersonal processes may have a greater impact on influencing Black

women's eating behaviors. However, no previous research has investigated this topic, and thus, exploratory hypotheses in this area were warranted.

An EMA approach using a sample of both Black and White college women allowed for examination of differential associations between races and provides information about temporal sequencing of events in real-time. Moreover, the current research adds understanding to the associations between negative social interactions and binge eating in Black and White women by investigating how denial is associated with these variables in daily life. Other disordered eating behaviors, such as dietary restriction, are less susceptible to this type of temporal sequencing because of their occurrence over longer periods of time as opposed to a discrete behavior measurable at a single time point. Findings from the current research can inform theoretical understandings of binge eating development and maintenance between and within Black and White college women and could contribute to future prevention and intervention work better suited to address binge eating in Black and White college women.

### **Overview of the Present Study Design**

The present study used EMA data to examine the impact of naturally occurring denial of disordered eating, interpersonal difficulties, and negative affect on binge eating in young adult women. It further explored differences in these associations at baseline and via EMA. EMA was used because the constructs being measured are dynamic states that can fluctuate over time within individuals. To capture the natural occurrence of the aforementioned feelings and behaviors, Black and White college women in young adulthood were screened for engagement in denial of disordered eating. Data were collected at baseline and three times a day across 14 consecutive days. Baseline constructs assessed help-seeking behaviors and demographic information in addition to the constructs assessed via EMA.

### **General Aims, Hypotheses, and Research Questions**

The primary goal of this study was to offer insight into similarities or differences between Black and White women who engage in binge eating, and whether denial of disordered eating was associated with interpersonal difficulties, negative affect, and subsequent binge eating. Identifying the specific processes that contribute to eating disorder development and maintenance between races is important for the advancement of individualized prevention and intervention efforts.

Aim 1. To examine differences between Black and White women in denial of disordered eating and help-seeking attitudes.

*Hypothesis 1.a.* Black women will report more denial of disordered eating behaviors than White women on a baseline measure of denial [measured by Deliberate Denial of Disordered Eating Behaviors (DDEBS-12) total score; Howard et al., 2020].

*Hypothesis 1.b.* Black women will report less willingness to seek professional help for mental health issues than White women on a baseline help-seeking attitude measure (measured by Attitudes Toward Seeking Professional Help Scale total score; Alvidrez et al., 2008; Fischer & Turner, 1970).

Aim 2. To examine associations between denial of disordered eating, interpersonal factors, negative affect, loss of control eating, and overeating.

*Hypothesis 2a*. It is expected that denial of disordered eating on a given day will be associated with less social interaction occurrence and more negative social interactions (measured by whether or not individuals report a social interaction and by the valence of social interactions that do occur) on the same day.

*Hypothesis 2.b.* It is expected that less social interactions and more negative social interactions (see Hypothesis 2a) on a given day will be associated with more negative affect [measured by the Positive and Negative Affect Schedule (PANAS); Watson, Clark, & Tellegan, 1998; Steiger et al., 1999] on the same day.

*Hypothesis 2.c.* It is expected that greater negative affect (measured by the PANAS; Watson, Clark, & Tellegan, 1998) during the day will be associated with binge eating at night (measured by levels of overeating and loss of control eating at end of day; Smyth et al., 2007).

*Research Question 1.* Exploratory analyses will be conducted to investigate whether race moderates associations between denial of disordered eating, interpersonal factors, negative affect, loss of control eating, and overeating.

*Research Question 2.* Exploratory analyses will be conducted to determine the relative contributions of denial of disordered eating, social interaction occurrence, valence of social interactions, negative affect, and race on loss of control eating and overeating while controlling for identified baseline covariates.

### **CHAPTER II**

### METHOD

### **Participants**

Participants were undergraduates recruited from a large southeastern university. Interested participants were recruited through a cloud-based research system (SONA) and flyers around campus and directed to an online screening form. Participants were provided informed consent online prior to completing the screening measure. Potential participants were eligible to participate if they self-reported: (1) female gender, (2) Black or White race, (3) age between 18 and 25, (4) denial of disordered eating over the previous 7 days, (5) no current or past treatment for an eating disorder, and (6) were able to honestly report on their disordered eating behaviors as measured by the Underreporting of Disordered Eating Behaviors Scale (UDEBS). The UDEBS is modeled after the MMPI L scales (e.g., Butcher et al., 1989) and assesses the tendency for individuals to present themselves in a favorable light with respect to their eating habits. Given that the current study asked individuals to honestly report on behaviors that they typically deny, the UDEBS was used to identify women who may not be able to do so. Individuals who scored one standard deviation above a previously determined mean on the UDEBS (i.e., endorsed four or more items) were not eligible to participate and removed from analyses. The mean and standard deviation were derived from a previous sample of college women that engaged in subclinical disordered eating (Howard et al., 2020).

The sample was limited to individuals who reported denying engagement of disordered eating to others during the previous 7 days in order to increase the probability of capturing denial of disordered eating over the 14-day EMA period. Of the 19,500+ undergraduates at ODU, 47%

are White and 30% are Black, posing little concern for recruiting Black and White students. The final data set consisted of 37 White and 35 Black female undergraduates.

**Rationale for sample.** Based on a power analysis (see below), 60 Black and 60 White participants were desired for recruitment, and the current sample was underpowered to detect effects for some analyses. A female sample was used because disordered eating behaviors are more prevalent among women (90% of reported eating disorder cases are women between the ages of 18 and 25), highlighting the need to assess and understand factors associated with eating disorder development in this population (Sweeting et al., 2015). This study also recruited a sample of women that was not currently in treatment for an eating disorder. This sample is important because research suggests that individuals who are not in treatment but have symptoms of disordered eating are more reluctant to honestly share their behaviors with others and are more likely to avoid visits to health care providers, making denial a more relevant construct (Vandereycken & Van Humbeek, 2008). Moreover, recruiting individuals who were not currently in treatment allowed for the study of binge eating behaviors that do not necessarily meet diagnostic criteria. In this first investigation of race differences in denial and binge eating in daily life, the current study focused on two racial groups, Black and White women, for two reasons. First, past research suggests that there may be barriers to eating disorder detection in Black women due to mental health stigma and pressure to reflect body-positive ideals, making denial of disordered eating a particularly relevant construct for this population (Lovejoy, 2001; Ward et al., 2013). Second, to be able to successfully recruit participants and complete this research project, the two largest racial groups at ODU were selected, while realizing that future research examining other racial groups (e.g., Latina) is warranted.

### Procedure

**Overview.** The current research included a baseline survey and 14 days of EMA. Eligible participants were identified and recruited through a cloud-based research system and flyers around campus. If eligible participants consented, they were contacted by email to complete the baseline assessment online. At the end of the baseline survey, they were directed to information on how to download the "LifeData RealLife Exp" EMA app and use the application over the next consecutive 14 days. The informed consent,

measure, baseline, and information about downloading and using the EMA application surveys were created using Qualtrics; these procedures have been previously used and demonstrated as feasible with similar populations (e.g., Heron, Howard, MacIntyre, & Smyth, 2017; Smyth et al., 2007).

Screening and baseline assessment. If participants gave their informed consent, they were given a set of screening questions (see below) to determine their eligibility. Participants were notified that this study aimed to gain a better understanding of eating habits in emerging adults. Participants received research credit or were entered into a raffle for monetary compensation if they completed the screening assessment (see compensation). If participants provided their email address and were deemed eligible, they were contacted via email to complete a separate baseline assessment online. During the baseline survey, participants were asked to consent to the EMA portion of the study, to provide information about their typical eating habits, denial of disordered eating behaviors, and other study variables (see below). Once participants successfully completed the baseline assessment, they were directed to information on how to download and use the LifeData Life Exp EMA app. Participants were entered into a raffle to receive monetary compensation for completing the baseline survey (see compensation).
**EMA**. EMA was collected via smartphone devices for 14 days. Participants received two notifications to their smartphones randomly throughout the day (prompts 1 and 2) and one between 6pm and 10pm each night (end of day). Participants were assigned an ID that they were asked to enter via a start-up survey once they began the EMA portion, so that the individualized data could be identified in LifeData and linked to baseline data. Participants received an email reminder if they missed more than one full day of surveys. The assessments inquired about denial of, and engagement in, disordered eating behaviors as well as social interactions that have occurred since the last observation and their current mood. After completing the EMA portion, participants were sent a gift card via email depending on their level of participation (see compensation).

*EMA survey software.* Commercial software called LifeData was used to develop the EMA surveys. It required participants to download the company's mobile application, RealLife Exp, on their iOS or Android device to access the surveys. Once participants downloaded the RealLife Exp application and began taking surveys, their data was uploaded to LifeData's cloud-based platform and from there could be downloaded for statistical analyses. If participants did not have an Apple or Android phone and they contacted the doctoral candidate, they would have been provided with an Android smartphone to use for the study. None of the participants contacted the doctoral candidate with this concern.

**Compensation.** Participants received .5 a research credit for completing the screening questionnaire on SONA or were entered into a raffle to win a \$15 gift card for completing the screening measure if they were recruited outside of the SONA system (i.e., via campus flyer). One participant received the \$15 gift card via email. Participants that completed the baseline survey were entered into a raffle to win a \$50 gift card. One participant received the \$50 gift card

via email. Participants received \$15/week for participating in the EMA portion of the study, and earned an additional \$10 bonus if they completed at least 85% of the surveys during the 14 days. They received monetary compensation on a gift card via email.

### Measures

**Screening measures**. If participants gave their informed consent, they were given the below screening questions to determine their eligibility.

*Demographic Information*. The screening measure asked participants to report on their age, sex, height, weight, race, and any current or past treatment for an eating disorder. BMI was calculated by dividing weight in kilograms over height squared in centimeters: weight in pounds was multiplied by 0.45 (giving weight in kilograms) and height in inches was multiplied by 0.025 and the result was squared (giving height in centimeters). Race was assessed using a multiple-choice item whereby participants were asked to select all that apply from the following list: (1) Black or African American; (2) White or Caucasian; (3) Asian or Asian American; (4) American Indian or Alaska Native; (5) Native Hawaiian or Pacific Islander; (6) other. Participants were deemed eligible if they selected either Black/African American or White/Caucasian *and* did not select more than one race. Race was scored dichotomously such that 0 = White and 1 = Black.

*Denial of Disordered Eating*. The Denial of Disordered Eating Behaviors Scale (DDEBS; Howard, Heron, & Cramer, 2020) was used to assess denial of disordered eating behaviors over the past 7 days. The DDEBS typically assesses denial of disordered eating over the past month but given that this study was a 14-day EMA study, and it was important to capture variables of interest over that timeframe, participants were screened for engagement in denial of disordered eating over the previous 7 days. The 12-item scale was presented in yes/no format. This scale is validated with college women and has excellent internal consistency (Howard, Heron, & Cramer, 2020).

Underreporting of Eating Behaviors Scale. The Underreporting of Eating Behaviors Scale (UDEBS; Howard, Heron, & Veltri, 2021; modeled after the MMPI L scales (e.g., Butcher et al., 1989) was used to detect attempts by respondents to present themselves in a favorable light with respect to their eating behaviors. Given that the DDEBS asks participants to self-report denial, this measure was designed to help ensure participants were responding honestly to the scale. The 10 items include true and false answers to questions describing undesirable eating habits that most everyone engages in (e.g., "I sometimes eat when I am not hungry"). Participants receive a 1 for endorsing an item in a socially desirable direction. Total scores are sums that range from 0 to 10, with higher scores representing higher social desirability about eating habits (Howard et al., 2021). Total scores for the scale are correlated positively with a measure of social desirability, thus demonstrating convergent validity (Howard et al., 2021). In addition, those who score higher on the UDEBS report less disordered eating and body dissatisfaction, thus demonstrating criterion validity (Howard et al., 2021). Individuals who scored one standard deviation above the mean (i.e., endorsed four or more items), derived from a previous sample of college women that engaged in subclinical disordered eating (Howard et al., 2020), were considered invalid and were not eligible to participate in the current study (Howard et al., 2020).

**Baseline measures**. Once participants gave their informed consent, completed the screening measures, provided their email address, and found eligible to participate, they completed the below questions via an online questionnaire prior to beginning the EMA portion of the study.

*Disordered Eating Behaviors*. The EDE-Q was used to assess frequency of disordered eating thoughts and behaviors over the past month. Response options range from 0 (*no days*) to 6 (*everyday*) or 0 (*not at all*) to 6 (*markedly*) depending on the item. The EDE-Q contains four subscales: restraint, eating concern, weight concern, and shape concern. Total scores are calculated by taking the average of the four subscales, with higher scores indicating higher levels of disordered eating (Fairburn & Beglin, 1994). EDE-Q total scores are positively associated with measures of eating concern (r = .68) and shape concern (r = .78), thus demonstrating criterion validity (Mond, Hay, Rodgers, Owen, & Beumont, 2004). Moreover, the EDE-Q is a reliable measure of disordered eating in college women (alphas range from .73 to .93; Rose, Vaewsorn, Roselli-Navarra, Wilson, & Weissman 2013). Alpha for the current sample was .93.

*Denial of Disordered Eating.* The DDEBS was used to assess the tendency for individuals who engage in disordered eating to intentionally deny such behaviors over the past month. Response options range from 1 (*never*) to 7 (*everytime*; Howard et al., 2020). The response options reflect that this scale assesses how frequently individuals engaged in *denial* of disordered eating behaviors as opposed to how often they engaged in disordered eating. For example, beneath the response option *rarely* the scale reads, "*in less than 10% of the chances I could have*". Therefore, if an individual does not engage in disordered eating often but denies each time they do, they would score high on this scale. Total scores are calculated by taking the mean of items, with higher scores indicating higher levels of deliberate denial as it pertains to disordered eating. The DDEBS is positively associated with measures of disordered eating and body dissatisfaction in college samples, thus demonstrating criterion validity. The scale is also positively associated with concealment and negatively associated with disclosure, thus demonstrating convergent validity (Howard et al., 2020). Cronbach's α for the DDEBS in a

separate college female sample was .94, suggesting excellent internal consistency (Howard et al., 2020). Alpha for the current sample was .90.

*Affect.* The Positive and Negative Affect Schedule (PANAS; Watson et al., 1998) was used to assess affect over the past month. This 20-item scale assesses feelings and emotions. The scale demonstrates good internal consistency and adequate test-retest reliability with non-clinical samples (Crawford & Henry, 2004). The scale is associated in the expected direction with measures of anxiety and depression, demonstrating criterion validity (Crawford & Henry, 2004). Response options range from 0 (*not at all*) to 6 (*extremely*). Positive and negative affect total scores are calculated by taking the mean of their respective 10 items, higher scores indicate more positive or more negative affect. Alpha for the negative affect subscale in the current sample was .88.

*Help-Seeking*. The Attitudes Toward Seeking Professional Help Scale (ATSPHS; Fischer & Turner, 1970) was used to measure attitudes towards seeking professional help for psychological services. The 29-item scale has adequate internal consistency ( $\alpha = .77$ ) and is associated with recent use of mental health care, thus demonstrating criterion validity (Elhai, Schweinle, & Anderson, 2008; Fischer & Farina, 1995). Response options range from 0 (*disagree*) to 4 (*agree*). Total scores are calculated by summing the items, with higher scores reflecting more positive attitudes towards seeking help. Alpha for the current sample was .70.

### Covariates (assessed at baseline).

*Thin-Ideal Internalization.* The Sociocultural Attitudes Towards Appearance Questionnaire (SATAQ-4; Schaefer et al., 2015) is a 22-item measure of societal and interpersonal norms, and appearance-related pressures. Items are rated on a 5-point response scale (1 = *definitely disagree*, 5 = *definitely agree*). This scale has demonstrated sufficient convergent validity with measures of disordered eating and body satisfaction in prior research with female samples (Schaefer et al., 2015). It contains subscale scores for appearance-ideal internalization (range: 10-50), and appearance pressures (range: 12-60). The five items contained on the thin-ideal internalization subscale (range: 5-25) were used in the current study. Alpha for the current sample was .89.

*Body Dissatisfaction*. The Body Shape Questionnaire (BSQ-16; Evans & Dolan, 1993) is a 16-item measure used to assess fears of weight gain, desire for weight loss, body dissatisfaction, and low self-esteem due to one's physical appearance. Response options range from 1 (*never*) to 6 (*always*). Higher scores suggest more weight and shape concerns. The BSQ-16 has excellent internal consistency (Cronbach's  $\alpha = .93-.97$ ; Evans & Dolan, 1993). This measure also has adequate convergent validity (r = .58-.81) with other measures of body dissatisfaction (Rosen, Jones, Ramirez, & Waxman, 1990). Alpha for the current sample was .95.

*College Adjustment.* The College Adjustment Test (CAT; Pennebaker, Colder, & Sharp, 1990) is a 19-item measure of coping in relation to college adjustment. Items are scored on a 7-point response scale (1 = not at all, 7 = a great deal). Total scores (range: 19-123) represent overall adjustment, with higher scores reflecting better adjustment. The CAT is positively associated with self-esteem and negatively associated with negative affect in a sample of college students (Pennebaker et al., 1990). The CAT has acceptable internal consistency (Cronbach's  $\alpha =$  .76) and test-retest reliability (r = .65) with college students (Pennebaker et al., 1990). Alpha for the current sample was .81.

*Peer Norms of Thinness and Disordered Eating.* The Peer Norms Scale (Giles, Helme, & Krcmar, 2007) measures peer injunctive norms surrounding peer acceptability relating to thinness and disordered eating behaviors. Injunctive norms address an individual's perception of

peers' acceptability of those behaviors as well as the importance placed on thinness. The Peer Norms Scale contains four dimensions: thinness norms (e.g., "my peers think being thin is important"), acceptability norms (e.g., "my peers think it is OK to use diet pills to lose/maintain weight"), encouragement norms (e.g., "my peers encourage vomiting to lose/maintain weight"), and communicative norms (e.g., "my peers make comments about my body"). Items are scored 1 (*strongly disagree*) to 5 (*strongly agree*) and then averaged for each subscale, with higher scores indicating greater normalization of disordered eating behaviors. Previous research indicates that the reliability of the subscales ranges from .70 to .88, and that peer norms of thinness and disordered eating are positively associated with media exposure (Giles et al., 2007). Alphas in the current sample by subscale were as follows: thinness norms (.86), acceptability norms (.87), encouragement norms (.87), and communicative norms (.91).

*Emotion Regulation.* The Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) is a 36-item measure that assesses difficulties individuals experience in modulating emotional arousal, the ability to be aware of, understand, and accept their emotions, and the ability to act in desired ways regardless of their emotional states. The DERS is a multidimensional measure composed of the following six subscales: (1) *Nonacceptance of Emotional Responses* (6 items) (2) *Difficulties Engaging in Goal-Directed Behaviors* (5 items) (3) *Impulse Control Difficulties* (6 items); (4) *Lack of Emotional Awareness* (6 items); (5) *Limited Access to Emotion Regulation Strategies* (8 items); and (6) *Lack of Emotional Clarity* (5 items). The DERS has excellent internal consistency (Cronbach's  $\alpha = .93$ ) and demonstrated construct validity with other measures of emotion regulation and predictive validity with clinically important behavioral outcomes in college students (Gratz & Roemer, 2004). Alpha for the current sample was .91.

**EMA measures.** Once participants downloaded the LifeData application, they completed the below questions via smartphone device during the 14-day EMA portion of the study.

*Binge Eating*. Two EDE-Q (Fairburn & Beglin, 1994) items were adapted for EMA by inquiring about behavior since the last prompt. At each assessment, participants reported if they have eaten since the last assessment. If they had, participants were asked: "*Did you eat a large amount of food given the circumstances?*" and "*Did you have a sense of having lost control over your eating?*" Each item was rated on a 7-point Likert scale from 0 (*not at all*) to 6 (*very much*). Both loss of control eating and overeating were assessed as outcome variables. Similar procedures have been used in other EMA studies (e.g., Heron, Scott, Sliwinski, & Smyth, 2014; Smyth et al., 2007). Binge eating was assessed at the end of the day (between 6pm and 10pm), and end of day surveys expired within four hours of receipt.

**Denial of Disordered Eating**. Participants reported whether they engaged in any of the 12 items on the DDEBS (Howard et al., 2020) since the last survey. Participants were initially asked, "Since the last notification did you attempt to deny or conceal eating related behaviors?" If yes, the 12 items from the DDEBS-12 were presented in checklist form and participants marked any item that applied to them (e.g., "I made up excuses to avoid an event where I knew food would be served"). Total scores were calculated dichotomously, such that 0 = did not deny disordered eating behaviors and <math>1 = did deny disordered eating behaviors. Although this scale has not been used in EMA research previously, adapting scales to checklist format is common practice in EMA research (e.g., Shiffman, Stone, & Hufford, 2008; Smyth et al., 2007).

*Affect.* The Positive and Negative Affect Schedule (PANAS; Watson et al., 1998) was adapted to assess momentary mood. The PANAS has previously been used in EMA studies to assess momentary affect and has demonstrated strong internal consistency at the momentary

level ( $\alpha$  = .91-.92; Smyth et al., 2007). Momentary affect scores were calculated the same as the baseline measure by taking the mean of the respective 10 items for positive and negative affect.

*Social Interactions*. Participants reported whether or not they interacted with others at the time of notification receipt. Social interactions included any form of communication with someone else (e.g., talking in-person, a phone conversation, texting). If yes, participants reported how pleasant the social interaction was from 0 (*not at all*) to 6 (*extremely*). Previous EMA research has used this approach to assess frequency and valence of social interactions in everyday life (Heron et al., 2014; Steiger et al., 1999). A continuous variable was calculated to assess the average valence of social interactions during the day and a dichotomous variable was calculated to assess whether or not a participant reported a social interaction during the times they were notified whereby 0 = no social interactions reported and 1 = at least one social interaction reported.

#### **CHAPTER III**

### RESULTS

### **Data Cleaning**

Prior to conducting analyses, data were cleaned and analyzed for missing data patterns. There were no associations found between missingness and demographic variables or outcome variables (ps > .05).

Screening data. 1,626 women were screened for participation in this study. Of these, 488 people were removed because they did not complete the survey beyond the basic demographic information or were duplicate entries. Another 285 were removed because they identified as a race other than Black or White, 341 people were removed because they fell outside of the 18-25 age range, and 307 people were removed for not reporting engagement in denial. An additional 38 people were removed because it was determined that they could not accurately report on their symptoms (as measured by scoring 1 SD above mean scores on the UDEBS) and 20 women were eliminated that were currently or previously treated for an eating disorder.

**Baseline data.** The initial data set consisted of 146 responses. Of these, 59 were removed because they did not complete the survey beyond basic demographic information, were duplicate entries, or the participants were older than 25 (they may have turned 26 between completing the screening or baseline survey or incorrectly reported age on one occasion). Duplicate entries consisted of true duplicates and individuals completing the survey twice. For individuals that completed the survey twice, the more complete survey or, if both complete, the first survey was retained. The remaining entries consisted of 43 Black female undergraduates and 44 White female undergraduates. Of these 87 female undergraduates, 72 completed the EMA portion of the study. The completed data set consisted of 35 Black and 37 White participants. Sixty-two of

these participants were recruited via SONA and 10 of these participants were recruited via flyers around campus. Analyses were conducted on data provided by the 72 female undergraduates. Skewness and kurtosis for all variables were within normal limits falling between  $\pm 3$  (George & Mallery, 2010; see Table 1). Levene's tests indicated homogeneity of variance (ps > .05; Levene, 1960). Box plots revealed no extreme outliers. A missing values analysis revealed no item was missing more than 5 responses. Expectation-Maximization (EM) imputation was used to handle any missing data. Descriptive statistics for baseline measures can be found in Table 1. All baseline variables used in hierarchical analyses were grand-mean centered, except in cases of dichotomous variables, which were entered uncentered.

Table 1

Measure	Ν	M (SD)	Range [Min, Max]	Skewness (SE)	Kurtosis (SE)	
Baseline						
(Person-level)						
EDE-Q Total			5.66 [0, 5.66]	0.38 (0.26)	-0.55 (0.51)	
White	37	2.31 (1.27)				
Black	35	2.15 (1.43)				
DDEBS Total			3.58 [1.4.58]	1.62 (0.26)	2.54 (0.51)	
White	37	1.80 (0.81)	5166 [1, 1166]	1.02 (0.20)	2.0 1 (0.0 1)	
Black	35	1.00(0.01) 1.75(0.15)				
Diack	55	1.75 (0.15)				
PANAS Positive			37 [12, 49]	0.14 (0.26)	0.40 (0.51)	
White	37	30.14 (6.53)				
Black	35	29.11 (8.17)				
PANAS Negative			33 [11, 44]	0.34 (0.26)	-0.69 (0.51)	
White	37	24.09 (7.84)		0.0 (0.20)	(0.01)	
Black	35	23.91 (8.19)				
Diack	55	23.91 (0.19)				
ATSPH			25 [5, 30]	0.58 (0.26)	1.51 (0.51)	
White	37	14.14 (3.93)				
Black	35	15.55 (4.59)				

Descriptive Statistics of Baseline Measures

Table 1 continued

Measure	Ν	M (SD)	Range [Min, Max]	Skewness (SE)	Kurtosis (SE)
Baseline Covariates (Person-level)					
SATAQ-Thin Ideal White Black	37 35	16.55 (5.84) 14.23 (6.06)	20 [5, 25]	-0.14 (0.26)	-1.05 (0.51)
BSQ Total White Black	37 35	47.61 (18.35) 47.15 (20.36)	78 [16, 94]	0.51 (0.26)	-0.55 (0.51)
CAT Total White Black	37 35	70.88 (13.37) 69.37 (14.10)	69 [37, 106]	0.06 (0.26)	0.01 (0.51)
PNS Thinness White Black	37 35	2.68 (1.22) 2.18 (1.37)	4.00 [1, 5]	0.55 (0.26)	-0.86 (0.51)
PNS Acceptability White Black	37 35	1.88 (0.70) 1.88 (1.01)	4.63 [0.37, 5]	1.22 (0.26)	2.11 (0.51)
PNS Encouragement White Black	37 35	1.49 (0.63) 1.57 (0.71)	2.98 [1, 3.98]	2.07 (0.26)	5.94 (0.51)
PNS Communicative White Black	37 35	3.00 (1.02) 2.97 (1.08)	4.00 [1, 5]	-0.19 (0.26)	-0.47 (0.51)
DERS Non-Acceptance White Black	37 35	16.86 (2.54) 17.07 (2.75)	12 [12, 24]	0.51 (0.26)	-0.27 (0.51)
DERS Goal Directed White Black	37 35	13.47 (2.67) 14.44 (3.28)	15 [9, 24]	0.67 (0.26)	-0.27 (0.51)
DERS Impulse Control White Black	37 35	14.61 (2.80) 15.03 (3.97)	19 [10, 29]	1.40 (0.26)	3.43 (0.51)

Table 1 continued

Measure	Ν	M (SD)	Range [Min, Max]	Skewness (SE)	Kurtosis (SE)
Baseline Covariates (Person-level)					
DERS Emotion Awareness White Black	37 35	12.93 (3.37) 13.26 (4.15)	16 [10, 26]	0.66 (0.26)	-0.21 (0.51)
DERS Strategies White Black	37 35	18.64 (2.53) 19.72 (3.04)	16 [9, 25]	0.22 (0.26)	1.10 (0.51)
DERS Clarity White Black	37 35	15.73 (2.50) 16.27 (3.17)	15 [8, 23]	-0.35 (0.26)	0.14 (0.51)

*Note.* EDE-Q = Eating Disorder Examination-Questionnaire. DDEBS = Deliberate Denial of Disordered Eating Behaviors Scale. PANAS = Positive and Negative Affect Schedule. ATSPH = Attitudes Towards Seeking Professional Help. SATAQ = Sociocultural Attitudes Towards Appearance Questionnaire. BSQ = Body Shape Questionnaire. CAT = College Adjustment Test. PNS = Peer Norm Scale. DERS = Difficulties in Emotion Regulation Scale.

EMA data. Prior to conducting analyses, the momentary data were cleaned to include the 87 respondents that provided sufficient responses to baseline data. Of these 87 individuals, 72 completed the EMA portion of the study, meaning 15 people completed the baseline survey but failed to download and/or initiate the EMA portion of the study. Only individuals that completed both the baseline measures and EMA measures were used in analyses. On average, participants completed 79% of the EMA surveys and total missingness for the data was less than 5%. EM imputation was used to handle missing data. Box plots revealed no extreme outliers. The residual file was gathered from HLM and examined graphically in SPSS. Based on these graphs, the data appeared to meet the normality, homoscedasticity, and independence assumptions. Structurally, the outcome variables appeared to meet the linear form assumption. The DDEBS variables were

positively skewed (4.42) and kurtosis was high (7.75), which was expected given that denial is a low base rate activity (see Table 2). These variables were transformed using logarithmic transformations. All variables were person-mean centered, except in cases of dichotomous variables, to prevent multicollinearity; no HLM multicollinearity error messages appeared for any of the final models suggesting the independent variables assumption was also met.

Descriptive statistics for EMA measures can be found in Table 2. As shown in Table 2, at prompt 1 (i.e., the first prompt of each day), there were 421 responses from participants that identified as White and 297 responses from participants that identified as Black. At this time point, participants that identified as White reported an average negative affect of 1.19 [on a scale from 0 (not all) to 6 (extreme)], reported denial of disordered eating 6% of the time, and reported a social interaction 43% of the time. Of the 43% of White participants that reported a social interaction at prompt 1, the average rating of the pleasantness of these interactions was a 4.31 on a scale from 0 (not pleasant at all) to 6 (extremely pleasant). Participants that identified as Black at this time point reported an average negative affect of 1.06, reported denial of disordered eating 3% of the time, and reported a social interaction 31% of the time. Of the 31% of Black participants that reported a social interaction at prompt 1, the average rating of these interactions was a 3.75. At prompt 2, there were 403 responses from participants that identified as White and 296 responses from participants that identified as Black. At this time point, participants that identified as White reported an average negative affect of 1.00 [on a scale from 0 (not all) to 6 (extreme)], reported denial of disordered eating 5% of the time, and reported a social interaction 46% of the time. Of the 46% of White participants that reported a social interaction at prompt 2, the average rating of these interactions was a 4.34 on a scale from 0 (not pleasant at all) to 6 (extremely pleasant). Participants that identified as Black at this time point reported an average

negative affect of 1.23, reported denial of disordered eating 3% of the time, and reported a social interaction 34% of the time. Of the 34% of Black participants that reported a social interaction at prompt 2, the average rating of these interactions was a 3.48. During the course of the 14-day survey, there were 260 reports of eating episodes from White participants and 223 reports of eating episodes from Black participants at the end of the day. White participants, on average, reported a loss of control rating of 1.11 and an overeating rating of 1.13 during these episodes, whereas Black participants reported a loss of control rating of 0.77 and an overeating rating of 0.73. Loss of control and overeating were both measured using scales from 0 (*not at all*) to 6 (*very much*).

Table 2

Measure	Ν	M(SD)	Range [Min, Max]	Skewness (SE)	Kurtosis (SE)	
EMA						
(Moment-level)						
Denial of DE Prompt 1			1.00 [0, 1]	5.24 (0.09)	9.57 (0.19)	
White	421	0.06 (0.23)				
Black	297	0.03 (0.17)				
Negative Affect Prompt 1			5.80 [0, 5.80]	1.12 (0.09)	0.43 (0.18)	
White	421	1.00 (1.12)				
Black	297	1.23 (1.18)				
Social Interaction Prompt 1			1.00 [0, 1]	0.48 (0.09)	-1.77 (0.18)	
White	421	0.46 (0.50)				
Black	297	0.34 (0.47)				
Valence Prompt 1			6.00 [0, 6]	-0.55 (0.15)	-0.16 (0.29)	
White	182	4.34 (1.59)				
Black	92	3.48 (1.49)				

### Descriptive Statistics of EMA Measures

Denial of DE Prompt 2			1.00 [0, 1]	4.42 (0.09)	7.55 (0.18)
White	403	0.05 (0.23)			
Black	296	0.03 (0.17)			

Table 2 continued

Negative Affect Prompt 2   6.00 [0, 6]   1.01 (0.09)   0.40 (0.19)     White   403   1.00 (1.12)   1.00 [0, 1]   0.38 (0.09)   -1.86 (0.18)     Social Interaction Prompt 2   1.00 [0, 1]   0.38 (0.09)   -1.86 (0.18)	Measure	Ν	M(SD)	Range [Min, Max]	Skewness (SE)	Kurtosis (SE)	
White 403 1.00 (1.12)   Black 296 1.23 (1.18)   Social Interaction Prompt 2 1.00 [0, 1] 0.38 (0.09)	Negative Affect Prompt 2			6.00 [0, 6]	1.01 (0.09)	0.40 (0.19)	
Black   296   1.23 (1.18)     Social Interaction Prompt 2   1.00 [0, 1]   0.38 (0.09)   -1.86 (0.18)	White	403	1.00 (1.12)				
Social Interaction Prompt 2 $1.00[0, 1] = 0.38(0.00) = 1.86(0.18)$	Black	296	1.23 (1.18)				
1.00 [0, 1] 0.50 (0.09) -1.00 (0.16)	Social Interaction Prompt 2			1.00 [0, 1]	0.38 (0.09)	-1.86 (0.18)	
White $403  0.46 \ (0.50)$	White	403	0.46 (0.50)				
Black 296 0.34 (0.47)	Black	296	0.34 (0.47)				
Valence Prompt 26.00 [0, 6]-0.62 (0.14)-0.13 (0.29)	Valence Prompt 2			6.00 [0, 6]	-0.62 (0.14)	-0.13 (0.29)	
White 184 4.34 (1.59)	White	184	4.34 (1.59)				
Black 101 3.48 (1.49)	Black	101	3.48 (1.49)				
Loss of Control Eating 6.00 [0, 6] 1.76 (0.11) 2.05 (0.22)	Loss of Control Eating			6.00 [0, 6]	1.76 (0.11)	2.05 (0.22)	
Night 260 1.11 (1.82)	Night	260	1.11 (1.82)				
White 223 0.77 (1.45)	White	223	0.77 (1.45)				
Black	Black						
Overeating Night     6.00 [0, 6]     1.75 (0.11)     2.11 (0.22)	Overeating Night			6.00 [0, 6]	1.75 (0.11)	2.11 (0.22)	
White 260 1.13 (1.81)	White	260	1.13 (1.81)				
Black 223 0.73 (1.31)	Black	223	0.73 (1.31)				

*Note.* N = number of responses.

### **Power Analysis**

Based on a G\*Power 3.1.9 linear regression analysis (Faul, Erdfelder, Lang, & Buchner, 2007), 219 participants were required to observe a small-to-medium effect size for three predictors ( $f^2 = .08$ ) and 197 participants were required for two predictors. However, because this regression power analysis did not account for the multiple assessments collected for each person and the correlation amongst residuals in multilevel nested designs, this estimate of number of participants was an overestimate of what was actually needed. Therefore, a formula developed by West and colleagues (2011) was used to determine the number of participants needed for a nested design (i.e., EMA) for power of .80. It was proposed that 120 participants (60 White, 60

Black) should be recruited based on estimates that participants would report, at minimum, 10 days of data and a conservative intraclass correlation coefficient (ICC; the total variance due to individual differences) of .43 would be observed for the eating variables (e.g., Heron et al., 2014). This proposed number also accounted for anticipated attrition. Participants reported, on average, 11 days of data in this study's 14 days of assessments (33 out of 42 momentary reports per person). An intraclass correlation coefficient (ICC; the total variance due to individual differences) of .47 was observed for overeating, .49 for loss of control eating, .25 for negative affect, .46 for social interactions, and .29 for valence of social interactions. In total, 72 participants (37 White, 35 Black) were recruited. This study was powered to detect effects in analyses, including moderation analyses, where negative affect and valence of social interactions were the outcome variables (Hypotheses 2a, 2b; Research Question 1 where negative affect and valence of social interactions were the outcome measures). This study was underpowered for the remainder of the analyses (i.e., Hypotheses 1a, 1b, 2c; Research Question 1 where loss of control eating, overeating, and occurrence of social interaction were the outcome measures; Research Question  $2^{1}$ . Based on the G\*Power 3.1.9 independent samples t-test analyses (Faul et al., 2007), a total of 176 participants (88 each) would have been required to detect small to medium effects between groups on baseline measures = .80. It is possible that the COVID-19 pandemic that occurred in spring-summer 2020 interfered with participant recruitment. During this time, participants were not recruited via flyers around campus and were not reminded about SONA participation via in-class announcements. Fifty participants were recruited in the Fall of 2019 whereas only 22 participants were recruited from Spring 2020-Summer 2020.

<sup>&</sup>lt;sup>1</sup>Given the ICC's obtained and number of observations at level 1 and level 2, N-effective using the West formula was 147 for loss of control eating, 153 for overeating, and 156 for occurrence of social interactions.

### **Descriptive Statistics**

All participants in the sample identified as Black (n = 35, 48.6%) or White (n = 37, 51.4%), as this was part of the inclusion criteria. The average age of participants was 20.88 (*SD* = 4.33) for Black participants and 22.19 for White participants (*SD* = 5.40). The majority of the sample identified as only heterosexual (n = 49, 68.4%), with the remaining participants identifying as mostly heterosexual (n = 9), bisexual (n = 7), or only homosexual/lesbian/gay (n = 7). Body Mass Index [BMI] was calculated for all participants based on their measured height and weight. The mean BMI of study participants was 26.37 (*SD* = 5.96) for White participants and 28.34 (*SD* = 6.41) for Black participants. BMI between 25.0 and 29.9 is considered overweight and is typical of college samples (Center for Disease Control and Prevention, 2017).

### **EMA Survey Compliance**

Completion rates were calculated by taking the total number of assessments completed divided by the total number of expected assessments for each participant. Participants completed an average of 33.13 (78.9%) of all surveys during the study. Another, more conservative, method was used for calculating momentary survey compliance. This second method considered compliance as the number of surveys participants completed within an hour of being notified divided by the total number of completed assessments. This method is sometimes preferred given that it reduces the likelihood of recall bias common in retrospective data collection. Using this second approach, participants completed, on average, 28.82 of the surveys within an hour of the notification; this equates to 87% (28.82 of 33.13) of the completed surveys filled out within one hour, and 67% (28.82 of 42) of the total possible surveys completed within one hour. Total and timely survey compliance numbers are presented in Table 3. All surveys were used in analyses to

retain as much power as possible, and given that surveys expired after approximately 2-4 hours, all survey were completed within a few hours of the prompt regardless.

### **Identification of Covariates**

A variety of variables were explored as covariates given their purported associations with binge eating. Body mass index (BMI) was explored as a covariate given that BMI and concerns about BMI are the most well-established risk factors for binge eating symptom severity (Stice, 2002). Other potential covariates discussed in the introduction were also assessed: body dissatisfaction, thin-ideal internalization, peer norms, college adjustment, and emotion regulation. Of the variables examined, body dissatisfaction was positively associated (r = .31; r =.36, ps<.05) and college adjustment was negatively associated (rs = -.25, ps<.05) with loss of control eating and overeating, respectively. These variables were entered as covariates in multivariate analyses where loss of control eating and overeating were the outcome variables. Zero-order correlations can be found in Table 4.

## Table 3

## EMA Survey Compliance

	N	Percentage of Sample
Total Compliance		
Completed 100%	6	8.3
Completed 85-100%	37	51.4
Completed 50-85%	16	22.2
Completed 20-50%	10	13.9
Completed $\leq 20\%$	3	4.2
Timely Compliance		
Completed 100%	8	11.1
Completed 85-99%	37	51.4
Completed 50-84%	26	36.1
Completed 20-49%	1	1.4
Completed $\leq 20\%$	0	0

*Note.* Total Compliance = the total number of surveys participants completed, Timely Compliance = the total number of surveys participants completed within an hour of being notified.

## Table 4

# Zero-Order Correlation Table of Baseline Study Variables and EMA Binge Eating

Scale	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. EMA Loss of Control	1	.89***	.13	.28*	.33**	05	.19	02	.14	.31*	25*	.01	.04	.17	.24
2. EMA Overeating		1	.19	.35**	.36**	11	.31*	03	.20	.36**	25*	.07	.08	.12	.16
3. BMI			1	.32*	.01	10	.37*	13	.17	.41**	16	.36*	.18	10	21
4. EDE-Q Total				1	.45**	35*	.45**	16	.64***	.89***	51***	.40**	.56***	.39**	.31*
5. DDEBS Total					1	43**	.47**	.07	.20	.51***	25	.15	.25	.21	.26
6. PANAS_Positive						1	44**	.39**	01	40*	.38*	12	10	.01	04
7. PANAS_Negative							1	19	.19	.56***	60***	.18	.27	.09	.12
8. ATSPH								1	.18	13	.15	09	14	15	19
9. SATAQ-Thin Ideal									1	.59***	35*	.38*	.40**	.25	.32*
10. BSQ Total										1	46**	.35*	.50***	.23	.18
11. CAT Total											1	20	28	24	29
12. PNS_Thinness												1	.53***	.39**	.25
13. PNS_Acceptability													1	.77***	.47**
14. PNS_Encourage														1	.48**
15. PNS_Communicate															1

*Note.*  ${}^{*}p < .05$ ,  ${}^{**}p < .01$ , and  ${}^{***}p < .001$ 

### Analyses

Analyses utilizing the baseline data were performed using SPSS (Hypotheses 1a-b). All multilevel analyses were performed using HLM 7.0 software (Hypotheses 2a-c, Research Questions 1-2). A random-effects ANOVA model was run for each multilevel analysis to determine if the level 1 IVs should be included as fixed or random effects. If the tau estimates were significant it was determined that there was significant variability among slopes at level 2, and therefore, the IVs were included as random effects. Level 1 variables were person-mean centered whereas level 2 variables were grand mean centered. Dichotomous level 1 and level 2 variables were entered uncentered. Separate models were run for overeating and loss of control eating (Hypothesis 2c, Research Questions 1-2).

For Hypotheses 2a-2b, all data at prompts 1 and 2 were used to investigate whether denial of disordered eating, negative affect, occurrence of social interactions, and valence of social interactions are associated with one another during the day. To do this, prompt 1 and prompt 2 total scores were merged in SPSS. This approach effectively created a "day" column for each variable. Although doing the analyses in this way, removed the ability to determine the temporal sequencing of events, it allowed for increased power and a heightened ability to determine whether these variables were positively or negatively associated with one another in real-time during the day. For Hypothesis 2c and Research Questions 1-2, day variables were lagged in SPSS, so that it could be determined whether events earlier in the day were associated with overeating and loss of control eating at night. Denial of disordered eating and occurrence of social interactions were measured dichotomously, such that 0 = did not report at prompt 1 or prompt 2 and 1 = did report at prompt 1 or prompt 2. Negative affect and valence scores were calculated by averaging across prompts. To run these analyses using HLM software, a single

day-level variable was necessary so that it could be lagged to appear on the same row as end of day prompts, thereby allowing for investigation of associations between events occurring during the day and binge eating at night.

Hypothesis 1a.: Between-person analyses will be used to test whether Black women report more denial than White women. Independent samples *t*-tests were run to compare Black and White women on levels of denial of disordered eating at baseline. As shown in Table 5, there were no significant differences between Black and White women on denial of disordered eating (ps > .05).

Hypothesis 1b.: Between-person analyses will be used to test whether Black women report less help-seeking than White women. Independent samples *t*-tests were run to compare Black and White women on levels of help-seeking attitudes at baseline. As shown in Table 5, there were no significant differences between Black and White women on help-seeking attitudes  $(p_{\rm S} > .05)$ .

### Table 5

М	eans	and	SD,	s foi	r D	DEBS	and	ATSI	PH	by	Race	2
---	------	-----	-----	-------	-----	------	-----	------	----	----	------	---

Variable	Black	White	<i>t</i> value	р
	Mean (SD)	Mean (SD)		
	(n = 35)	(n = 37)		
DDEBS	1.75 (0.15)	1.80 (0.81)	0.29	.78
ATSPH	15.55 (4.59)	14.14 (3.93)	-1.55	.13

*Note.* SD = Standard Deviation. DDEBS = Deliberate Denial of Disordered Eating Behaviors Scale. ATSPH = Attitudes Towards Seeking Professional Help. \*p < .05 \*\*p < .01 \*\*\*p < .01

# Hypothesis 2a. Within-person analyses will be used to test whether denial of disordered eating is associated with occurrence of social interactions and valence.

To test this hypothesis, this is a sample equation that was used:

Level 1 model: OCCURRENCE\_Day<sub>ti</sub> =  $\pi_{0i} + \pi_{1i}$ (DDEBS\_Day<sub>ti</sub>) +  $e_{ti}$ Level 2 model:  $\pi_{0i} = \beta_{00} + r_{0i}$ 

```
\pi 1i = \beta 10
```

Denial of disordered eating (measured dichotomously as whether a participant reported denial (1) or not (0) was entered as the independent variable). Occurrence of social interactions (measured by whether or not individuals report a social interaction) and negative social interactions (measured by the valence of social interactions that do occur) in a given day were entered as the dependent variables. Separate models were run for social interaction and valence of social interactions. Given that the model looking at the association between denial of disordered eating and social interactions contained a dichotomous outcome variable, a Bernoulli distribution was used. Tau estimates were not significant for either model; therefore, the models were left as fixed for parsimony. Results can be found in Table 6. A significant negative relation was found between denial of disordered eating and valence of social interactions during that same day. A significant positive relation was found between denial of disordered eating and social interactions, such that the occurrence of denial was associated with a higher likelihood of reporting a social interaction.

# Hypothesis 2b. Within-person analyses will be used to test whether social interactions and valence of social interactions are associated with negative affect.

To test this hypothesis, below is a sample equation that was used:

Level 1 model: PANAS\_Day<sub>ti</sub> =  $\pi_{0i} + \pi_{1i}(\text{OCCURRENCE}_Day_{ti}) + e_{ti}$ 

Level 2 model:  $\pi 0i = \beta 00 + r0i$ 

```
\pi 1i = \beta 10
```

Occurrence of social interactions (measured by whether or not individuals report a social interaction at prompt 1 and 2) and negative social interactions (measured by the average valence of social interactions that occurred during prompt 1 and prompt 2) were the independent variables. Negative affect was the dependent variable (measured continuously using the PANAS at prompts 1 and 2). Tau estimates were not significant for either model; therefore, the models were left as fixed for parsimony. Results can be found in Table 6. A significant and negative relation was found between reporting a social interaction and negative affect (p<.001), such that reporting a social interaction is associated with less negative affect during the day. A significant and negative relation was also found between valence and negative affect, such that less positive social interactions were associated with more negative affect.

Hypothesis 2c. Within-person analyses will be used to test whether negative affect is associated with disordered eating at night.

To test this hypothesis, below is a sample equation that was used:

Level 1 model: BE\_Night<sub>ti</sub> =  $\pi_{0i} + \pi_{1i}$ (PANAS\_Day<sub>ti</sub>) +  $e_{ti}$ Level 2 model:  $\pi_{0i} = \beta_{00} + r_{0i}$ 

$$\pi 1\mathbf{i} = \beta 10 + r1\mathbf{i}$$

Negative affect was entered as the independent variable (measured continuously using an aggregated PANAS score across prompt 1 and prompt 2). Binge eating scores (i.e., overeating and loss of control eating) were the dependent variables (measured continuously at end of day). Tau estimates were significant for both models; therefore, independent variables were entered as random effects. Results can be found in Table 6. Negative affect during the day was not significantly associated with loss of control eating or overeating at night.

# Research Question 1. Exploratory analyses will be conducted to investigate whether race moderates associations proposed in hypotheses 2a, 2b, and 2c.

To test this hypothesis, below is a sample equation that was used:

Level 1 model: BE\_Night<sub>ti</sub> = 
$$\pi_{0i} + \pi_{1i}(PANAS_Day_{ti}) + e_{ti}$$

Level 2 model:  $\pi_{0i} = \beta_{00} + \beta_{01}(\text{Race}) + r_{0i}$ 

$$\pi_{1i} = \beta_{10} + \beta_{11}$$
(Race)

Race was added as a moderator to hypotheses 2a, 2b, and 2c to test whether race changes any of the relations. Tau estimates were not significant, and models were left as fixed. Results can be found in Table 6. Race significantly moderated the relation between valence and negative affect, such that the negative relation between positive valence and negative affect was stronger for Black women. Simple slopes can be found in Figure 1.



*Figure 1*. The association between valence of social interaction and negative affect total scores as a function of race. Simple slopes for the significant moderation analysis from Research Question 1.

# Table 6

# Multilevel analyses for hypotheses 2a, 2b, and 2c and Research Question 1

	Hypothesis 2a & Research Question 1											
<b>Predictors</b>	<i>B p</i> OR 95%			∕₀ CI	В	SE B	t	df	р			
	Outcome: Social InteractionOutcome: Valence of Social Interactions											
DDEBS	1.01	0.04	2.76*	[1.05	, 7.24]	-0.83	0.28	-1.97*	555	.04		
Race	-0.44	0.19	0.65	[0.33	, 1.25]	-0.42	0.26	-1.61	65	.11		
DDEBS x Race	-0.71	0.50	0.49	[0.06	, 3.86]	-0.46	0.58	-0.54	555	.55		
	Hypothesis 2b & Research Question 1											
<b>Predictors</b>	В	SE B	t	df	р							
		Outcon	ne: Negative	e Affect								
Social Interaction	-0.17	0.07	<b>-2.1</b> 1*	1415	.04							
Race	-0.23	0.20	-1.09	65	.27							
Interaction x Race	-0.01	0.16	-0.05	1415	.96							

### Table 6 continued

<b>Outcome: Negative Affect</b>								-		
Valence	-0.18	0.04	-4.82***	555	<.001					
Race	-0.26	0.23	-1.11	65	.26					
Valence x Race	0.19	0.10	2.04*	555	.04					
			Hypothesi	is 2c & Re	esearch Que	stion 1				
<b>Predictors</b>	В	SE B	t	df	р	В	SE B	t	df	р
	(	<b>Dutcome:</b>	Loss of Con	trol Eatin	g		Outco	me: Overe	ating	
Negative Affect	0.11	0.16	0.70	470	.48	0.11	0.12	0.93	470	.35
Race	-0.29	0.29	-0.76	65	.45	-0.08	0.33	-0.26	65	.80
Negative Affect x	0.30	0.19	1.53	470	.12	0.42	0.23	1.81	470	.07
Race										

*Note.* DDEBS = Deliberate Denial of Disordered Eating Behaviors Scale across prompts 1 and 2. Social Interaction = whether or not a participant reported a social interaction across prompts 1 and 2. Valence = valence of social interaction across prompts 1 and 2, with higher scores reflecting more positive social interactions. Robust standard errors were used for all analyses. Analyses where social interaction was the outcome variable contained Bernoulli-distributed outcomes. \*p < .05, \*\*p < .01, \*\*\*p < .005.

### Research Question 2. Exploratory analyses will be conducted to investigate the

# relative contributions of denial of disordered eating, interpersonal factors, race, and negative affect on binge eating while controlling for baseline covariates.

To test this hypothesis, below is a sample equation that was used:

Level 1 model: BE\_Night<sub>ti</sub> = 
$$\pi_{0i} + \pi_{1i}$$
(DDEBS\_Day<sub>ti</sub>) +  $\pi_{2i}$ (PANAS\_Day<sub>ti</sub>) +  $\pi_{3i}$ (ISOLATION\_Day<sub>ti</sub>) +  $\pi_{4i}$ (VALENCE\_Day<sub>ti</sub>) +  $e_{ti}$   
Level 2 model:  $\pi_{0i} = \beta_{00} + \beta_{01}$  (CAT<sub>baseline</sub>) +  $\beta_{02}$  (BSQ<sub>baseline</sub>) +  $\beta_{03}$  (Race) +  $r_{0i}$ 

 $\pi_{1i} = \beta_{10}$  $\pi_{2i} = \beta_{20}$  $\pi_{3i} = \beta_{30}$  $\pi_{4i} = \beta_{40}$ 

Denial of disordered eating, negative affect, social interaction, and valence of social interactions across prompts 1 and 2 and were entered simultaneously in multilevel analyses to determine their relative contribution to binge eating at night while controlling for covariates (i.e., body dissatisfaction and college adjustment) and looking at the influence of race. Covariates were determined by their significant associations with binge eating variables at baseline (see Table 4). Models were left as fixed. Results can be found in Table 7. When entered together, denial of disordered eating (DDEBS) was the only significant predictor of loss of control eating above covariates (i.e., CAT and BSQ), suggesting that denial of disordered eating during the day was positively associated with loss of control eating at night. Valence of social interactions was the only significant predictor of overeating beyond covariates (i.e., CAT and BSQ). Valence of social interactions during the day was negatively associated with overeating at night, such that more positive social interactions during the day were associated with less overeating at night.

### Table 7

### Multilevel analyses for Research Question 2

Predictors	В	SE B	t	df	р	В	SE B	t	df	р	
				-	-					-	
	Outcome: Loss of Control Eating						Outcome: Overeating				
Covariates											
CAT	-0.61	0.22	-1.89	467	.07	-0.81	0.33	-2.56***	467	<.001	
BSQ	0.75	0.33	2.30*	467	.01	0.77	0.33	2.32**	467	<.01	
Independent Variables											
DDEBS	0.72	0.32	2.28*	467	.02	0.17	0.45	0.39	467	.70	
Social Interaction	-0.12	0.10	-1.33	467	.19	-0.18	0.13	-1.38	467	.16	
Valence	-0.16	0.12	-1.37	467	.17	-0.27	0.13	-2.17*	467	.03	
Negative Affect	0.50	0.12	1.78	467	.08	0.48	0.10	1.71	467	.09	
Race	-0.45	0.37	-1.22	65	.23	-0.41	0.37	-1.11	65	.27	

Note. CAT = College Adjustment Test. BSQ = Body Shape Questionnaire. DDEBS = Deliberate Denial of Disordered Eating Behaviors Scale across prompts 1 and 2. Social Interaction = whether or not a participant reported a social interaction across prompts 1 and 2. Valence = valence of social interaction across prompts 1 and 2, with higher scores reflecting more positive social interactions. \*p < .05, \*\*p < .01, \*\*\*p < .005.

### **CHAPTER IV**

### DISCUSSION

The present study used an ecological momentary assessment (EMA) approach to expand on an interpersonal formulation of disordered eating using a racially diverse sample of young women. Specifically, this study investigated whether denial of disordered eating is associated with interpersonal factors (i.e., occurrence and valence of social interactions), whether interpersonal factors are associated with negative affect, and whether negative affect is associated with binge eating (Figure 2). Race differences in these variables and whether race moderated any of the associations was also explored. Previous research on disordered eating has almost exclusively focused on young, non-Hispanic White women in the United States to the detriment of understanding etiological and maintaining factors of disordered eating in other racial and ethnic groups. In addition, an interpersonal formulation of disordered eating (i.e., the idea that disordered eating behaviors increase interpersonal problems; in turn, these interpersonal problems intensify eating disorder symptoms) has neglected to investigate the impact of denial of disordered eating behaviors, which is likely related to the lack of a psychometrically valid measure of denial until now. This study extends past research by investigating denial of disordered eating using an interpersonal formulation of disordered eating while also exploring race in this formulation.



*Figure 2.* An interpersonal formulation of disordered eating that includes denial of disordered eating behaviors

Results suggested that denial of disordered eating during the day was negatively associated with positive social interactions during the same day and that more frequent social interaction and more positive social interactions on a given day were associated with less negative affect on that same day. When all variables measured during the day (denial of disordered eating, occurrence of a social interaction, valence of social interactions, race, and negative affect) were entered simultaneously as independent variables, denial of disordered eating earlier in the day was positively associated with loss of control eating at night while valence of social interactions was negatively associated with overeating at night, such that more negative social interactions earlier in the day preceded higher levels of overeating at night. There were no race differences in denial of disordered eating or help-seeking behaviors at baseline, but race moderated a relation between valence of social interactions and negative affect during the day, such that less positive social interactions were associated with more negative affect, and this relation was stronger for Black women than for White women.

### **Denial of Disordered Eating Behaviors**

**Denial of disordered eating and binge eating.** Denial of disordered eating behaviors is commonly seen in those who engage in disordered eating (Vandereycken, 2008). Although there is a dearth of research as it pertains to this topic, particularly as it relates to binge eating, qualitative research from the BN literature suggests that secrecy surrounding binge eating is most often related to shame and stigmatization (Petterson et al., 2008). In fact, many women report going to great lengths to hide binge eating, including going to multiple stores to shop for food or having a secret stash of food at home (Petterson et al., 2008). When all independent variables in this study were entered simultaneously in separate multilevel models of loss of control eating and overeating (i.e., Research Question 2), denial of disordered eating was the only significant predictor of loss of control eating beyond covariates controlled for in the model (i.e., body dissatisfaction and college adjustment). When all variables were entered together in multi-level analyses, a positive association between denial and loss of control eating emerged. One possible explanation for this could be that many of the denial questions could pertain to dietary restriction (e.g., "Have you told people you have eaten when you have not"), and dietary restriction is shown to precede loss of control eating (Stice, 2002). This association tends to emerge given that caloric deprivation can trigger the body's natural defenses to binge eat in order to regain caloric homeostasis (Stice, 2002). Denial was not a significant predictor of perceived overeating; however, we were underpowered to detect small to medium effects for these analyses.

Denial and interpersonal factors. One hypothesized way in which denial might exacerbate binge eating behaviors is through associations with interpersonal factors. A significant negative relation was found between denial of disordered eating and valence of social interactions during day, such that individuals who engaged in denial reported more negative social interactions. This finding is consistent with previous research that demonstrates lying or other forms of dishonestly may lead to negative social interactions, as it destabilizes trust between individuals (Wang, Galinsky, & Murnighan, 2009). Those close to individuals who deliberately deny disordered eating behaviors might subsequently experience frustration in the relationship, especially if they suspect disingenuous interactions occurring. Consequently, attempts to deny or conceal disordered eating behaviors might lead to discord or fractured relationships, although this should be investigated using experimental designs as the current study is correlational in nature.

A significant relation was found between denial of disordered eating and social interaction during the day (Hypothesis 2a), such that denial of disordered eating during the day was

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associated with a higher likelihood of social occurrences. This association was in the opposite direction than hypothesized. Although contraindicated in this study, women who engage in disordered eating often report a deficiency in their social networks, isolating themselves from others and spending more time alone than those not diagnosed with an eating disorder (Leonidas & Antonio dos Santos, 2014). The social withdrawal syndrome hypothesis of disordered eating behaviors (Rotenberg, Bharathi, Davies, & Finch, 2013) helps to explain these behaviors, suggesting that those with an eating disorder are resistant to share personal information with others, therefore decreasing their opportunities to form social connections and garner social support. However, social interactions in this study were conceptualized as, "any form of communication with someone else (e.g., talking in-person, a phone conversation, texting)", and a positive relation may have emerged because denial of disordered eating, in some cases, necessitates a social interaction (e.g., to lie to someone, you need to interact with them). It is also possible that the COVID-19 pandemic created opportunity for denial and contributed to this association, such that individuals who were required to quarantine and subsequently interact with others that they may otherwise not (like family members who may not be aware of a participant's disordered eating behaviors) were put into positions ripe for concealment and interaction. In the state of Virginia, where this study occurred, a stay-at-home order was issued between April 1, 2020 and June 10, 2020, and during this time data were collected from approximately 20 people in the current study. The impacts of COVID-19 on disordered eating and interpersonal factors are worthy of attention.

**Denial of disordered eating and race**. This study also attempted to expand previous research by investigating whether denial of disordered eating and a related behavior (willingness to seek help) differed by race. It was hypothesized that young Black women may be more likely

than young White women to deny disordered eating behaviors and avoid seeking help for mental health concerns given past abuses by health care systems, stigma surrounding mental health issues in the Black community, and concerns about the cultural competency of healthcare providers (Alvidrez et al., 2008). This study was ultimately not powered to detect effects (due to the sample size limitations described previously) and subsequently did not find significant differences by race in these baseline measures. Although past research has demonstrated that self-disclosure tends to be lower amongst Black Americans (e.g., Morrison & Downey, 2000), this has largely been demonstrated within the context of the therapeutic relationship (Kelly & Boyd-Franklin, 2005) where concerns about stigma and cultural competency may be particularly salient. This study asked about denial and help-seeking within the context of a confidential research study. In addition, rates of Black psychologists and helping professionals are on the rise. In 2015, 66% of early career psychologists were White and 34% identified as racial or ethnic minorities, which was similar to the general population at the time (62% White; 38% racial or ethnic minority; National Center for Science and Engineering Statistics, 2015; U.S. Census Bureau, 2015). In 2016, a third (32%) of psychology doctorate degrees were awarded to racial and ethnic minorities (U.S. Department of Education, 2016). This evolvement may be changing help-seeking attitudes amongst racial and ethnic minorities. Additionally, disclosure varies by context, content, gender, age, and interpersonal relationship (Consedine, Sabag-Cohen, & Krivoshekova, 2007). For example, research suggests that women are more likely to seek help for mental health concerns than men (Sagar-Ouriaghli, Godfrey, Bridge, Meade, & Brown, 2019), and younger adults are more willing to seek help than older adults (Mackenzie, Scott, Mather, & Sareen, 2009). This study was conducted with a sample of young women, and it should be noted that help-seeking attitudes are generally higher in this population. It should also

be noted that race did not moderate associations between denial and interpersonal factors such as valence of social interactions and frequency of social interactions. This study was powered to detect moderating effects of race on associations between denial and valence of social interactions. Therefore, it stands to reason that denial adversely impacts social functioning regardless of race, and individuals in this study appeared to engage in denial at similar rates.

### **Interpersonal Factors**

Interpersonal factors and binge eating. Less frequent social interaction and negative social interactions may be keys to understanding etiological and maintaining factors in binge eating. An interpersonal model of binge eating suggests that interpersonal problems may increase negative affect and result in binge eating (Wilfley et al., 2002). When all independent variables in this study were entered simultaneously in multilevel models of loss of control eating and overeating, valence of social interactions was the only significant predictor of overeating beyond covariates (i.e., college adjustment [CAT] and body dissatisfaction [BSQ]). It is possible that individuals in this study coped with negative social interactions through overeating, which may provide an emotion regulation function. Emotion regulation models of binge eating suggest that individuals engage in binge eating as a means to down-regulate negative emotions, which is likely due to lacking more adaptive strategies (Harrison, Sullivan, Tchanturia, & Treasure, 2010).

However, it is also important to note that negative affect was not a significant predictor of overeating while negative social interactions were. There are a few possible explanations for these findings. First and foremost, would be consideration of time-scale differences. There is a rich literature linking negative affect and binge eating behaviors (Ivanova et al., 2015); however, this body of research suggests that the link between negative affect and binge eating tends to
exist on a shorter timescale than that used in this study, such that elevations in negative affect tend to closely precede binge eating (see further discussion below). Another possible explanation could be that there is something unique about negative social interactions beyond its ties to negative affect. Steiger and colleagues (1999) found that women who binge eat are hypersensitive to social interactions, such that they show larger increases in self-critical thoughts as a result of negative social interactions compared to healthy controls. This fits with theoretical formulations linking women who binge eat to heightened disturbances of self and associated social sensitivities (Steiger et al., 1999). Lastly, it is also possible that it is easier for individuals to identify and report on negative social interactions in comparison to accurately reporting on their internal experiences. This might be especially true of individuals who engage in disordered eating given that poor interoceptive awareness is often cited as a key feature of disordered eating (Merwin, Zucker, Lacy, & Elliott, 2010).

Interpersonal factors and negative affect. Interpersonal models of disordered eating posit that negative affect mediates the relation between interpersonal problems and binge eating symptoms (Ivanova et al., 2015). Individuals who binge eat tend to have higher levels of interpersonal problems and poorer interpersonal problem-solving skills (Blomquist, Ansell, White, Masheb, & Grilo, 2012; Svaldi, Dorn, & Trentowska, 2011), and these interpersonal problems are well-established risk factors for increased negative affect (Baumeister & Leary, 1995). In fact, research suggests that social isolation increases stress, reduces sleep quality, and is associated with higher mortality rates (Cacioppo & Cacioppo, 2014). In support of this previous research, this study found that reporting a social interaction was associated with less negative affect during the day. In other words, individuals who reported a social interaction,

which was assessed via the question "are you interacting with anyone right now?", at prompt 1 and prompt 2, reported less negative affect, on average, that day.

A significant negative relation was found between valence of social interactions and negative affect, such that more positive social interactions were associated with less negative affect. Prior research suggests that negative social interactions result in poorer mood and selfconcept (Steiger et al., 1999). Some of this research even suggests that negative social interactions may have more potent effects on mood and psychological well-being than the positive impacts of social support (e.g., Lincoln, 2000). People have an intense need to connect with others and gain acceptance into social groups, which has been hypothesized to serve an evolutionary purpose (i.e., better chance of survival linked to belonging; Baumeister & Leary, 1995). Therefore, it stands to reason that negative mood associated with negative social interactions is a normative and adaptive reaction. It should be noted that "negative social interactions" can be conceptualized in a myriad of ways, ranging from minor social stressors to conflict. In addition, the impact of valence of social interactions on mood may vary based on relational and psychological factors (e.g., degree of closeness, depressive symptoms; Lincoln, 2000). These factors should be considered in future research.

Interpersonal factors and race. Race was explored in these aforementioned associations and was found to significantly moderate an association between the valence of social interactions and negative affect, such that there was a stronger negative relation between valence of social interactions and negative affect for Black women. Said another way, the less positive the social interaction, the worse a person's negative affect is, and this effect was stronger for Black women than for White women. One possible explanation for this could be explained by microaggression theory. Microaggressions are brief, everyday exchanges that send denigrating messages to individuals based on their group membership (e.g., race; Sue et al., 2007). Black women experience more microaggressions than White women do (Sue et al., 2007). The cumulative effects of these messages can be quite devastating and could lend an explanation as to why a negative social interaction might be associated with greater negative affect for Black women, as the effects of negative social interactions have accumulated over time.

### **Negative Affect**

Negative affect and binge eating. Negative affect is one of the most well-established risk factors for engagement in binge eating (Dingemans, Danner, & Parks, 2017), and emotions related to interpersonal experiences are particularly related to binge eating (Zeeck, Stelzer, Linster, Joos, & Hartmann, 2011). The research evidence suggests that engagement in disordered eating serves to regulate one's emotions by temporarily suppressing negative affect (Gross, 2002; Smyth et al., 2007), including negative emotions involving others (e.g., loneliness, frustration; Truglia et al., 2006). EMA studies consistently demonstrate that negative affect is an antecedent to binge eating (Berg et al., 2017; Smyth et al., 2007). However, in this study, negative affect during the day was not significantly associated with loss of control eating or overeating at night. Non-significant findings are likely related to the small sample size. In addition, given the design of this study and the timeframes over which participants answered questions, the study was asking a different research question from some past studies. In the morning and afternoon surveys, participants were asked about their current mood and in the evening survey participants were asked to report on their eating habits since the time of last prompt. Past research indicates that negative affect may begin increasing four hours prior to the binge episode and is highest within the hour prior to engagement in loss of control eating and overeating (Berg et al., 2017). Given the design of this study, it is impossible to know when the

ratings of affect were conducted relative to incidents of loss of control eating and overeating, which may contribute to non-significant results. The study was designed in this manner because denial of disordered eating and binge eating are low base rate activities, and thus participants were not unnecessarily taxed through additional surveys. However, future research might consider asking participants to report on the specific amount of time since their last eating episode and/or consider using event-contingent prompts to assess negative affect more proximally to eating episodes.

**Negative affect and race.** The present study also explored race as a moderator of associations between negative affect and binge eating and found that race did not significantly moderate these associations. The overall pattern of results from this study generally aligns with well-established evidence that disordered eating behaviors at large, and binge eating specifically, uphold an interpersonal formulation of disordered eating (Rieger et al., 2010; Wilfley, 2002) and provides preliminary support for the notion that this formulation may generalize across White and Black women; however, this study was underpowered to detect significant findings pertaining to binge eating variables.

### **Implications and Directions for Future Research**

This study provides preliminary evidence that denial of disordered eating may play an important part in interpersonal formulations of disordered eating. Denial of disordered eating during the day was negatively associated with positive social interactions and positive social interactions during the day were negatively associated with overeating at night. These findings did not vary across race and therefore suggest that these associations may hold for both Black and White young college women. In addition, occurrence of social interactions and valence of social interactions were negatively associated with negative affect, demonstrating that negative affect likely plays a role in the processes mentioned above.

The impacts of denial might be shared by clinicians with their clients to provide psychoeducation about the effects of denial. Clinicians might specifically share that denial of disordered eating may be positively associated with loss of control eating and negative social interactions. It might be helpful to frame this discussion in terms of how denial of disordered eating could interfere with a client's long-term goals. This fits especially well within a Dialectical-Behavioral Therapy (DBT) framework, which is focused on helping clients do what is effective in the moment. Many clients develop long-term goals pertaining to creating or strengthening healthy relationships. Although denial of disordered eating might assist a client in getting what they want in the short-term (e.g., not having to eat in front of others), it is likely to harm them in the long-term (e.g., developing and maintaining healthy relationships; Linehan, 2015). It is also possible that further explorations of denial of disordered eating may lead to treatment interventions that contain an honesty component, such as training modules on how to disclose disordered eating to trusted confidants. DBT for eating disorders (Safer, Telch, & Chen, 2009) could develop specific interpersonal effectiveness skills pertaining to honesty. Interpersonal effectiveness scripts from DBT (Linehan, 2015) could be modified for this purpose. For example, a client might be encouraged to describe, express, assert, and reinforce their needs to a loved one (e.g., "I have difficulty being honest around my eating habits. I feel concerned about judgment from others. Would you be able to help hold me accountable? I would really appreciate your help."). Future research should continue to investigate the impacts of denial using clinical samples and experimental designs.

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Negative interpersonal interactions may be particularly devastating for Black women given the cumulative impact of negative social experiences (Sue et al., 2007), resulting from implicit biases and subsequent microaggressions. Sue (2010) further suggests the importance of being trained to use "microinterventions", which is the process of confronting a microaggression. Microinterventions consist of asking for clarification (e.g., "could you say more about what you mean?"), separating intent from impact (e.g., "I know you probably didn't mean this, but..."), and sharing your own process (e.g., "I noticed that..."). In addition, psychologists can support Black clients by validating as opposed to minimizing their experiences of microaggressions as well as addressing these slights that may occur within the context of a therapeutic relationship (Sue, 2010). Future research should continue to explore race differences and the role of negative social interactions in interpersonal formulations of disordered eating.

### **Strengths and Limitations**

The present study had a number of strengths and limitations. The most notable strength was the research design used. The design used EMA to capture assessments of denial of disordered eating, mood, social factors, and binge eating as they were occurring in real-time. Participants answered three surveys a day at random times for 14 consecutive days in order to ensure variables of interest were captured. Participants were screened prior to participation for engagement in denial of disordered eating, ability to accurately report on symptomatology, and demographic variables; thus, increasing the chances that this study would capture the appropriate variables. This study added novelty to the existing literature in a few important ways. First, this study used a diverse sample of college women and approximately equal numbers of Black and White college women participated. A recent systematic review (Goode et al., 2020) determined that there are only 13 existing studies that have investigated correlates of binge eating between

Black and White races, none of which are EMA studies. Second, this is the first study to investigate the role of denial of disordered eating in interpersonal formulations of disordered eating. A psychometrically valid measure of denial of disordered eating did not exist until recently (Howard et al., 2020).

Although this study used a diverse sample of equal numbers of Black and White college women and identified mostly as heterosexual, these results may not generalize to other demographic groups, such as men or those with other gender identities, other sexual identities, and races or ethnicities other than Black and White. In addition, this study used a non-clinical sample, and, because of this, variation related to binge eating may be limited, future research with clinical samples is warranted. Future research might also consider controlling for the effects of year in school, Greek life affiliation, athletic membership, and other variables that might influence denial of disordered eating and binge eating behaviors. The sample size was also modest, and this study was not powered to detect effects beyond analyses where the outcome measures were negative affect or valence of social interactions. Given the ICC's obtained and number of observations at level 1 and level 2, a total of 156 participants were needed to be powered to detect effects in all proposed analyses. Participants completed three surveys per day given that denial of disordered eating and binge eating are low base rate activities and therefore participants were not unnecessarily taxed. However, because of this, this study was not able to gather more proximal information regarding thoughts, feelings, and behaviors immediately preceding binge eating episodes. It also possible that individuals are less likely to comply with prompts when engaging in binge eating behavior and this should also be considered a limitation.

This study also relied on self-report measures, which may be subject to reporting errors given that people are often biased when reporting their own experiences and individuals who

engage in disordered eating tend to lack interoceptive awareness; however, this limitation may be offset by the fact that a validity scale was used to eliminate participants that may not be able to accurately report on their eating experiences. In addition, although the novelty of studying denial of disordered eating behaviors is a strength, items were adapted from the DDEBS (Howard et al., 2020) that had never been used in EMA before. Lastly, no causal relations can be concluded. Although the hypotheses related binge eating can tell us something about the temporal sequencing of events, the study was correlational in nature. Despite these limitations, the present study provides preliminary evidence of the role of denial of disordered eating in interpersonal formulations of disordered eating using a racially diverse sample.

#### **CHAPTER V**

### CONCLUSION

This study provided initial support for the role of denial in interpersonal formulations of disordered eating using a racially diverse sample. This is the first study to explore the role of denial in interpersonal formulations of disordered eating given the lack of a psychometrically valid measure until recently. Results found that denial of disordered eating behaviors during the day was positively associated with negative social interactions and more negative social interactions during the day were significantly associated with more overeating at night. These associations did not vary across race. The hope is that this study will provide a starting point for future research to continue exploring how denial of disordered eating informs interpersonal formulations of disordered eating.

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### **APPENDIX A**

### **SCREENING QUESTIONNAIRES**

### About You

1. What is your birth date? Month \_\_\_\_\_ / Day \_\_\_\_ / Year \_\_\_\_ 2. What is your height: \_\_\_\_\_ feet, \_\_\_\_\_ inches 3. What is your best guess of your weight? pounds 4. What is your race? (circle as many as apply) (1) Black or African American (4) American Indian or Alaska Native (2) White or Caucasian (5) Native Hawaiian or Other Pacific Islander (3) Asian or Asian American (6) Other 5. How do you define your sexual identity? Would you say that you are: (1) Only homosexual/lesbian/gay (2) Mostly homosexual/lesbian/gay (3) Bisexual (4) Mostly heterosexual (5) Only heterosexual (6) Other 6. Are you CURRENTLY receiving any of the following types of mental health treatment? a. Psychotherapy or counseling? Yes No b. Pharmacotherapy or medications? Yes No c. Other mental health treatment (e.g., chemical dependency)? Yes No d. Treatment for an eating disorder? Yes No 7. In the PAST have you received any of the following types of mental health treatment? a. Psychotherapy or counseling? Yes No b. Pharmacotherapy or medications? Yes No

- c. Other mental health treatment (e.g., chemical dependency)? Yes No
- d. Treatment for an eating disorder? Yes No

8. How do you define your gender? Would you say that you are:

- (1) Male
- (2) Female
- (3) Male to female transgender
- (4) Female to male transgender
- (5) Gender queer/non-conforming
- (6) Other (please specify)

# EDE-Q Behavioral Items

1. Over the past week (7 days), have there been any times when you have felt that you have eaten what other people would regard as an unusually large amount of food given the circumstances?	No	Yes
If you answered yes: 1a. How many such episodes have you had over the past four weel	xs?	
1b. During how many of these episodes of overeating did you have lost control over your eating?	e a sense of	having
2. Have you had other episodes of eating in which you have had a sense of having lost control and eaten too much, but have <u>not</u> eaten an unusually large amount of food given the circumstances?	No	Yes
If you answered yes: 2a. How many such episodes have you had over the past four weel	xs?	
3. Over the past week (7 days), have you made yourself sick (vomit) as a means of controlling your shape or weight?	No	Yes
<u>If you answered yes</u> : 3a. How many have you done this over the past four weeks?		
4. Over the past week (7 days), have you taken laxatives as a means of controlling your shape or weight?	No	Yes
If you answered yes: 4a. How many have you done this over the past four weeks?		
5. Over the past week (7 days) have you taken diuretics (water tablets) as a means of controlling your shape or weight?	No	Yes
If you answered yes: 5a. How many have you done this over the past four weeks?		
6. Over the past week (7 days), have you exercised <u>hard</u> as a means of controlling your shape or weight?	No	Yes
If you answered yes: 6a. How many have you done this over the past four weeks?		

## Deliberate Denial of Disordered Eating Behaviors Scale-12-item

Please read each question and circle the appropriate number to the right. Please answer <u>all</u> the questions. Some of these questions may be difficult to answer or may feel uncomfortable. 1 = Yes; 0 = No

## In the past seven days, have you...

- 1. Told people you have eaten when you have not eaten?
- 2. Made up excuses to avoid events where you know food will be served?
- 3. Told people you are not hungry when you are?
- 4. Been dishonest about how much you ate?
- 5. Eaten in secret?
- 6. Ate slowly in order to give the impression that you are eating more than you are?
- 7. Quickly cleared your plate in order to hide how much food you ate?
- 8. Deliberately hid food (e.g., in a napkin) in order to give the impression you ate more than you did?
- 9. Ate more food than you lead others to believe?
- 10. Ate less food than you lead others to believe?
- 11. Told people you have dietary restrictions (e.g., gluten free) in order to avoid eating certain foods?
- 12. Told people you felt sick in order to avoid eating?

# Underreporting of Eating Behaviors Scale

- 1. I have never skipped a meal (T)
- 2. I have never been dissatisfied with my figure (T)
- 3. I am always content with my shape (T)
- 4. I rarely get cravings for unhealthy food (T)
- 5. I sometimes eat too much (F)
- 6. I never think about food (T)
- 7. I eat perfectly portioned meals (T)
- 8. I sometimes eat when I am not hungry (F)
- 9. I prefer some foods to others (F)
- 10. When I get hungry, I think about food (F)

## **UDEBS** Filler Items

The following items will be interspersed within the UDEBS questionnaire to assist in ensuring participants are not able to determine the purpose of the questionnaire. All items have been adapted from reliable and valid psychological questionnaires to T/F format.

- 1. I respect my body.
- 2. I am comfortable in my body.
- 3. I feel like I am beautiful.
- 4. People encourage me to eat more.
- 5. I eat as if I am an autopilot.
- 6. I am lazy.
- 7. I am good at resisting temptation.
- 8. I have friends with whom I can share my sorrows and my joys.
- 9. I am satisfied with my sleep.
- 10. I feel a strong connection towards my own ethnic group.
- 11. I take a positive attitude towards myself.
- 12. I pay attention to how I feel.
- 13. I feel confident and positive about myself.

If you would like to talk to a professional about any distress you may have experienced, you can contact the ODU Counseling Center at 757-683-4401.

# **APPENDIX B**

# **BASELINE QUESTIONNAIRES\*\***

# Eating Disorder Examination – Questionnaire (EDE-Q)

The following questions are concerned with the <u>PAST MONTH (28 days</u>). Please read each question carefully and circle the letter that corresponds to the appropriate number of days on the right.

ON OF	N HOW MANY DAYS OUT F THE PAST 28 DAYS	No days	1-5 days	6-12 days	13-15 days	16-22 days	23-27 days	Every day
1.	Have you been deliberately <u>trying</u> to limit the amount of food you eat to influence your shape or weight?	0	1	2	3	4	5	6
2.	Have you gone for long periods of time (8 hours or more when not sleeping) without eating anything in order to influence your shape or weight?	0	1	2	3	4	5	6
3.	Have you <u>tried</u> to avoid eating any foods that you like in order to influence your shape or weight?	0	1	2	3	4	5	6
4.	Have you tried to follow definite rules regarding your eating in order to influence your shape or weight; for example, a calorie limit, a set amount of food, or rules about what or when you should eat?	0	1	2	3	4	5	6
		No	1-5	6-12	13-15	16-22	23-27	Every
5.	Have you wanted your stomach to be empty?	days 0	days 1	days 2	days 3	days 4	days 5	day 6
6.	Has thinking about food or its calorie content made it much more difficult to concentrate on things you are interested in; for example, read, watch TV, or	0	1	2	3	4	5	6
7.	Have you been afraid of losing control over eating?	0	1	2	3	4	5	6

8.	Have you had episodes of binge eating?	0	1	2	3	4	5	6
9.	Have you eaten in secret? (Do not count binges.)	0	1	2	3	4	5	6
10	. Have you definitely wanted your stomach to be flat?	0	1	2	3	4	5	6
ON OI	N HOW MANY DAYS OUT F THE PAST 28 DAYS	No days	1-5 days	6-12 days	13-15 days	16-22 days	23-27 days	Every day
11 12	<ul> <li>Has thinking about shape or weight made it more difficult to concentrate on things you are in; for example, read, watch TV, or follow a conversation?</li> <li>Select 1-5 days for this</li> </ul>	0	1	2	3	4	5	6
13	question. . Have you had a definite fear that you might gain weight or become fat?	0	1	2	3	4	5	6
14	. Have you felt fat?	0	1	2	3	4	5	6
15	. Have you had a strong desire to lose weight?	0	1	2	3	4	5	6

15. On what proportion of times that you have eaten have you felt guilty because the effect on your shape or weight? (Do not count binges.)

(A)	None of the times	(E)	More than half the times					
(B)	A few of the times	(F)	Most of the time					
(C)	Less than half the times	(G)	Every time					
(D)	Half the times		-					
<ul> <li>16. Over the past four weeks (28 days), have there been any times when you have felt that you have eaten what other people would regard as an No Yes unusually large amount of food given the circumstances?</li> <li><u>If you answered yes</u>:</li> <li>16a. How many such episodes have you had over the past four weeks?</li> </ul>								
16b. During how many of these episodes of overeating did you have a sense of having lost control over your eating?								
17. Ha sense o unusua	ve you had other episodes of eating f having lost control and eaten too i lly large amount of food given the c	in wł nuch, circum	nich you have had a but have <u>not</u> eaten an istances?	No	Yes			
	<u>If you answered yes</u> : 17a. How many such episodes have	e you ha	d over	the past fo	ur wee	ks?		
--	--	--	---	---	--	---	--	--
18. me	Over the past four weeks, have you mathematical ans of controlling your shape or weight	ade your ?	self sid	ck (vomit)	as a	No	Y	ſes
	If you answered yes: 18a. How many have you done this	s over th	e past :	four weeks	? _			
19. cor	Over the past four weeks, have you tal atrolling your shape or weight? <u>If you answered yes</u> : 19a. How many have you done this	ken laxa s over th	tives as e past :	s a means o four weeks	of ?	No	Y	'es
20. a m	Over the past four weeks, have you tak neans of controlling your shape or weigh <u>If you answered yes</u> : 20a. How many have you done this	ken diure ht? s over th	etics (v e past :	vater tablet four weeks	rs) as ?	No	Y	ſes
21. cor	Over the past four weeks, have you ex ntrolling your shape or weight? <u>If you answered yes</u> :	ercised <u>l</u>	<u>nard</u> as	a means o	f	No	Y	es
	21a. How many have you done this	s over th	e past :	four weeks	? _			
Ov	21a. How many have you done this er the past 4 weeks (28 days)	s over the <b>Not at</b>	e past : all	four weeks Slightly	? 	lerately	Ma	rkedly
<b>Ov</b> 22.	<ul><li>21a. How many have you done this</li><li>er the past 4 weeks (28 days)</li><li>Has your weight influenced how you think about (judge) yourself as a person?</li></ul>	s over th <b>Not at</b> 0	e past : <b>all</b> 1	four weeks Slightly 2	? <b>Moo</b> 3	derately 4	<b>Ma</b> 5	<b>rkedly</b> 6
<b>Ov</b> 22. 23.	<ul> <li>21a. How many have you done this</li> <li>er the past 4 weeks (28 days)</li> <li>Has your weight influenced how you think about (judge) yourself as a person?</li> <li>Has your shape influenced how you think about (judge) yourself as a person?</li> </ul>	Not at	e past : <b>all</b> 1	four weeks Slightly 2 2	? Mod 3 3	derately 4 4	<b>Ma</b> 5 5	rkedly 6 6
<b>Ov</b> 22. 23. 24.	<ul> <li>21a. How many have you done this</li> <li>er the past 4 weeks (28 days)</li> <li>Has your weight influenced how you think about (judge) yourself as a person?</li> <li>Has your shape influenced how you think about (judge) yourself as a person?</li> <li>How much would it upset you if you had to weigh yourself once a week for the next four weeks?</li> </ul>	Not at	e past : <b>all</b> 1 1	four weeks Slightly 2 2 2 2	? Mod 3 3 3	derately 4 4 4	<b>Ma</b> 5 5 5	rkedly 6 6 6
<b>Ov</b> 22. 23. 24. 25.	<ul> <li>21a. How many have you done this</li> <li>er the past 4 weeks (28 days)</li> <li>Has your weight influenced how you think about (judge) yourself as a person?</li> <li>Has your shape influenced how you think about (judge) yourself as a person?</li> <li>How much would it upset you if you had to weigh yourself once a week for the next four weeks?</li> <li>How dissatisfied have you felt about your weight?</li> </ul>	Not at Not at 0 0 0	e past : all 1 1 1	four weeks Slightly 2 2 2 2 2 2	? Mod 3 3 3 3	derately 4 4 4 4	<b>Ma</b> 5 5 5 5 5	rkedly 6 6 6 6
Ov 22. 23. 24. 25. 26.	<ul> <li>21a. How many have you done this</li> <li>er the past 4 weeks (28 days)</li> <li>Has your weight influenced how you think about (judge) yourself as a person?</li> <li>Has your shape influenced how you think about (judge) yourself as a person?</li> <li>How much would it upset you if you had to weigh yourself once a week for the next four weeks?</li> <li>How dissatisfied have you felt about your weight?</li> <li>How dissatisfied have you felt about your shape?</li> </ul>	s over th <b>Not at</b> 0 0 0 0 0 0 0	e past : all 1 1 1 1 1	four weeks Slightly 2 2 2 2 2 2 2 2 2 2	? Mod 3 3 3 3 3 3	derately 4 4 4 4 4 4 4	Ma 5 5 5 5 5 5	rkedly 6 6 6 6 6
Ov 22. 23. 24. 25. 26. 27.	<ul> <li>21a. How many have you done this</li> <li>er the past 4 weeks (28 days)</li> <li>Has your weight influenced how you think about (judge) yourself as a person?</li> <li>Has your shape influenced how you think about (judge) yourself as a person?</li> <li>How much would it upset you if you had to weigh yourself once a week for the next four weeks?</li> <li>How dissatisfied have you felt about your weight?</li> <li>How dissatisfied have you felt about your shape?</li> <li>How concerned have you been about other people seeing you eat?</li> </ul>	s over the <b>Not at</b> 0 0 0 0 0 0 0 0 0 0 0 0 0	e past : all 1 1 1 1 1 1 1 1	four weeks Slightly 2 2 2 2 2 2 2 2 2 2 2	? Mod 3 3 3 3 3 3 3 3	derately 4 4 4 4 4 4 4 4 4	Ma 5 5 5 5 5 5 5 5	rkedly 6 6 6 6 6 6 6 6

while undressing or taking a bath or shower?29. How uncomfortable have you felt about others agoing your body for

- about others seeing your body; for example, in communal changing rooms, when swimming or wearing tight clothes?
- 0 1 2 3 4 5 6

# Positive and Negative Affect Schedule (PANAS)

This scale consists of a number of words that describe different feelings and emotions. Read each item and then list the number from the scale below next to each word. Indicate to what extent you have felt this way over the past month.

1	2	3	4	5
Very Slightly	A Little	Moderately	Quite a Bit	Extremely
1. Interested				
2. Distressed				
3. Excited				
4. Upset				
5. Strong				
6. Guilty				
7. Scared				
8. Hostile				
9. Enthusiastic				
10. Proud				
11. Irritable				
12. Alert				
13. Ashamed				
14. Inspired				
15. Nervous				
16. Determined				
17. Attentive				
18. Jittery				
19. Active				
20. Afraid				

# Attitudes Toward Seeking Professional Help

Your race/ethnicity: \_\_\_\_\_African American \_\_\_\_\_White/European American

Instructions

Read each statement carefully and indicate your degree of agreement using the scale below. In responding, please be completely candid.

0 = Di	isagree 1 = Partly disagree 2	= Partly agree	3 = Agree
1.	If I believed I was having a mental get professional attention.	breakdown, my first	inclination would be to
2.	The idea of talking about problems to get rid of emotional conflicts.	with a psychologist s	strikes me as a poor way
3.	If I were experiencing a serious em be confident that I could find relief	otional crisis at this p in psychotherapy.	point in my life, I would
4.	There is something admirable in the with his or her conflicts and fears w	e attitude of a person vithout resorting to pr	who is willing to cope of the offersion
5.	I would want to get psychological h of time.	nelp if I were worried	or upset for a long period
6.	I might want to have psychological	counseling in the fut	ure.
7.	A person with an emotional probler likely to solve it with professional h	m is not likely to solv nelp.	re it alone; he or she is
8.	Considering the time and expense i doubtful value for a person like me	nvolved in psychothe	erapy, it would have
9.	A person should work out his or he counseling would be a last resort.	r own problems; gett	ing psychological
10.	. Personal and emotional troubles, lil	ke many things, tend	to work out by themselves.

### Sociocultural Attitudes Towards Appearance Questionnaire - 4

Please read each of the following items carefully and indicate the number that best reflects your agreement with the statement.

Definitely Disagree = 1 Mostly Disagree = 2 Neither Agree Nor Disagree = 3 Mostly Agree = 4 Definitely Agree = 5

- 1. It is important for me to look athletic.
- 2. I think a lot about looking muscular.
- 3. I want my body to look very thin.
- 4. I want my body to look like it has little fat.
- 5. I think a lot about looking thin.
- 6. I spend a lot of time doing things to look more athletic.
- 7. I think a lot about looking athletic.
- 8. I want my body to look very lean.
- 9. I think a lot about having very little body fat.
- 10. I spend a lot of time doing things to look more muscular.

Answer the following questions with relevance to your Family (include: parents, brothers, sisters, relatives):

- 11. I feel pressure from family members to look thinner.
- 12. I feel pressure from family members to improve my appearance.
- 13. Family members encourage me to decrease my level of body fat.
- 14. Family members encourage me to get in better shape.

Answer the following questions with relevance to your Peers (include: close friends, classmates, other social contacts):

- 15. My peers encourage me to get thinner.
- 16. I feel pressure from my peers to improve my appearance.
- 17. I feel pressure from my peers to look in better shape.

18. I get pressure from my peers to decrease my level of body fat.

Answer the following questions with relevance to the Media (include: television, magazines, the Internet, movies, billboards, and advertisements):

19. I feel pressure from the media to look in better shape.

- 20. I feel pressure from the media to look thinner.
- 21. I feel pressure from the media to improve my appearance.
- 22. I feel pressure from the media to decrease my level of body fat.

# Peer Norms Scale

My peers	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
1. think being really thin is important.	1	2	3	4	5
2. think being really thin is attractive.	1	2	3	4	5
3. think it is OK to go on a low carb diet to lose/maintain weight	1	2	3	4	5
4. think it is OK to restrict fat and calories to lose/maintain weight.	1	2	3	4	5
5. think it is OK to vomit to lose/maintain weight	1	2	3	4	5
6. think it is OK to vigorously exercise more than once a day to lose/maintain weight.	1	2	3	4	5
7. think it is OK to smoke cigarettes to lose/maintain weight	1	2	3	4	5
8. think it is OK to use laxatives to lose/maintain weight.	1	2	3	4	5
9. think it is OK to use diet pills to lose/maintain weight	1	2	3	4	5
10. think it is OK to skip meals to lose/maintain weight.	1	2	3	4	5
11. encourage low-carb diets to lose/maintain weight.	1	2	3	4	5
12. encourage fat and calorie restriction to lose/maintain weight.	1	2	3	4	5
13. encourage vomiting to lose/maintain weight.	1	2	3	4	5
14. encourage vigorously exercising more than once a day.	1	2	3	4	5
15. encourage smoking cigarettes to lose/maintain weight.	1	2	3	4	5
16. encourage using laxatives to lose/maintain weight.	1	2	3	4	5
17. encourage using diet pills to lose/maintain weight.	1	2	3	4	5
18. encourage skipping meals to lose/maintain weight.	1	2	3	4	5
19. make comments about my attractiveness	1	2	3	4	5
20. make comments about my body	1	2	3	4	5
21. make comments about the attractiveness of people our age	1	2	3	4	5
22. make comments about the bodies of people our age	1	2	3	4	5
23. make comments about the attractiveness people in general	1	2	3	4	5
24. make comments about the bodies of people in general	1	2	3	4	5

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#### The College Adjustment Test

Use a 7-point scale to answer each of the following questions, where:

1 2 3 4 5 6 7 not at all somewhat a great deal

Within the LAST WEEK, to what degree have you:

- 1. Missed your friends from high school
- 2. Missed your home

3. Missed your parents and other family members

- 4. Worried about how you will perform academically at college \_\_\_\_\_
- 5. Worried about love or intimate relationships with others \_\_\_\_\_
- 6. Worried about the way you look \_\_\_\_\_
- 7. Worried about the impression you make on others \_\_\_\_\_
- 8. Worried about being in college in general \_\_\_\_\_
- 9. Liked your classes \_\_\_\_\_
- 10. Liked your roommate(s)
- 11. Liked being away from your parents \_\_\_\_\_
- 12. Liked your social life \_\_\_\_\_
- 13. Liked college in general
- 14. Felt angry \_
- 15. Felt lonely \_\_\_\_\_
- 16. Felt anxious or nervous
- 17. Felt depressed
- 18. Felt optimistic about your future at college
- 19. Felt good about yourself

Factor	Item
1: Nonacceptance of Emotional Responses	29) When I'm upset, I feel guilty for feeling that way.
(NONACCEPTANCE)	25) When I'm upset, I feel ashamed with myself for feeling that way.
	15) When I'm upset, I become embarrassed for feeling that way.
	14) When I'm upset, I become angry with myself for feeling that way.
	33) When I'm upset, I become irritated with myself for feeling that way.
	27) When I'm upset, I feel like I am weak.
2: Difficulties Engaging in Goal-Directed	30) When I'm upset, I have difficulty concentrating.
Behavior (GOALS)	22) When I'm upset, I have difficulty focusing on other things.
	16) When I'm upset, I have difficulty getting work done.
	38) When I'm upset, I have difficulty thinking about anything else.
	24) When I'm upset, I can still get things done. (r)
3: Impulse Control Difficulties (IMPULSE)	37) When I'm upset, I lose control over my behaviors.
	31) When I'm upset, I have difficulty controlling my behaviors.
	17) When I'm upset, I become out of control.
	23) When I'm upset, I feel out of control.
	<ol><li>I experience my emotions as overwhelming and out of control.</li></ol>
	28) When I'm upset, I feel like I can remain in control of my behaviors. (r)
4: Lack of Emotional Awareness	7) I am attentive to my feelings. (r)
(AWARENESS)	3) I pay attention to how I feel. (r)
	12) When I'm upset, I acknowledge my emotions. (r)
	21) When I'm upset, I believe that my feelings are valid and important. (r)
	9) I care about what I am feeling. (r)
	39) When I'm upset, I take time to figure out what I'm really feeling. (r)
5: Limited Access to Emotion Regulation	20) When I'm upset, I believe that I'll end up feeling very depressed.
Strategies (STRATEGIES)	19) When I'm upset, I believe that I will remain that way for a long time.
	35) When I'm upset, I believe that wallowing in it is all I can do.
	40) When I'm upset, it takes me a long time to feel better.
	32) When I'm upset, I believe that there is nothing I can do to make myself feel better.
	26) When I'm upset, I know that I can find a way to eventually feel better. (r)
	41) When I'm upset, my emotions feel overwhelming.
	34) When I'm upset, I start to feel very bad about myself.
6: Lack of Emotional Clarity (CLARITY)	<ol><li>I have difficulty making sense out of my feelings.</li></ol>
	5) I have no idea how I am feeling.
	10) I am confused about how I feel.
	8) I know exactly how I am feeling. (r)
	1) I am clear about my feelings. (r)

# Body Shape Questionnaire-16

We would like to know how you have been feeling about your appearance over the **PAST FOUR WEEKS**. Please read each question and circle the appropriate number to the right. Please answer <u>all</u> the questions.

		Nev	ver				
			Raı	ely			
		Ì		Son	netir	nes	
					Oft	en	
						Ve	ry often
0	/ER THE PAST <u>FOUR WEEKS:</u>	Ì	Í	Í	Ì		Always
		İ	i	i	i	i	
1.	Have you been so worried about your shape that you have been	1	1	1	I	I	I
	feeling you ought to diet?	1	2	3	4	5	6
				-		-	-
2.	Have you been afraid that you might become fat (or fatter)?	1	2	3	4	5	6
3.	Has feeling full (e.g. after eating a large meal) made you feel	1	r	2	1	5	6
	fat?	1	Z	3	4	3	0
4.	Have you noticed the shape of other women and felt that your	1	2	3	1	5	6
	own shape compared unfavorably?	1	2	5	т	5	0
_							
5.	Has thinking about your shape interfered with your ability to						
	concentrate (e.g. while watching television, reading, listening to	1	2	3	4	5	6
	conversations)?	-	_	C	-	U	0
6	Has being palead such as when taking a both made you feel						
0.	fat?	1	2	3	4	5	6
	1at /						
7	Have you imagined cutting off fleshy areas of your body?	1	2	3	4	5	6
, <b>.</b>		1	_	2	•	U	Ū
8.	Have you not gone out to social occasions (e.g. parties) because						
	you have felt bad about your shape?	1	2	3	4	5	6
9.	Have you felt excessively large and rounded?	1	2	3	4	5	6
10.	Have you thought that you are in the shape you are because you						
	lack self-control?	1	2	3	4	5	6
1.1							
11.	Have you worried about other people seeing rolls of fat around	1	•	2		-	6
	your waist or stomach?	1	2	3	4	3	6
10	When in company have your worried about taking up too much						
12.	room (a g sitting on a sofe, or a bug sost)?	1	r	2	Л	5	6
	room (e.g. sitting on a sola, or a bus seat)	1	L	3	4	3	0

13. Has seeing your reflection (e.g. in a mirror or shop window) made you feel bad about your shape?	1	2	3	4	5	6
14. Have you pinched areas of your body to see how much fat there is?	1	2	3	4	5	6
15. Have you avoided situations where people could see your body (e.g. communal changing rooms or swimming baths)?	1	2	3	4	5	6
16. Have you been particularly self-conscious about your shape when in the company of other people?	1	2	3	4	5	6

\*\*At baseline, the DDEBS-12 and UDEBS will be re-administered but will assess the past month as opposed to the past seven days (not applicable for UDEBS). The demographic questionnaire will also be re-administered (see Appendix A).

If you would like to talk to a professional about any distress you may have experienced, you can contact the ODU Counseling Center at 757-683-4401.

### **APPENDIX C**

# **EMA QUESTIONNAIRES**

# [LOCATION/ACTIVITY QUESTIONS]

What were you doing when you received this notification?

- In class
- Other school activity
- Working
- House or yard work
- Socializing
- Relaxing
- Eating/Drinking
- Physical Activity
- Watching TV/Movie
- Other Activity

Where were you doing this activity?

- At home or in dorm room
- Other person's home/dorm
- On-campus academic building
- On-campus non-academic building
- Restaurant or bar
- Outside
- Other location on campus
- Other location off campus

# [MOOD QUESTIONS]

On the following pages are words that describe how you may feel right now. Rate how you are feeling RIGHT NOW.

Right now, I feel:

- Depressed or sad
  - $\circ$  0 (Not at all) to 6 (Extremely)
- Excited
  - $\circ$  0 (Not at all) to 6 (Extremely)
- Worried or anxious
  - o 0 (Not at all) to 6 (Extremely)
- Angry or hostile
  - $\circ$  0 (Not at all) to 6 (Extremely)
- Relaxed
  - $\circ$  0 (Not at all) to 6 (Extremely)
- Unhappy
  - $\circ$  0 (Not at all) to 6 (Extremely)

- Enthusiastic
  - $\circ$  0 (Not at all) to 6 (Extremely)
- Frustrated
  - $\circ$  0 (Not at all) to 6 (Extremely)
- Content
  - o 0 (Not at all) to 6 (Extremely)

# [SOCIAL INTERACTION QUESTIONS]

- Are you INTERACTING with other people RIGHT NOW? --An interaction is any form of communication with someone else (e.g., talking in-person, a phone conversation, texting)--
  - Yes or No
  - YES:
    - Who are you with right now? (Check all that apply).
      - Significant other
      - Friend(s)
      - Family member(s)
      - Roommate(s)
      - Classmate(s)
      - Professor(s)
      - Coworker(s)
      - Acquaintance(s)
      - Stranger(s)
      - Other(s)
    - Are you with:
      - Male(s) only
      - Female(s) only
      - Both males and females
    - How pleasant is the interaction?
      - 0 (Not at all) to 6 (Extremely)

# [DENIAL QUESTIONS]

- Since the last notification did you attempt to deny or conceal eating related behaviors?
  - Yes or No
  - YES:
    - Which of the following did you engage in since the last notification? (check all that apply)
      - Told people you have eaten when you have not
      - Made up excuses to avoid an event where you know food will be served
      - Told people you are not hungry when you are
      - Was dishonest about how much you ate
      - Ate in secret

- Quickly cleared your plate to hide how much you ate
- Deliberately hid food to give the impression you ate more than you did
- Ate more food than you lead others to believe
- Ate less food than you lead others to believe
- Told people you have dietary restrictions in order to avoid eating certain foods
- Told people you felt sick in order to avoid eating

# [EATING BEHAVIOR QUESTIONS]

•

Have you eaten any food (including meals or snacks) since the last notification?

# YES:

- When did you last eat?
  - I am currently eating
  - Less than 1 hour ago
  - 1-3 hours ago
  - More than 3 hours ago
- When you most recently ate, how much did you try to limit the amount of food you ate?
  - 0 (Not at all) to 6 (Very much)
- Were you concerned about other people seeing you eat?
  - 0 (Not at all) to 6 (Very much)
- Did you eat an unusually large amount of food given the circumstances?
  - $\circ$  0 (Not at all) to 6 (Very much)
- Did you have a sense of having lost control over your eating?
  - 0 (Not at all) to 6 (Very much)

# NO:

- How typical or normal is it for you to not eat during the last several hours?
  - 0 (Not at all typical) to 6 (Very typical)
- How much did each of the following factors influence you to NOT eat since the last beep?
  - $\circ$  I was not feeling hungry.
    - 0 (Not at all) to 6 (Very much)
  - I am trying to control my weight and/or shape.
    - 0 (Not at all) to 6 (Very much)
  - I did not like the food options available.
    - 0 (Not at all) to 6 (Very much)
  - I did not have time to prepare or eat food.
    - 0 (Not at all) to 6 (Very much)

### EMA Filler Items

The following items will be interspersed within the EMA questionnaires to assist in ensuring participants will not be able to determine how to answer items to reduce survey time.

## [BODY IMAGE STATE SCALE-BISS QUESTIONS]

Right now, how do you feel about your physical appearance?

• 0 (Extremely dissatisfied) to 6 (Extremely satisfied)

Right now, how do you feel about your body size and shape?

• 6 (Extremely satisfied) to 0 (Extremely dissatisfied)

Right now, how do you feel about your weight?

• 0 (Extremely dissatisfied) to 6 (Extremely satisfied)

Right now, how physically attractive do you feel?

• 6 (Extremely attractive) to 0 (Extremely Unattractive)

Right now, how do you feel about your looks compared to how you usually feel?

• 0 (A great deal worse) to 6 (A great deal better)

Right now, how do you feel about your looks compared to the average person?

• 6 (A great deal better) to 0 (A great deal worse)

# [PHYSICAL ACTIVITY QUESTION]

Have you thought about being more physically active since the last notification?

• 0 (Not at all) to 6 (Very much)

If you would like to talk to a professional about any distress you may have experienced, you can contact the ODU Counseling Center at 757-683-4401.

### VITA

### Lindsay Marie Howard

### Virginia Consortium Program in Clinical Psychology Norfolk, VA 23529

### **Education**

Ph. D.	Clinical Psychology ( <i>expected</i> August 2021) Virginia Consortium Program in Clinical Psychology
M. S.	Psychology (awarded December 2017) Department of Psychology Old Dominion University
<b>B.</b> A.	Psychology and Economics (awarded May 2012) Saint Olaf College

### **Background**

Lindsay Howard is a sixth-year graduate student at the Virginia Consortium Program in Clinical Psychology. She is pursuing her Ph.D. in Clinical Psychology from the Virginia Consortium Program. Lindsay currently is on internship at Canvas Health in Oakdale, MN and accepted a position as an Assistant Professor at Augustana University, which she will start Fall of 2021. Her research focuses on denial of disordered eating behaviors, race differences in levels of body dissatisfaction and disordered eating, and the interpersonal formulation of eating disorders.

#### **Selected Publications**

- Howard, L. M., Heron, K. E., & Cramer, R. J. (2020). The Deliberate Denial of Disordered Eating Behaviors Scale: development and initial validation in young women with subclinical disordered eating. *Journal of Psychopathology and Behavioral Assessment*, 42, 774-786.
- Howard, L. M., Heron, K. E., & Cramer, R. J. (2019). Denial of disordered eating behaviors, suicide, and non-suicidal self-injury in young women. *Death Studies*, 44, 338-346.

#### **Selected Presentations**

Howard, L.M., & Heron, K.E. (April, 2018). *Initial development and validation of the deliberate denial of disordered eating behaviors scale*. Paper presented at the International Conference for Eating Disorders, Chicago, IL.