

PREDICTING BINGE EATING AND BODY DISSATISFACTION IN A NATURALISTIC
ENVIRONMENT AMONG WOMEN WHO BINGE EAT FROM AN ATTACHMENT
THEORY PERSPECTIVE

LEAH ALLISON SARAH KEATING

A DISSERTATION SUBMITTED TO THE FACULTY OF GRADUATE STUDIES IN
PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR
OF PHILOSOPHY

GRADUATE PROGRAM IN CLINICAL PSYCHOLOGY
YORK UNIVERSITY
TORONTO, ONTARIO

November 2016

© Leah Keating, 2016

Abstract

Introduction: The current study examined naturalistic and momentary relationships among binge eating, body dissatisfaction, negative affect, depressive symptoms, social self-esteem, emotion dysregulation, and attachment anxiety and avoidance. **Method:** Participants were 55 undergraduate women who owned a mobile phone and who had binge eaten at least once during the past 28 days. All participants were screened to confirm the presence of binge eating and then completed measures of attachment anxiety and attachment avoidance. Participants then received seven text messages per day for 14 days. These text messages contained links to measures of state negative affect, state depressive symptoms, state social self-esteem, state emotion dysregulation, recent binge eating, and state body dissatisfaction. **Results:** Depressive symptoms and low social self-esteem predicted subsequent binge eating. Negative affect, depressive symptoms, and low social self-esteem predicted subsequent body dissatisfaction. Attachment anxiety moderated the relationship between negative affect and subsequent body dissatisfaction such that greater negative affect was associated with greater body dissatisfaction for those lower in attachment anxiety, but not for those higher in attachment anxiety. Findings revealed several significant pathways wherein different aspects of emotion dysregulation mediated interactions between attachment anxiety and negative affect and/or social self-esteem, on binge eating and/or body dissatisfaction. **Discussion:** Momentary psychological states predict subsequent binge eating and heightened body dissatisfaction, and the strength of these relationships depends on women's levels of attachment anxiety. Interventions for binge eating and body dissatisfaction should address attachment insecurity and emotion dysregulation, as well as eating disorder symptoms, in order to maximize therapeutic benefit.

Acknowledgements

Thank you to each individual who assisted me in conducting this research. I am extremely grateful to my participants, who allowed this project to come into fruition. Thank you to my academic supervisor, Dr. Jennifer Mills, for your persistent guidance. Your investment in my dissertation and in my skills as a researcher has greatly facilitated the development of my research and of my trajectory as a scientist-practitioner. Thank you to my Master's thesis supervisor, Dr. Giorgio Tasca, who inspired my interests in attachment theory and statistical modeling. I am thankful to Drs. Catherine Classen and Robert Muller for allowing me to collaborate in research that further inspired my interest in attachment theory. Thank you to my dissertation committee members, Drs. David Flora, Jennine Rawana, Alberta Pos, Rebecca Basset-Hunter, and Adele LaFrance, for providing guidance and feedback on the project. I am grateful to Kareena Gurbaxani, Kristi Mellom, and Sharry Shakory for all your help with recruitment. Thank you to my lab mates, Kaley Roosen, Rachel Vella-Zarb, Amy Shannon, and Jacqueline Hogue, for your support and advice throughout multiple steps of this program. Thank you to my colleague, Chrissy Macaulay, for being one of the first people who listened to my research idea, for allowing me to practice my lab meeting presentation with you, for being a wonderful friend, and for engaging in so many discussions about attachment theory. Thank you to Leah Hartman, Alexis Stradz, and Katie Herdman for all the support over coffee and peanut butter sandwiches. I am grateful to Karina Zorzella for your comradeship and support during the months that we analyzed our data side by side. Thank you to Kim Cullen for all the study sessions and enriching discussions. Thank you to Amanda Robinson, Mariel Angus, Elizabeth Todd, Dee Dooley, Jenna MacKay, Marie-Pierre Paquet, and Bruno Daoust for your long-term friendship and support. Thank you to my Nana for modeling commitment and hard work, to my

Uncle Arthur for inspiring me to pursue my interests, and to my Aunt Maureen for modeling steadfastness and tenacity. Thank you to my Grandpa for your continuous support of my education. Thank you to my father for modeling integrity and perseverance, and to my mother for continuously inspiring me to follow my dreams. Thank you to my partner, Nina, for encouraging me to pursue a career in psychology, and for your endless support and understanding.

TABLE OF CONTENTS

Abstract.....	ii
Acknowledgments.....	iii
Table of Contents.....	v
List of Tables.....	vi
List of Figures	viii
Introduction.....	1
Binge Eating, Body Image, Negative Affect, and Depressive Symptoms.....	3
Binge Eating, Body Image, and Social Self-Esteem.....	6
Binge Eating, Body Image, and Emotion Regulation.....	7
Attachment, Binge Eating, and Body Dissatisfaction.....	9
Summary and Hypotheses.....	15
Method.....	16
Participants.....	16
Measures.....	19
Procedure.....	23
Data Analytic Strategy.....	26
Results.....	28
Preliminary Analyses.....	28
EMA Results	35
Discussion.....	51
Summary of Main Findings.....	51
Discussion of Hypothesis 1 Results.....	52
Discussion of Hypothesis 2 Results.....	56
Discussion of Hypothesis 3 Results.....	57
Discussion of Follow-Up Results.....	61
Minimal Role Found for Attachment Avoidance and for Direct Effect of Attachment Anxiety.....	64
Strengths, Limitations, and Future Directions.....	67
Implications.....	75
References.....	83
Tables.....	111
Figures.....	139
Appendices.....	142
Appendix A: Recruitment Poster.....	142
Appendix B: Multilevel Models and Calculations.....	143

LIST OF TABLES

Table 1: Descriptive Statistics and Comparisons of Weekly Scores on Momentary Study Variables.....	111
Table 2: Bivariate Correlations Among Momentary Predictors at First and Last Time Points.....	112
Table 3: Fixed and Random Effects for Model Predicting Momentary Binge Eating from Previous Momentary PANAS Negative Affect.....	113
Table 4: Fixed and Random Effects for Model Predicting Momentary Binge Eating from Previous Momentary DASS Depression.....	114
Table 5: Fixed and Random Effects for Model Predicting Momentary Binge Eating from Previous Momentary CTS Social Self-Esteem.....	115
Table 6: Fixed and Random Effects for Model Predicting Momentary BISS from Previous Momentary PANAS Negative Affect.....	116
Table 7: Fixed and Random Effects for Model Predicting Momentary BISS from Previous DASS Depression.....	117
Table 8: Fixed and Random Effects for Model Predicting Momentary BISS from Previous CTS Social Self-Esteem.....	118
Table 9: Results of Model Predicting Momentary Binge Eating from Cross-Level ECR Anxiety/ Avoidance x PANAS Negative Affect/ DASS Depression/ CTS Social Self-Esteem Interaction.....	119
Table 10: Results of Model Predicting Momentary Body Satisfaction from Cross-Level ECR Anxiety/ Avoidance x PANAS Negative Affect/ DASS Depression/ CTS Social Self-Esteem Interaction.....	120
Table 11: Fixed Effects for Models Evaluating Emotion Dysregulation as a Mediator of the Relationship between Attachment Anxiety/ Avoidance x Negative Affect Interactions and Binge Eating (ECR Anxiety/ Avoidance x Momentary PANAS Negative Affect → Momentary S-DERS Subscale → Momentary Binge Eating).....	122

Table 12: Fixed Effects for Models Evaluating Emotion Dysregulation as a Mediator of the Relationship between Attachment Anxiety/ Avoidance x Depression Interactions and Binge Eating (ECR Anxiety/ Avoidance x Momentary DASS Depression → Momentary S-DERS Subscale → Momentary Binge Eating)	124
Table 13: Fixed Effects for Models Evaluating Emotion Dysregulation as a Mediator of the Relationship between Attachment Anxiety/ Avoidance x Social Self-Esteem Interactions and Binge Eating (ECR Anxiety/ Avoidance x Momentary CTS Social Self-Esteem → Momentary S-DERS Subscale → Momentary Binge Eating).....	126
Table 14: Fixed Effects for Models Evaluating Emotion Dysregulation as a Mediator of the Relationship between Attachment Anxiety/ Avoidance x Negative Affect Interactions and Body Satisfaction (ECR Anxiety/ Avoidance x Momentary PANAS Negative Affect → Momentary S-DERS Subscale → Momentary Body Satisfaction)	128
Table 15: Fixed Effects for Models Evaluating Emotion Dysregulation as a Mediator of the Relationship between Attachment Anxiety/ Avoidance x Depression Interactions and Body Satisfaction (ECR Anxiety/ Avoidance x DASS Depression → Momentary S-DERS Subscale → Momentary Body Satisfaction)	130
Table 16: Fixed Effects for Models Evaluating Emotion Dysregulation as a Mediator of the Relationship between Attachment Anxiety/ Avoidance x Social Self-Esteem Interactions and Body Satisfaction (ECR Anxiety/ Avoidance x CTS Social Self-Esteem → Momentary S-DERS Subscale → Momentary Body Satisfaction).....	132
Table 17: Fixed Effects for Models Evaluating Emotion Dysregulation as a Mediator of the Relationship between Attachment Anxiety/ Avoidance and Binge Eating (ECR Anxiety/ Avoidance → Momentary S-DERS Subscale → Momentary Binge Eating).....	134
Table 18: Fixed Effects for Models Evaluating Emotion Dysregulation as a Mediator of the Relationship between Attachment Anxiety/ Avoidance and Body Satisfaction (ECR Anxiety/ Avoidance → Momentary S-DERS Subscale → Momentary Body Satisfaction)	136
Table 19: Summary of Results of Hypothesis Tests and Significant Findings.....	138

LIST OF FIGURES

Figure 1: Participant flow chart throughout recruitment process.....	139
Figure 2. Body dissatisfaction scores at higher and lower levels of attachment anxiety and for higher and lower levels of momentary negative affect.....	140
Figure 3: Mediation model for Hypothesis 3.....	141

Predicting Binge Eating and Body Dissatisfaction in a Naturalistic Environment Among Women Who Binge Eat from an Attachment Theory Perspective

The current study examines predictors of binge eating from the perspective of attachment theory. Binge eating is characterized by episodes of eating an unusually large amount of food in a discrete period of time (American Psychiatric Association [APA], 2013). These episodes are accompanied by a sense of lost control (APA, 2013) and seem to occur when an individual's internal satiety cues fail to constrain his or her responsiveness to external food cues (Herman & Polivy, 1996). In contrast, more normal eating is characterized by a pattern in which an individual's satiety cues constrain the influence of external food cues on his or her food consumption (Herman & Polivy, 1996). Binge eating is also a diagnostic criterion for binge-eating disorder and bulimia nervosa (APA, 2013), which have 12-month prevalence rates of 1.6% (Hudson, Hiripi, Pope, & Kessler, 2007) and 1.5% (Hoek, 2006), respectively, among female participants. These disorders are associated with poor health-related quality of life, suicide attempts, and psychosocial stress (Engel, Adair, Hayas, & Abraham, 2009; Grucza, Przybeck, & Cloninger, 2007; Johnson, Spitzer, & Williams, 2001). In order to meet criteria for binge-eating disorder or bulimia nervosa, binge eating must occur at least once per week for a minimum of 3 months (APA, 2013). Estimates from one Canadian study suggest that 13.7% of women also binge eat at subclinical levels (i.e., one to five days in the previous month; Gauvin, Steiger, & Brodeur, 2009).

Women who binge eat are also prone to body dissatisfaction, which refers to a negative subjective evaluation of one's body (Stice & Shaw, 2002). Research has found that binge eating is positively associated with body dissatisfaction among obese women seeking bariatric surgery (Grilo, Masheb, Brody, Burke-Martindale, & Rothschild, 2005), among obese outpatients

attending a weight loss program (Sorbara & Geliebter, 2002), and among obese undergraduate students (Womble et al., 2001). Body dissatisfaction is associated with eating disorder symptoms, low self-esteem, anxiety, and depression (Johnson & Wardle, 2005; Kim, 2007).

Given the significant negative outcomes associated with binge eating and body dissatisfaction, the current study examined state- and trait-level predictors of binge eating and body dissatisfaction among women who exhibit subclinical- and clinical-level binge eating (i.e., who indicate that they binge eat at least 1-5 days per month; Gauvin et al., 2009). In light of previous research described below, this study examined these variables from an attachment theory perspective. According to attachment theory, attachment figures' availability or unavailability during time of perceived or real threat influences the development of infants' internal working models, or cognitive interpersonal schema (Bowlby, 1982). These internal working models form the bases for individuals' experiences of themselves and others, and patterns of regulating affect (Tasca & Balfour, 2014).

Research has indicated that attachment patterns moderate treatment outcomes for women with binge-eating disorder. For example, Tasca and colleagues (2006) randomized women with binge-eating disorder to group cognitive-behavioural therapy (GCBT; Wilfley, Stein, Friedman, Beren, & Wiseman, 1996), group psychodynamic interpersonal psychotherapy (GPIP; Tasca, Mikail, & Hewitt, 2005), or a waitlist control condition (Tasca et al., 2006). While the two treatment conditions performed equally well and resulted in increased reductions in days binged compared to the waitlist condition, there was an attachment anxiety by treatment interaction. Specifically, women with binge-eating disorder who attended GCBT experienced greater reductions in binge days if they were lower in attachment anxiety. Conversely, those who attended GPIP experienced greater reductions in binge days if they were higher in attachment

anxiety (Tasca et al., 2006).

However, little research has examined whether individuals' attachment patterns predict moment-to-moment binge eating and body dissatisfaction among women who binge eat. Such research may point towards personality traits that moderate treatment outcomes among women struggling with disordered eating. Identification of attachment styles and associated mechanisms such as emotion dysregulation that may predict binge eating and body dissatisfaction would allow for the personalization of treatments based on such factors. This tailoring of evidence-based interventions is necessary to facilitate and sustain treatment outcomes. While CBT is considered the most well established treatment for binge-eating disorder (Shafran & Wilson, 2005), results of a large randomized control trial for binge eating disorder indicated that 21% of participants continued to binge eat at posttreatment and 41% continued to binge eat at 1-year follow-up (Wilfley et al., 2002). The finding that healthcare costs associated with BED are 36% higher than the national average (Grenon et al., 2010) further supports the importance of preventing and reducing disordered eating through the improvement of eating disorders treatments. Therefore, the current study examined attachment insecurity, negative affect, depressive symptoms, social self-esteem, and emotion dysregulation as predictors of binge eating. A sample of women was studied in order to build on previous theory and research on relationships among these constructs among women.

Binge Eating, Body Image, Negative Affect, and Depressive Symptoms

Cross-sectional (Sim & Zeman, 2006; Wheeler, Greiner, & Boulton, 2005) and longitudinal (Bearman, Presnell, Martinez, & Stice, 2006; Keel, Mitchell, Davis, & Crow, 2001) studies have found that negative mood and negative affect are positively related to binge eating (Wheeler et al., 2005) and body dissatisfaction (Bearman et al., 2006; Sim & Zeman, 2006; Keel

et al., 2001). Binge eating is also associated with major depression (Bulik, Sullivan, & Kendler, 2002; Grucza et al., 2007; Johnson et al., 2001). In contrast, intuitive eating (i.e., eating based on internal hunger and satiety cues instead of emotional cues; Tribole & Resch, 1995) is associated with positive affect (Tylka & Wilcox, 2006).

Research utilizing ecological momentary assessment (EMA; Stone & Shiffman, 1994), a technique that uses repeated sampling to assess phenomena at the moment they occur, has further contributed to current understanding of the relationship between negative affect, binge eating, and body dissatisfaction. EMA research allows investigators to study phenomena in real-world settings. While laboratory studies allow for experimental control, they can lack generalizability, whereas EMA affords a level of ecological validity not available in more artificial laboratory conditions (Stone & Shiffman, 1994). Additionally, retrospective self-report data are subject to recall biases. For example, long recall periods can yield unreliable estimates of an event, reconstruction biases can lead individuals to recall more salient or recent events, and individuals' current states or moods can bias their recall of previous states. EMA reduces these recall biases by examining phenomena on a moment-to-moment basis (Stone & Shiffman, 1994). Additionally, EMA allows for the collection of a large number of repeated measures observations, thereby providing more reliable estimates of constructs of interest. EMA assesses participants in their natural environments, allowing researchers to observe variation in participants' responses to naturally occurring events (Stone & Shiffman, 1994). Moreover, EMA allows for the evaluation of complex theoretical models (Smyth et al., 2001) of eating.

Results of an early EMA study established that among individuals with bulimia nervosa, negative mood preceded both binge eating and purging (Johnson & Larson, 1982). EMA research has also found that found that days characterized by either stable negative affect or by

increasing negative affect are associated with binge eating among women with bulimia nervosa (Crosby et al., 2009). Additionally, research has indicated that state negative affect is associated with heightened state body dissatisfaction among undergraduate women (Colautti et al., 2011), and with binge eating among women with bulimia nervosa (Engelberg, Steiger, Gauvin, & Wonderlich, 2007; Smyth et al., 2007) and binge-eating disorder (Stein et al., 2007).

With respect to binge eating, these findings can be understood using Heatherton and Baumeister's (1991) escape theory of binge eating, according to which binge eating allows individuals to escape from aversive self-awareness and to focus instead on concrete external stimuli such as one's eating. The findings on body dissatisfaction can be explained from the perspective of the body displacement hypothesis, which states that body dissatisfaction may result from the displacement of negative affect (Bruch, 1978). That is, individuals displace distress onto their bodies (Bruch, 1978). Such displacement localizes negative feelings and makes them more controllable through weight loss (Bruch, 1978). Societal valuation of thinness may further perpetuate this restricted focus; in cultures in which one's self-worth is treated as contingent on one's appearance, an individual may funnel general dysphoria into body dissatisfaction (Haedt-Matt, Zalta, Forbush, & Keel, 2012; Keel et al., 2001; Sim & Zeman, 2006). Consistent with the body displacement hypothesis, McFarlane, Urbszat, and Olmsted (2011) found that compared to female participants without eating disorders, those with eating disorders exhibited greater body-related attentional focus following an ineffectiveness induction, suggesting that women may displace feelings of inadequacy onto bodily appearance concerns.

Despite the evidence noted above, the link between negative mood and subsequent binge eating has been inconsistent. Unlike the above studies, negative mood has been unrelated to subsequent binge eating among college women who reported at least subclinical eating disorder

symptoms (Heron, Scott, Sliwinski, & Smyth, 2014; Wegner et al., 2002). It could be that the nature and strength of the relationships among momentary psychological states (e.g., negative mood) and binge eating or body dissatisfaction vary depending on individual differences. Furthermore, other psychological states, including appraisals of one's competencies (i.e., self-esteem) and emotion regulation, may play a role in determining eating behaviour or body image.

Binge Eating, Body Image, and Social Self-Esteem

Body image and binge eating have also been associated with variables related to self-esteem, particularly social self-esteem. Social self-esteem refers to the experience of self-consciousness, worrying about others' perceptions of oneself, feeling inferior to others, feeling concerns with the impression that one is making, and worrying about looking foolish (Heatherton & Polivy, 1991). Correlational studies have found that social-evaluative anxiety and appearance-based rejection sensitivity are associated with both eating disorder symptoms and body image concerns (Cash, Thériault, & Annis, 2004; Park, 2007). Compared to women without eating disorders, those with binge-eating disorder are more likely to report feeling bothered by having no one to turn to when they had a problem and to experience poorer social functioning (Johnson et al., 2001). Longitudinal research has found that deficits in social support predict increases in subsequent body dissatisfaction (Bearman et al., 2006; Stice & Whitenton, 2002). Moreover, EMA research has found that women higher in body shame report greater body dissatisfaction in the company of others, though this effect disappeared controlling for objective body size or body mass index (BMI; kg/m^2 ; Colautti et al., 2011).

Recent EMA methodology, which by design allows for the measurement of rapidly fluctuating processes such as social context and eating behaviours (Stone & Shiffman, 1994), has further elucidated the influence of interpersonal context on eating disorder symptoms. Among

overweight and adolescent females who reported at least two episodes of loss of control eating during the past month, within- and between-person interpersonal problems predicted momentary loss of control eating (Ranzenhofer et al., 2014). Leahey, Crowther, and Ciesla (2011) examined reactions to appearance-based social comparisons among women with high body dissatisfaction and eating pathology, high body dissatisfaction alone, and low body dissatisfaction. Following upward comparisons (i.e., comparing oneself with someone believed to be better off), those high in both eating pathology and body dissatisfaction experienced greater increases in eating disorder symptoms, suggesting that women prone to eating disorder symptomatology self-soothe following negative social comparisons through disordered eating.

Binge Eating, Body Image, and Emotion Regulation

Research has also indicated a link between disordered eating and emotion dysregulation. Emotion regulation involves understanding and being aware of one's emotions, accepting one's emotions, controlling impulsive behaviours, working effectively towards desired goals during negative emotional states, and flexibly using contextually appropriate emotion regulation strategies to meet situational demands (Gratz & Roemer, 2004). Emotion dysregulation involves difficulties in these areas. Cross-sectional research has demonstrated a positive relationship between limited access to emotion dysregulation strategies and binge eating among undergraduate students (Whiteside et al., 2007). Among both women in a community sample and those with eating disorders, emotion-oriented coping (i.e., attempting to ameliorate the emotions associated with the problem) and avoidance distraction (distracting oneself with an alternative task) were associated with greater emotional eating, controlling for negative affect (Spoor, Bekker, Strien, & van Heck, 2007). Additionally, distress intolerance was associated with bulimic symptoms among individuals at a substance abuse treatment facility (Lavender, Happel,

Anestis, Tull, & Gratz, 2015). Emotion dysregulation has also been positively associated with body dissatisfaction, controlling for stress and negative affect (Asperg & Wagaman, 2010; Lavender & Anderson, 2010). Additionally, lack of clarity concerning one's feelings, alexithymia, and lower interoceptive awareness, which are aspects of emotion dysregulation involving difficulty identifying and describing emotions, have all been associated with binge eating and body image disturbances among college women and among patients with binge-eating disorder (Bagby, Parker, & Taylor, 1994; Carano et al., 2006; Tylka & Subich, 2004; Wheeler et al., 2005; Whiteside et al., 2007).

By allowing for the analysis of within- and between-person effects (Stone & Shiffman, 1994), EMA research has found that emotional lability predicts binge eating among women with bulimia nervosa controlling for age, BMI, and education level (Anestis et al., 2010). Taken together, these cross-sectional and momentary findings suggest that individuals prone to binge eating may have limited strategies for coping with emotional distress, and may subsequently rely on less adaptive strategies such as binge eating (Whiteside et al., 2007). Given that binge eating exhibited a stronger correlation with EMA affective lability than with retrospective self-reported affective lability (Anestis et al., 2010), momentary assessments of emotion dysregulation may be particularly suitable for assessing this relationship.

Potentially, individuals higher in alexithymia and emotional reactivity may channel and express their emotions through their bodies and eating behaviours (Cochrane, Brewerton, Wilson, & Hodges, 1993), allowing them to localize their emotional experiences (Fitzgibbon, Sánchez-Johnsen, & Martinovich, 2003; Gilbert, 2007; Heatherton & Baumeister, 1991). Therefore, emotion dysregulation may elucidate the relationships among negative affect, social self-esteem, binge eating, and body dissatisfaction. Furthermore, these relationships may be

different for women higher in some personality characteristics, including attachment anxiety and avoidance. The next section explains attachment in more detail and provides a rationale for its implication in binge eating and body dissatisfaction.

Attachment, Binge Eating, and Body Dissatisfaction

Attachment insecurity and its interconnectedness with emotion dysregulation (Cassidy, 1994) may influence the relationships among negative affect, depression, social self-esteem, binge eating, and body dissatisfaction. According to attachment theory, affectional bonds develop between infants and caregivers; through this bond, the child develops internal working models of the self and other (Bretherton & Munholland, 1999; Marvin & Britner, 1999). Internal working models develop in response to individuals' repeated experiences of their caregivers' availability and responsiveness (Bowlby, 1979). The appropriateness of such responsiveness appears to be determined by the interaction between the infant's internal states and the caregiver's attunement to such states. Among socially diverse infant-mother pairs, mothers who tended to comment appropriately and in an attuned manner on their infants' internal states were significantly more likely to have securely attachment infants (Meins et al., 2012). Such research points towards the match between caregivers' responsiveness and infants' attachment patterns. While more emotionally reactive infants may require a higher level of soothing and validation, less sensitive infants may benefit from receiving more opportunities for autonomy seeking.

Bowlby (1969) postulated that internal working models serve as a lifelong template for appraising oneself and others in relationships. Internal working models help the child interpret, regulate, and predict attachment figures' supportiveness and responsiveness (Bretherton & Munholland, 1999). They influence individuals' strategies for regulating attachment-related distress (Kobak, 1999) and are manifested in individuals' attachment patterns, which can be

conceptualized as regions in two-dimensional space along dimensions of anxiety and avoidance (Brennan, Clark, & Shaver, 1998; Slade, 1999).

Secure attachment. Infants with caregivers who are accessible and responsive to their emotions tend to develop more secure attachment patterns (i.e., lower attachment anxiety and avoidance; Brennan et al., 1998; Hazan & Shaver, 1987; Kobak, 1999). Securely attached individuals view emotions as signals that assist individuals to accommodate to one another (Kobak, 1999). They express negative affect openly and directly (Cassidy, 1994; Kobak, 1999) in ways that do not overwhelm them (Wearden, Cook, & Vaughan-Jones, 2003). Securely attached individuals have internal working models of themselves as worthy and of others as responsive and dependable (Lopez, 1995). They become close to others easily and are comfortable with depending on others and with others depending on them (Hazan & Shaver, 1987).

Insecure attachment. More insecure (i.e., anxious or avoidant) attachment patterns can develop when children's negative emotions do not restore their access to their attachment figures and when their perceived or actual experiences lead them to view caregivers as undependable and rejecting (Dozier, 1999; Kobak, 1999).

Attachment anxiety. Infants with caregivers who respond slowly or inconsistently to their distress, or who intrusively force attention on the infant, often exhibit anxious attachment patterns (Hazan & Shaver, 1987). They learn to exhibit heightened negative emotionality because they fear that relaxing in the presence of attachment figures risks loss of contact with caregivers (Cassidy, 1994). Their tendency to under-regulate attachment-related emotions compromises their ability to self-regulate affect, increasing their vulnerability to emotion dysregulation (Lopez, 1995). Anxiously attached individuals have hyperactivated strategies; they

are hypervigilant to cues of abandonment, rejection, and interpersonal distress (Magai, 1999; Mikulincer & Shaver, 2005). They tend to idealize others while devaluing themselves (Jewell et al., 2016) and they have internal working models of themselves as fearful and unstable and of others as unreliable (Lopez, 1995). They often ruminate on personal shortcomings (Mikulincer & Shaver, 2005).

Attachment avoidance. Infants with caregivers who reject their attempts at seeking support and protection tend to develop avoidant attachment patterns (Lopez, 1995). Individuals with these patterns use deactivating strategies to inhibit their distress (Cassidy, 1994; Magai, 1999) and have limited access to their emotions (Dozier, 1999). They develop internal working models of others as untrustworthy and rejecting and of themselves as alone and unwanted (Lopez, 1995). They tend to minimize their own attachment needs and to avoid close relationships with others (Jewell et al., 2016). They have difficulty trusting and depending on others (Hazan & Shaver, 1987).

Attachment theory and eating disorders. Attachment theory may add to the literature indicating that thin-idealizing media messages and dieting precipitate disordered eating. Research and theory posit that women diet when they perceive discrepancies between themselves and media ideals of thin bodies (Mills, Polivy, Herman, & Tiggemann, 2002) and that when dieting, they binge in response to food cravings and adverse psychological experiences such as low mood (Fairburn, 2008). Since not all women exposed to thin-idealizing media messages experience eating disorder symptoms, certain traits may increase women's susceptibility to such messages. Attachment insecurity may be one important factor. Indeed, cross-sectional research has linked attachment insecurity with negative mood, social difficulties, emotion dysregulation, body dissatisfaction, and eating disorder symptoms (Cash et al., 2004; Iannantuono & Tylka,

2012; Illing, Tasca, Balfour, & Bissada, 2010; Keating, Tasca, & Hill, 2013; Suldo & Sandberg, 2000; Troisi, D'Argenio, Francesco, & Piero, 2001; Wei, Vogel, Ku, & Zakalik, 2005).

Longitudinal research on children has found that baseline attachment to mother is associated with eating pathology and shape and weight concerns 1 year later (Goossens et al., 2012). In contrast, in a community sample of adolescent women, baseline attachment was not associated with eating pathology 1 year later, although attachment interacted with initial eating disorder symptoms in predicting increased eating pathology 1 year later (Burge et al., 1997), suggesting that after early childhood, attachment insecurity may only be associated with eating pathology with those presenting with eating disorder symptoms.

In sum, there is evidence that attachment insecurity puts an individual at increased risk for eating pathology, although the precise pathway is not clear. As reviewed above, attachment style influences how a person learns to cope with distress. Emotion dysregulation may be one mechanism through which attachment insecurity precipitates eating disorder symptoms. Indeed, cross-sectional studies suggest that emotion dysregulation mediates the relationship between attachment insecurity and eating disorder symptoms (including binge eating and body dissatisfaction) among women seeking treatment for an eating disorder (Tasca et al., 2009), among women from the community (Ty & Francis, 2009), among children aged 10 to 15 years (Van Durme, Braet, & Goossens, 2015), among candidates for bariatric surgery (Shakory et al., 2015), and among female twins and triplets (Eggert, Levendosky, & Klump, 2007). Relatedly, among college students, emotion dysregulation mediated the relationship between perceptions of their parents' responses to their emotions (and particularly over-magnification of sadness) when growing up and binge eating (Buckholdt, Parra, & Jobe-Shields, 2009). Among African-American adults, emotion dysregulation and depression mediated the relationship between

childhood emotional abuse and emotional overeating (Michopoulos et al., 2015).

While these studies provide evidence of the associations among attachment insecurity, emotion dysregulation, and eating disorder symptoms, the cross-sectional nature of this research precludes potential inferences about the roles of attachment or emotion dysregulation in the etiology of eating disorders (Jewell et al., 2016). To date, no known study has used multiple repeated measures momentary data to examine such relationships. Furthermore, researchers have suggested that future studies should use nonclinical samples to elucidate these potential etiological pathways (Jewell et al., 2016).

Based on the available evidence, several predictions arise from an attachment theory of eating pathology. A focus on weight and eating may replace inadequate regulatory functions of early attachment relationships (Pearlman, 2005), leading insecurely attached individuals to redirect their attention to more concrete, attainable appearance-related domains in which to value and devalue themselves (Cole-Detke & Kobak, 1996; Hardit & Hannum, 2012) such as eating and weight. Individuals higher in avoidance attachment tend to defensively devalue the need for relationships and subsequently cut off affective experiences from working memory and experience a down-regulation of emotion (Shaver & Mikulincer, 2002; Tasca et al., 2009). Such individuals may channel negative affect into a focus on eating and weight. Consistent with this possibility, alexithymia mediated the relationship between attachment avoidance and body esteem in women with eating disorders (Keating et al., 2013).

On the other hand, with their increased need for approval (Collins & Read, 1990), tendency to be “other-oriented,” and reliance on others to determine their self-worth, women with anxious attachment styles may also be attuned to messages from their social environments, including western standards of beauty that idealize thin female bodies (Hardit & Hannum, 2012).

Subsequently, such individuals may be particularly susceptible to internalizing societal messages about appearance and attempt to meet external standards of beauty in order to gain others' acceptance and approval (Eggert et al., 2007; Sharpe et al., 1998) and minimize interpersonal distress. Moreover, with their fear of disconnection from their caregivers (Cassidy, 1994) and tendency to ruminate about personal shortcomings (Mikulincer & Shaver, 2005), individuals higher in attachment anxiety tend to "hyperactivate" their attachment symptoms; that is, they keep negative emotional responses active in working memory, resulting in an up-regulation of emotions and intensified negative emotional responses (Shaver & Mikulincer, 2002; Tasca et al., 2009). Therefore, individuals higher in attachment anxiety may become dysregulated and attuned to their perceived shortcomings during moments in which they experience low social self-esteem and unrealistically high standards about weight and shape.

Consistent with this possibility, Hardit and Hanum (2012) found that anxious attachment moderated the relationship between sociocultural attitudes and body dissatisfaction such that this relationship was particularly strong for participants higher in attachment anxiety. Conversely, college women with positive body image attributed their body appreciation to unconditional acceptance from their family (Wood-Barcalow, Tylka, & Augustus-Horvath, 2010) and intuitive eating was associated with unconditional self-regard (i.e., congruence between one's actual and ideal selves; Rogers, 1961; Tylka & Wilcox, 2006).

Research has also indicated that attachment anxiety is associated with poorer treatment outcomes among women with eating disorders (e.g., eating disorder and depressive symptoms; Keating et al., 2015; Illing, Tasca, Balfour, & Bissada, 2010) and that attachment avoidance predicted dropout among women with anorexia nervosa, binge-purge type (Tasca, Taylor, Ritchie, & Balfour, 2004). Similarly, two studies have found a dose-response relationship

between childhood trauma, which is closely linked to insecure attachment (George, 1996; Joubert, Webster, & Hackett, 2012; Lyons-Ruth & Jacobvitz, 1999; West & George, 1999) and treatment dropout among women with bulimia nervosa (Mahon, Bradley, Winston, Palmer, & Harvey, 2001). In sum, attachment theory may be helpful in elucidating current understanding of disordered eating on a moment-to-moment basis. A greater understanding of the mechanisms through which attachment insecurity predicts eating disorder symptoms may optimize long-term treatment outcomes by identifying appropriate treatment targets.

Summary and Hypotheses

Cross-sectional research has shown that binge eating and body dissatisfaction are linked to negative mood, negative affect, social insecurity, emotion dysregulation, and attachment insecurity. EMA findings show that binge eating and body dissatisfaction may be triggered by negative affect (e.g., Colautti et al., 2011; Crosby et al., 2009) and social insecurity (Colautti et al., 2011; Leahey et al., 2011), suggesting that these symptoms may distract women from painful self-referent experiences. Individuals higher in attachment insecurity may have difficulty regulating negative affect and social distress, and subsequently channel such distress into their appearance and eating. Specifically, the tendencies for individuals higher in attachment anxiety to fear abandonment and for those higher in attachment avoidance to avoid depending on others (Lo et al., 2009) may result in difficulty regulating interpersonal distress and in a subsequent redirection of their attention to more controllable domains (Cole-Detke & Kobak, 1996) such as binge eating and body dissatisfaction. No study has tested this model in a naturalistic setting. The current study used EMA to assess these relationships during women's day-to-day lives.

In general, researchers have called for naturalistic and longitudinal examinations of the effects of affective and social factors on eating disorder symptoms (Cash et al., 2004; Tylka &

Subich, 2004), and suggested that future research should examine the interaction between macrocharacteristics (e.g., individual traits) and microcharacteristics (e.g., momentary assessments of mood) in predicting binge eating (Smyth et al., 2007). McFarlane and colleagues (2011) pointed out that an increased understanding of body image concerns may assist clients and clinicians to address issues that may underlie and maintain eating disorder symptoms. Such an understanding appears important both to prevention efforts as well as to treatment.

Therefore, the current study examined the influence of emotional and interpersonal functioning on women's binge eating and body dissatisfaction. Specifically, it was hypothesized that among women who exhibit subclinical and clinical binge eating:

- (1) Greater momentary negative affect and depression and lower social self-esteem would predict subsequent momentary binge eating and body dissatisfaction;
- (2) The relationships in (1) would be stronger for women higher in baseline attachment anxiety and avoidance than for those lower in attachment anxiety and avoidance;
- (3) Momentary emotion regulation would mediate the relationships in (2).

Method

Participants

Participants were 55 female undergraduate students at York University. Of the 55 individuals who participated, 51 attended the debriefing session in which they were weighed and measured by the researcher. Therefore, analyses examining BMI include data for these 51 individuals, rather than for the full sample. All participants were required to own a smartphone. This requirement is believed to detract minimally from the representativeness of the sample, as research suggests that 79% of American 18-24-year-olds, 53% of American women, and 56% of American adults own a smartphone (Pew Research Center, 2013). This latter percentage is

identical for Canadians (Google, 2013), though no known Canadian data stratify this proportion by age or gender.

Participants were also required to meet the criterion for at least subclinical binge eating defined by Gauvin and colleagues (2009), who defined subclinical-level binge eating as having binge eaten between 1 and 5 days in the past month. In the current study, participants had binge eaten at least once during the past month, as assessed by prescreen questions adapted from the Eating Disorders Examination (Fairburn, Cooper, & O'Connor, 2008). Previous research utilizing a similar criterion for subclinical binge eating (i.e., once per month in the preceding 6 months) has found that individuals with binge-eating disorder differ minimally from those with subclinical binge-eating disorder on weight and shape concerns, distress, dietary restraint, and history of seeking treatment for a weight or eating problem (Striegel-Moore et al., 2000).

Of the 4,093 Introductory Psychology students registered to participate in the Undergraduate Research Participant Pool (URPP) during the Summer 2014 semester, 862 were eligible to sign up for the prescreen (i.e., identified as women, reported owning a smartphone, and endorsed at least one episode of having eaten an unusually large amount of food accompanied by a sense of lost control during the past 28 days, as assessed through an online prescreen service offered by the URPP).¹ As shown in Figure 1, I prescreened 153 students, who were recruited through either the URPP ($n = 122$) or through posters ($n = 31$). Of these 153 individuals, 42 were not eligible because they either did not own a smartphone ($n = 3$) or had not actually binged during the past 28 days ($n = 39$). Of the 122 individuals recruited through the

¹ URPP recruitment took place during the Summer 2014 semester and again during the Fall-Winter 2014-2015 academic year. Because some students would have been required to participate in URPP studies during both time periods, it is possible that there was some overlap in eligible participants. Therefore, only the proportion of students eligible during the first time period (i.e., Summer 2014) is reported.

URPP, 85 were eligible to participate for the study. Of these 85 individuals, 56 participated for 3 days (the time allotted by the URPP service) and 29 agreed to participate for 14 days. An additional 27 individuals were recruited to participate for 14 days through posters. One of these 27 individuals had to cancel her participation between the prescreen and commencement of the momentary assessments due to her phone breaking. The final sample consisted of the 29 14-day participants recruited through the URPP as well as the 26 individuals recruited through posters, yielding the total sample size of 55 (Figure 1).

Among the final sample, mean number of days binged in the past 28 days at prescreen was 8.36 ($SD = 7.00$), mean number of binge episodes in the past 28 days was 10.36 ($SD = 11.74$), mean number of subjective binge days (i.e., days containing at least one episode of experiencing a loss of control while eating a small moderate amount of food; Fairburn & Cooper, 1993) in the past 28 days was 6.31 ($SD = 10.98$), mean number of subjective binge episodes in the past 28 days was 7.48 ($SD = 14.17$), mean number of objective overeating days (i.e., days containing at least one episode of eating a large amount of food without experiencing loss of control; Fairburn & Cooper, 1993) was 2.44 ($SD = 5.98$), and mean number of objective overeating episodes was 2.59 ($SD = 6.41$).

The mean age was 21.20 years ($SD = 4.36$). The mean BMI was 25.89 ($SD = 6.37$), which falls within the lower range of overweight (World Health Organization, 2016). The median annual family income was between \$60,001 and \$70,000. 9.1% of participants identified as bisexual, 83.6% identified as heterosexual, 1.8% identified as questioning, and 3.6% selected other (where 1.8% reported being asexual, 1.8% reported being heteroflexible, and 1.8% reported being queer). 7.3% reported being in a married or common law relationship, 1.8% reported being separated or divorced, and 90.9% reported being single. 5.5% reported living

alone, 9.1% reported being in a conjugal relationship, 9.1% reported living in a dorm or a shared apartment with a friend, 74.5% reported living with their parents or relatives, and 1.8% reported other (i.e., that she was living with her son). The sample was quite ethnically diverse; 34.5% identified as Asian, 10.9% identified as Black, 27.3% identified as White, 7.3% identified as Hawaiian/ Pacific Islander, 10.9% identified as Hispanic/ Latino, 5.5% identified as Arab/ Middle Easter, 1.8% identified as Mixed, and 1.8% did not report their ethnic identity. Concerning employment status, 1.8% was employed full-time, 58.2% were employed part-time, 36.4% were unemployed, 1.8% was on disability, and 1.8% reported other employment (i.e., babysitting). 7.3% of the sample reported a previous eating disorder diagnosis and 5.5% reported intent to seek treatment for an eating disorder within the next month. Additionally, 18.2% reported a previous mood disorder diagnosis and 18.2% reported intent to seek treatment for a mood disorder within the next month.

Measures

Prestudy measures.

Initial binge eating. To ensure that participants met the criterion for subclinical binge eating, I used items from the *Questions for Identifying Bulimic Episodes and Other Episodes of Overeating* section of the Eating Disorder Examination Edition 16.0D (Fairburn, Cooper, & O'Connor, 2008), a semi-structured diagnostic interview which assesses for the presence of eating disorders.

Demographics. Participants completed a demographics questionnaire with items pertaining to the demographic characteristics described above.

Social desirability. To measure social desirability, the 17-item Social Desirability Scale-17 (SDS-17; Stöber, 1999) was used. This true-false scale assesses desirable but infrequent

behaviours. Total scores range from 0 to 17, with higher scores indicating greater social desirability. The SDS-17 has demonstrated evidence of convergent, criterion, and discriminant validity (Stöber, 2001). To assess internal consistency, in addition to calculating coefficient alpha, I calculated the mean inter-item correlation, which is not influenced by the number of scale items. Clark and Watson (1995) recommended mean inter-item correlations between .15 and .50. For the SDS-17, coefficient alpha was .75 and the mean inter-item correlation was .16.

Attachment. To measure participants' attachment patterns, the Modified Experiences in Close Relationships Scale (ECR; Lo et al., 2009) was used. The original ECR was developed to measure romantic attachment from 323 items measuring 60 attachment-related constructs (Brennan et al., 1998). Lo and colleagues (2009) then developed the modified ECR to assess attachment to close others rather than exclusively to romantic partners. This scale contains 36 items with response options ranging from 1 (*disagree strongly*) to 7 (*agree strongly*). The modified ECR contains two scales: one measuring attachment anxiety and the other measuring attachment avoidance. Mean scores for each subscale range from 1 to 7, with higher scores indicating greater attachment anxiety and avoidance. In the current study, for ECR anxiety, coefficient alpha was .91 and the mean inter-item correlation was .35. For ECR avoidance, coefficient alpha was .91 and the mean inter-item correlation was .36.

Momentary assessments.

Momentary binge eating. Participants responded to the following items adapted from the *Questions for Identifying Bulimic Episodes and Other Episodes of Overeating* section of the Eating Disorder Examination (Fairburn et al., 2008).

State body dissatisfaction. The Body Image States Scale (BISS; Cash, Fleming, Alindogan, Steadman, & Whitehead, 2002) measures respondents' momentary affective and

evaluative experiences of their appearance. The BISS contains six items with response options ranging from 1 (e.g., *extremely dissatisfied, a great deal worse*) to 9 (e.g., *extremely satisfied, a great deal better*). Mean scores range from 1 to 9, with higher scores representing greater body satisfaction. This scale has demonstrated convergent validity (Cash et al.). In the current study, for all momentary assessments, internal consistency is reported for Day 1 Observation 1. For the BISS, coefficient alpha was .67 and the mean inter-item correlation was .30.

Negative affect. To measure negative affect, I used the Negative Affect subscale of the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). The PANAS's Negative Affect scale requires respondents to indicate the extent to which they have experienced 10 different mood states, with higher scores indicating greater negative affect. The Negative Affect subscale has shown evidence of convergent validity and adequate test-retest reliability (Crawford & Henry, 2004; Watson et al., 1988.). For PANAS Negative Affect, coefficient alpha was .89 and the mean inter-item correlation was .44. When entering the PANAS Negative Affect items into the online format, I mistakenly entered response options as ranging from 1 (*very slightly or not at all*) to 4 (*Quite a bit*) rather than from 1 to 5 (*extremely*). Therefore, total scores ranged from 1 to 40 rather than from 1 to 50. This error may have compromised the consistency of the psychometric properties of the scale used in the current study with those of this scale used in previous research. However, since scores in the current study had substantial variability (see Table 1) and the scale demonstrated good internal consistency, the measure was still used.

State depressive symptoms. To measure depressive symptoms, the Depression subscale of the short version of the Depression Anxiety Stress Scales (DASS; Lovibond & Lovibond, 1995) was used. The short DASS is comprised of 21 negative symptoms with response options

ranging from 0 (*Did not apply to me at all*) to 4 (*Applied to me very much or most of the time*).

This scale has three 7-item subscales: Depression, Anxiety, and Stress. The Depression subscale measures symptoms of dysphoria, hopelessness, self-deprecation, lack of interest, anhedonia, and a lack of inertia. Scores on this subscale range from 0 to 28, with higher scores indicating greater depressive symptoms. The DASS's instructions require participants to rate their symptoms in the past week. However, consistent with Heron and Smyth's (2013) methodology for an EMA study, I adapted these instructions to reflect participants' emotional state in consideration of their experiences since the last assessment. The DASS has demonstrated convergent validity (Lovibond & Lovibond, 1995). In the current study, coefficient alpha was .86 and the mean inter-item correlation was .48.

State social self-esteem. To measure state social self-esteem, the social self-esteem subscale of the Current Thoughts Scale (CTS; Heatherton & Polivy, 1991) was used. The CTS consists of 20 items with response options ranging from 1 (*not at all*) to 5 (*extremely*). This scale has three subscales: performance self-esteem (seven items), appearance self-esteem (six items), and social self-esteem (seven items). The social self-esteem subscale measures the extent to which participants feel embarrassed, foolish, or self-conscious about their public image. Scores on this subscale range from 7 to 35. Higher scores represent greater social self-esteem. This subscale has demonstrated construct validity (Heatherton & Polivy, 1991). In the current study, coefficient alpha was .87 and the mean inter-item correlation was .49.

State emotion dysregulation. The state version of Gratz and Roemer's (2004) Difficulties in Emotion Regulation Scale (S-DERS; Lavender, Tull, DiLillo, Messman-Moore, & Gratz, 2015) consists of 21 items with response options range from 1 (*not at all*) to 5 (*completely*). Higher scores represent greater difficulty with state emotion dysregulation. The S-DERS yields a

summed total score and four subscale scores. S-DERS Nonacceptance of Current Emotions (Nonacceptance; seven items) assesses negative perceptions of and responses to one's current emotional state. Nonacceptance scores can range from 7 to 35. S-DERS Limited Ability to Modulate Current Emotional and Behavioral Responses (Modulate; seven items) measures difficulty with responding to momentary emotions. Modulate scores can range from 7 to 35. S-DERS Lack of Awareness of Current Emotions (Awareness; five reverse-scored items) measures inattention to and unawareness of one's emotions. Awareness scores can range from 5 to 25. S-DERS Lack of Clarity about Current Emotions (Clarity; two items) measures difficulty identifying one's emotional states. Clarity scores can range from 2 to 10. Total S-DERS scores can range from 21 to 105.

The S-DERS has demonstrated predictive validity (Lavender, Tull, et al., 2015). In the current study, for S-DERS Nonacceptance, coefficient alpha was .92 and the mean inter-item correlation was .62. For S-DERS Modulate, coefficient alpha was .87 and the mean inter-item correlation was .49. For S-DERS Awareness, coefficient alpha was .71 and the mean inter-item correlation was .33. For S-DERS Clarity, coefficient alpha was .78 and the mean inter-item correlation was .64. For S-DERS Total, coefficient alpha was .92 and the mean inter-item correlation was .33.

Procedure

Participants were recruited through York University's URPP and through posters distributed throughout campus. Those recruited through the URPP first completed the two prescreen binge eating questions online. Those recruited through posters contacted me through email after reading an advertisement describing the study and the eligibility criteria, which included the same binge eating questions as those used in the URPP prescreen (Appendix A).

I then met with potential participants individually in the lab. During this meeting, I informed potential participants that the study was on women's relationships and on variability in their emotions, self-esteem, eating, and body image. I then assessed whether participants had actually met criteria for subclinical binge eating within the past month using questions from the Eating Disorders Examination Edition 16D (Fairburn et al., 2008). All eligible individuals agreed to participate in the study. Only 3 days' worth of momentary assessments could be allotted per participant through the URPP because any more would have exceeded reasonable compensation through partial course credit. Therefore, those recruited through this method were then given the option to participate for 14 days (11 additional days) and have their name put into a draw to win a \$100 gift card. Participants then read and signed the informed consent form, completed the prestudy measures, and provided their mobile phone numbers. At the end of the prescreen, I provided all participants with a link to the National Eating Disorder Information Centre (2008), a website which provides information and resources on eating disorders, as well as contact information for Counselling and Disability Services at York University.

Participants were then scheduled to receive seven text messages per day at random intervals between 9:00 a.m. and 11:00 p.m. over a 14-day period. Texts were scheduled within a minimum of 1 hour of each other. To prevent participants from providing multiple responses at the same time, participants were instructed to complete the assessments as soon as possible within the hour following the text prompts, provided that it was safe and appropriate to do so (Colautti et al., 2011).

Stratified random sampling of the assessments was selected over a fixed schedule to circumvent issues related to response bias. For instance, participants may have delayed onset of binge eating if they anticipated being questioned about such behaviour. Similar designs have

been utilized in other EMA studies. For example, in Colautti and colleagues' (2011) study, participants completed momentary assessments, which took place randomly within a minimum of 90 minutes of one another, six times per day over a 7-day period between 10:00 a.m. and 8:00 p.m. In Crosby and colleagues' (2009) EMA study, participants completed momentary assessments six times per day over a 2-week period between approximately 8:30 a.m. and 9:50 p.m, within 20 minutes of six "anchor" times that were evenly distributed throughout the day. In Leahey and colleagues' (2011) study, participants completed momentary assessments six times per day over a 5-day period during 2-3-hour time blocks scheduled between 9:00 a.m. and 11:00 p.m.

Texts were sent through Red Oxygen (2016), a bulk SMS website. Most other EMA studies have utilized palmtop computers and Personal Digital Assistants (PDAs; e.g., Anestis et al., 2010; Colautti et al., 2011; Crosby et al., 2009; Leahey et al., 2011). However, given the high proportion of young adults who now own smartphones (Pew Research Center, 2013), I suspected that members of the participant pool would be more comfortable using their own smartphones than PDAs, and subsequently more likely to agree to participate. That is, I anticipated that a more representative sample would be obtained by collecting data through smartphones than through PDAs. This procedure also minimizes the chances that the participant will forget or lose the device given to them for the study.

Each text contained a greeting with participants' given name, as well as a link to the momentary assessments, which were posted through the website FluidSurveys.com (2016). To prevent any linkage between participants' names with their unique identifiers, I employed the services of a research assistant (RA). Specifically, after meeting with each participant, I provided this RA with participants' names, mobile phone numbers, and scheduled participation times. The

RA then uploaded this information into the Red Oxygen (2016) software.

The dataset that I downloaded through FluidSurveys.com did not include any record of participants' names. Instead, the web link in the texts was unique for each participant and time point. This web link was recorded into the downloaded dataset. I then linked these web links with participants' study identifiers. This system simultaneously ensured that data were de-identified and enabled me to link responses to participants' study identifiers. The date and time of each complete assessment was recorded through FluidSurveys.com (2016).

I then met with participants again to weigh, measure, and debrief them. Of the 55 participants, 51 attended this debriefing session. Participants guessed a median of 0 hypotheses (range = 0-2). It was determined from talking to participants that demand characteristics were minimal and did not affect the results. Participants recruited through the URPP received credit for the course PSYC 1010 and had their names entered into a draw to win one of five \$100 gift cards to the York University bookstore. Those recruited through posters were each paid \$50.00.

Data Analytic Strategy

For all preliminary analyses, data were screened for outliers and deviations from normality. When outliers and non-normal distributions were identified, analyses were run with and without deletion of the outliers and transformation of the variables. When statistical significance differed as a function of this adjustment, the adjusted distribution was used so as to ensure that the relationships identified were not an artefact of assumption violations. When statistical conclusions remained the same regardless of whether the adjusted variable was used, the original distribution was used so as to maintain interpretability. All descriptive statistics are reported for the untransformed variables.

For the main analyses, the data structure was hierarchical such that the repeated measures

were nested within individuals (Bauer, Preacher, & Gill, 2006). That is, a given participant's momentary responses at one time point were dependent on their responses at other time points. Therefore, the data did not contain independent observations across the momentary assessments (Nezlek, 2008; Tasca et al., 2010). Ordinary least squares techniques assume independence of observations, and violation of this assumption yields underestimated error variance and increased Type I error rates (Nezlek, 2008).

To account for dependence in the data, I tested the current study's hypotheses using multilevel modeling (MLM), which partitions within- and between-person variability (Nezlek, 2008; Raudenbush & Bryk, 2002). That is, MLM models the dependencies among the level 1 observations (i.e., within-person or repeated measures observations) by estimating random effect variance parameters (Bauer et al., 2006). These random effects allow for both random intercepts, which reflect differences in overall outcome across the Level 2 units (i.e., study participants), and random slopes, which reflect between-participant differences in the effects of predictors on outcomes (Bauer et al., 2006).

MLM also estimates parameters when individuals have missing data (Tasca et al., 2010) by computing a matrix of maximum likelihood estimates of regression coefficients and standard errors for complete data, based on incomplete data (Raudenbush & Bryk, 2002). These coefficients can then be used to estimate scores for each individual (Raudenbush & Bryk, 2002), thereby circumventing the need for imputation or listwise deletion.

Additionally, unlike traditional repeated measures ANOVA, MLMs do not assume sphericity (i.e., equivalent error variances for all pairs and linear combinations of repeated measures observations across time; Clinton, 2004; Stevens, 2002). For example, in the current study, the error surrounding the relationship between participants' Day 1 Observation 1 and Day

1 Observation 2 scores did not have to be equal to the error surrounding the relationship between participants' Day 1 Observation 1 and Day 1 Observation 3 scores.

MLM allows predictors at levels 1 and 2 of the data. In the current study, the level 1 predictors were the momentary assessments of negative affect, depression, social self-esteem, and emotion dysregulation; and the level 2 predictors were the trait measures of attachment anxiety and avoidance. Consistent with Engelberg and colleagues' (2007) EMA study, lag variables were created for the momentary predictor variables. That is, scores for the momentary variables from the recording previous to the current assessment of binge eating and body dissatisfaction were used as level 1 predictors (Engelberg et al., 2007). To test the current study's hypotheses, I used the models presented in Appendix B.

For all models, level 1 variables were group-mean centered (i.e., deviated around a given individual's mean) so that the level 1 slopes would represent the pooled within-person effects of the variable on the outcome (Enders & Tofhigi, 2007). Level 2 variables were grand-mean centered (i.e., deviated around the total sample's mean) so as to represent parameters as the average effect rather than as the effect coded zero on the variables (Cohen, Cohen, West, & Aiken, 2003; Enders & Tofhigi, 2007).

All preliminary analyses were run using IBM SPSS Statistics 23. All main hypotheses were tested using HLM program version 7 with the restricted maximum likelihood method of estimation, which yields more realistic posterior variances when the number of level 2 units is smaller (Bryk & Raudenbush, 1992).

Results

Preliminary Analyses

EMA compliance. Participants provided a total of 2,681 separate momentary recordings.

Completion rate, defined as the percentage of prompted momentary assessments for which participants provided complete data, averaged 48.83% across participants (range = 3.06-94.90%). Since MLM makes use of all available repeated measures data and estimates parameters even when individuals have missing data, all available data were used in the current study.

Relationship of EMA compliance to demographic and outcome variables. To determine whether any participant characteristics were associated with the proportion of missing data, I examined the relationship of completion rate with the demographic and momentary outcome variables. Completion rates were significantly higher for participants recruited through posters ($M = 57.97\%$, $SD = 0.21$) than for those recruited through the URPP ($M = 41.64\%$, $SD = 0.25$), $t(53) = -2.74$, $p = .008$. Also, completion rate decreased significantly from the first week of the study ($M = 55.51\%$, $SD = 0.23$) to the second week ($M = 42.12\%$, $SD = 0.29$), $t(53) = 6.83$, $p < .001$. However, one-way analyses of variance showed that completion rate was not significantly related to family income, sexual orientation, employment status, marital status, living arrangements, ethnicity, or whether participants had ever been diagnosed with an eating or mood disorder (all $ps > .05$). Additionally, completion rate was only weakly related to BMI, $r(49) = .21$, $p = .138$; age, $r(53) = .19$, $p = .170$; SDS-17, $r(53) = .09$, $p = .519$; ECR anxiety, $r(53) = -.12$, $p = .367$; and ECR avoidance, $r(53) = -.12$, $p = .370$. Therefore, missing data did not appear to vary substantially as a function of any individual trait-level variables measured in the current study.

To determine whether completion rate was associated with the momentary variables of interest, completion rate variable was entered at level 2 of the MLMs predicting binge eating and body dissatisfaction. Completion rate was not associated with momentary BISS, $B = -0.53$, $t(53)$

= -0.78, $p = .438$, indicating that momentary body dissatisfaction did not differ as a function of the proportion of assessments that participants completed. However, completion rate was significantly negatively associated with momentary binge eating, $B = -1.85$, $t(53) = -2.80$, $p = .007$, $OR = 0.16$, 95% CI [0.04, 0.59], indicating that participants who completed fewer momentary assessments were more likely to binge eat when they did provide data. Completion rate was also significantly negatively associated with S-DERS Clarity, $B = -1.57$, $t(53) = -2.60$, $p = .012$, indicating that participants with higher completion rates reported less momentary difficulty clarifying their emotions. Completion rate was not significantly associated with any of the other momentary predictors (all $ps > .05$).

Accounting for missingness. MLMs are more flexible than other procedures such that they do not require data to be missing completely at random (MCAR; Gallop & Tasca, 2009). MCAR denotes missingness that does not depend on the value of the outcome or predictors (Little & Rubin, 2002). However, MLMs assume that data are missing at random (MAR), or that missingness does not depend on the outcome variable but that it may depend on other variables (Little & Rubin, 2002). Since person-level completion rate was associated with momentary binge eating, it is likely that the data were not MAR. While it is unknown whether missing binge data at a given time point was associated with the score at that time point, the probability of missing values appeared to be related to the response values. Therefore, noncompliance was non-ignorable and a “missing mechanism” variable needed to be included at level 2 of the models (Gueorguieva & Krystal, 2004, p. 313).

One identified missingness mechanism was the tendency for those with higher completion rates to report less momentary difficulty clarifying their emotions. Therefore, S-DERS Clarity was identified as a missingness mechanism and was controlled for in all

subsequent multilevel models, with the exception that to circumvent issues with singularity, S-DERS Clarity was not controlled for in the models examining S-DERS Clarity or S-DERS Total as mediators. The decision to control for S-DERS Clarity was deemed appropriate on conceptual as well as statistical grounds. That is, greater difficulty identifying one's emotions may reflect a more general tendency to lack attunement to one's momentary internal states, given that greater confusion and uncertainty about one's emotions have been associated with lower mindfulness (Lavender, Tull, et al., 2015). This lack of attention to one's internal states may in turn compromise compliance in a study that by definition demands self-focus. Completion rate was not associated with any of the other momentary predictors (all $ps > .05$).

Comparison of weeks 1 and 2. Researchers have raised the issue of measurement reliability in EMA research, noting that the process of recording one's behaviours as they occur may alter the frequency of such behaviours (Stein & Corte, 2003). While many factors, such as what one has eaten and others' comments, may have influenced fluctuations in participants' body dissatisfaction, such systematic reactivity could be indicated by a significant difference between momentary responses from the first half to the second half of the study. For example, the requirement to focus on one's feelings about one's body could have drawn participants' attention to perceived deficits in their appearance, thereby increasing body dissatisfaction. One EMA study comparing frequency of eating disorder behaviours between the first and second halves of momentary assessment period found that such behaviours are not reactive to EMA methodology (Stein & Corte, 2003).

To examine whether the process of recording the momentary psychological and eating variables systematically altered the frequency of such events (Stein & Corte, 2003) in the current study, I assessed potential between-week reactivity in the outcome variables (i.e., binge eating

and body dissatisfaction). First, each participant's weekly rate of binge eating (i.e., total number of binges/ total number of complete responses) and mean weekly scores on the BISS were calculated. Then, repeated-measures analyses of variance were used to examine change in the outcome variables. Table 1 presents the weekly and total means for the predictor and outcome variables in the model. Participants did not endorse significant changes in the outcomes (i.e., weekly binge rates and weekly mean BISS scores) from week 1 to week 2 (Table 1). Therefore, reactivity was not considered a problem.

Relationships among demographic variables and study variables and identification of potential covariates. I then evaluated the necessity of controlling for any demographic variables. I used one-way ANOVA to test differences on the study variables across the categorical demographic variables. Family income, sexual orientation, employment status, marital status, living arrangements, ethnic identity, and whether participants had been diagnosed with an eating or mood disorder were not significantly related to the mean momentary assessment variables (i.e., mean binge rate, PANAS Negative Affect, DASS Depression, CTS Social Self-Esteem, S-DERS Nonacceptance, S-DERS Modulate, S-DERS Awareness, S-DERS Clarity), averaged over the study period. Additionally, these demographic variables were not significantly related to person-level SDS-17, ECR anxiety, or ECR avoidance (all $ps > .05$).

The correlations of the continuous demographic variables (i.e., age and BMI) and SDS-17 scores with the mean of the momentary variables averaged over the duration of the study, and of ECR anxiety and avoidance with the demographic variables, were then examined (the relationship between ECR anxiety and avoidance and the outcome variables is reported below). Age and SDS-17 were not significantly correlated with any of the momentary variable means (all $ps > .05$). BMI was significantly positively associated with mean CTS Social Self-Esteem, $r(49)$

= .32, $p = .020$. ECM-M36 anxiety and avoidance were not significantly correlated with each other, $r(53) = -.12$, $p = .398$, or with any of the demographic variables (all $ps < .05$). Therefore, the demographic variables were not significantly related to any of the study variables, with the exception that participants with higher BMIs reported greater momentary social self-esteem.

To further determine whether BMI and SDS-17 scores should be included as potential covariates in the MLMs along with S-DERS Clarity, these variables were entered separately as the only predictors in models predicting each main predictor and outcome. BMI was significantly negatively associated with momentary DASS Depression, $B = -0.30$, $t(49) = -1.78$, $p = .032$ as well as significantly positively associated with CTS Social Self-Esteem, $B = 0.36$, $t(49) = 2.93$, $p = .005$. Therefore, BMI was controlled for in all models examining these variables. BMI was not significantly associated with any other momentary predictor or outcome. SDS-17 was not significantly associated with any momentary predictor or outcome, and was therefore not included as a covariate.

Since participants' eating patterns and body image may have differed according to whether assessments took place on a weekday versus weekend (i.e., Fridays at 4:00 pm – Sundays at 11:00 pm), “weekend” was also examined as a potential level 1 covariate in the multilevel models. Weekend was not significantly associated with binge eating, $B = 0.21$, $t(54) = 1.90$, $p = .063$, $OR = 1.23$, 95% CI [0.99, 1.54] or BISS, $B = -0.08$, $t(54) = -1.28$, $p = .207$ and was therefore not included in models predicting these variables.

Relationship of recruitment method with demographic and study variables. To determine whether to include recruitment method in the multilevel models, I compared those recruited through the URPP with those recruited through posters on the study variables using independent samples t -tests. Recruitment method was not significantly associated with any of the

mean momentary variables averaged over the study period or with ECR anxiety, ECR avoidance, BMI, or SDS-17 (all p s > .05). Additionally, using MLMs, recruitment method did not predict momentary binge eating ($B = -0.44$, $SE = 0.32$, $t[53] = 0.32$, $p = .173$, $OR = 0.64$, 95% CI = [0.34, 1.22]) or BISS ($B = -0.05$, $SE = 0.34$, $t[53] = -0.15$, $p = .887$) when entered as a level 2 (i.e., person level) predictor. Therefore, recruitment method was not associated with any of the study variables and was not included as a covariate in the multilevel models.

Summary of covariates included in MLMs. Based on the preliminary analyses described above, S-DERS Clarity was included as a level 1 (i.e., the within-person level) predictor as a missingness mechanism in all multilevel models in which S-DERS Clarity and S-DERS Total were not included as predictors. Additionally, for all the models including DASS Depression and CTS Social Self-Esteem, BMI was included as a level 2 covariate.

Relationships among momentary predictors. To obtain estimates of the relationships among the predictor variables, I calculated the correlations among the momentary predictors at the first (i.e., Day 1 Observation 1) and last (i.e., Day 14 Observation 7) time points. Table 2 shows these correlations.

Data screening for MLMs. To identify outliers in the fitted MLMs with significant results, z scores and box-and-whisker plots of the level 1 and level 2 residuals were examined (Raudenbush, Bryk, Cheong, Congdon, & du Toit, 2011). Across these fitted models, a mean of 9.75 level 1 outliers (of 2,681 potential time points) and 1.13 level 2 outliers (of 55 participants) were identified. These outliers were determined to represent legitimate data, and deletion of these outliers did not influence the significance of any results. Therefore, results are reported from the analyses with the original scores in the model.

For all MLMs, results are reported from analyses using robust standard errors. These

standard errors are consistent even when maximum likelihood assumptions for estimating MLMs are mistaken, and they are relatively insensitive to distributional assumptions and to misspecification of variances and covariances at each level of the models (Raudenbush et al., 2011). Since the robust errors differed minimally from the model-based standard errors, maximum likelihood assumptions were deemed to be tenable (Raudenbush et al., 2011).

Descriptive statistics. The mean number of minutes between the time at which messages were sent and each momentary assessment was completed was 39.13 minutes ($SD = 48.68$). The mean number of minutes between the time at which participants began and completed the momentary assessments was 5.43 minutes ($SD = 5.39$), after six extreme completion times due to technical errors were removed.

Participants reported binge eating a mean number of 10.89 times ($SD = 9.05$; range: 0-40) during the study period. One participant (1.8%) did not binge during the entire study period, 33 (60%) binged 1 to 10 times, 14 (25.4%) binged 11 to 20 times, four (7.2%) binged 21 to 30 times, and three (5.4%) binged 31 to 40 times. On average, participants reported binge eating on 26.98% ($SD = 0.23$) of the assessments that they completed. Mean ECR Anxiety was 4.35 ($SD = 1.04$), mean ECR Avoidance was 4.19 ($SD = 1.06$), mean SDS-17 was 7.80 ($SD = 3.33$), and mean BMI was 25.89 ($SD = 6.38$).

EMA Results

Hypothesis 1: Momentary negative affect, depressive symptoms, and social self-esteem will predict subsequent momentary binge eating and body dissatisfaction.

Predicting binge eating. A Bernoulli distribution was used for all models predicting the binary binge eating variable, on which participants indicated that they either did or did not binge since the previous momentary assessment (Raudenbush & Bryk, 2002). This distribution is

similar to logistic regression such that in order to improve issues with nonnormality and nonlinearity, the probability of the outcome is logarithmically transformed (Raudenbush & Bryk, 2002). To assess effect size, I examined the odds ratio, which is the change in odds of a participant binge eating with a 1-unit increase in the predictor variable.

Model 1 (Appendix B) was used to represent current binge eating as a function of previous PANAS Negative Affect. Table 3 presents the results of this model. Previous PANAS Negative Affect did not significantly predict probability of binge eating. Model 2 (Appendix B) was used to represent current binge eating as a function of previous DASS Depression and previous CTS Social Self-Esteem and subsequent binge eating. As shown in Table 4, previous DASS Depression was significantly positively associated with subsequent probability of binge eating such that greater depression at one time point was associated with greater likelihood of binge eating at the next time point. Similarly, previous CTS Social Self-Esteem was significantly negatively associated with binge eating such that participants experiencing lower social self-esteem were more likely to binge eat at the subsequent time point (Table 5).

Predicting body dissatisfaction. To test the hypothesis that previous PANAS Negative Affect, DASS Depression, and CTS Social Self-Esteem would predict subsequent body dissatisfaction, I used Models 3 and 4 (Appendix B). To assess effect size, I examined the regression coefficients, which represent the predicted change in body dissatisfaction per 1-point increase in the predictor variables. Additionally, I examined the proportion of total within-person variance accounted for by adding the variable of interest (i.e., previous PANAS Negative Affect/ DASS Depression/ CTS Social Self-Esteem) to the model (Calculation 1 in Appendix B).

Table 6 presents the results of the model for current BISS as a function of previous PANAS Negative Affect. Previous PANAS Negative Affect was significantly negatively

associated with subsequent BISS, indicating that participants experiencing greater momentary negative affect tended to experience greater body dissatisfaction at the subsequent time point. Previous DASS Depression was also significantly negatively associated with subsequent BISS (Table 7), indicating that participants experiencing greater momentary depressive symptoms tended to experience greater body dissatisfaction at the subsequent time point. Additionally, previous CTS Social Self-Esteem was significantly positively associated with subsequent BISS (Table 8), indicating that participants experiencing greater momentary social self-esteem tended to experience lower body dissatisfaction at subsequent time points.

In sum, the results partially supported Hypothesis 1. Previous PANAS Negative Affect did not predict subsequent binge eating. However, previous DASS Depression and previous CTS Social Self-Esteem both predicted subsequent binge eating. Previous PANAS Negative Affect, previous DASS Depression, and previous CTS Social Self-Esteem all predicted subsequent body dissatisfaction.

Hypothesis 2: Attachment anxiety and avoidance will moderate the relationships of momentary negative affect, depressive symptoms, and social self-esteem with momentary binge eating and body dissatisfaction. To examine whether the relationships of momentary PANAS Negative Affect, DASS Depression, and CTS Social Self-Esteem with momentary binge eating and BISS varied as a function of participants' trait levels of ECR anxiety and avoidance, participants' ECR scores were entered as predictors of the level 2 intercept and slope in random-coefficients MLMs (see Models 5 and 6, Appendix B; Raudenbush & Bryk, 2002). This inclusion of the ECR anxiety and avoidance variables as predictors of the slopes allowed for the interaction term to be tested, and specifically for an examination of whether the relationships between PANAS Negative Affect, DASS Depression, or CTS Social Self-Esteem and binge

eating or BISS depended on participants' levels of ECR anxiety or avoidance. The sample size suggested that it was preferable to include fewer predictors in each model (Tabachnick & Fidell, 2007). Therefore, for all models that included ECR scores as level 2 predictors, anxiety and avoidance were entered separately.

To represent effect size, the odds ratio was calculated for the models predicting binge eating and the variance explained was examined for the models predicting BISS. For these models, the variance explained was equal to the proportion of total between-person variance accounted for by adding ECR anxiety/ avoidance to the level 2 slope (see Calculation 2 in Appendix B; Raudenbush & Bryk, 2002).

As shown in Table 9, neither ECR anxiety nor ECR avoidance moderated the relationship between any momentary predictor and binge eating. Table 10 presents the results of the analyses predicting BISS. There was a significant ECR anxiety by previous PANAS Negative Affect interaction predicting subsequent BISS. Examination of the simple slopes (Cohen et al., 2003) indicated that at higher levels of ECR anxiety (i.e., at 1 *SD* above the mean on ECR anxiety or at a score of 5.39, representing a mean response option between “Neutral/ Mixed and Agree Strongly”), previous PANAS Negative Affect was not significantly associated with BISS, $B = -0.004$, $t(51) = -0.40$, $p = .690$. At lower levels of ECR anxiety (i.e., at 1 *SD* below the mean on ECR anxiety or at a score of 3.31, representing a mean response option between “Neutral/ Mixed and Disagree Strongly”), previous PANAS Negative Affect was significantly negatively associated with subsequent BISS, $B = -0.04$, $t(51) = -2.64$, $p = .011$, indicating that greater negative affect was associated with greater subsequent body dissatisfaction (Figure 2). Neither ECR anxiety nor ECR avoidance moderated the relationship between any other momentary predictor and subsequent body dissatisfaction (Table 10).

Therefore, the results partially supported Hypothesis 2. Neither ECR anxiety nor ECR avoidance scores moderated the relationship between any momentary predictor and either binge eating, or between momentary previous DASS Depression or CTS social self-esteem and BISS. However, ECR anxiety moderated the relationship between previous PANAS Negative Affect and BISS such that greater negative affect was associated with greater subsequent body dissatisfaction for participants lower in attachment anxiety but not for those higher in attachment anxiety.

Hypothesis 3: Emotion dysregulation will mediate the interaction between attachment insecurity and negative affect/ depression/ social self-esteem on binge eating and body dissatisfaction. To assess for mediation, the indirect effect of paths *a* (the relationship between the predictor, or the ECR anxiety/ avoidance by previous PANAS/ DASS Depression/ CTS Social Self-Esteem interaction, and mediator, or the previous S-DERS scores) and *b* (the relationship between the mediator, or S-DERS scores, and outcome, or binge eating or BISS scores) was estimated as *ab*, or the product of paths *a* (i.e., the relationship between the predictor and mediator) and *b* (i.e., the relationship between the mediator and outcome; Krull & MacKinnon, 1999). Figure 3 shows the hypothesized mediation model. The significance of indirect effects is determined through examination of confidence intervals such that if the confidence interval includes zero, the mediating effect is not larger than would be expected by chance (MacKinnon, Krull, & Lockwood, 2000). To construct the 95% confidence intervals, the Monte Carlo method for assessing mediation (MCMAM; MacKinnon, Lockwood, & Williams, 2004) was employed using Selig and Preacher's (2008) interactive tool. Using the MCMAM, the indirect effect estimates (i.e., the coefficients for paths *a* and *b*, respectively) are estimated from the sample (MacKinnon et al., 2004). Then, these estimates are used to simulate a sampling

distribution of their product. Then, many random values are taken from this distribution over many draws, yielding an average indirect effect. The upper and lower confidence limits for the asymmetrical 95% confidence interval of the indirect effect are then equal to the corresponding 2.5th and 97.5th percentiles of this distribution (Preacher & Selig, 2012).

One assumption of indirect effects is that the predictor and mediator do not interact (Judd & Kenny, 1981). Therefore, after testing each mediation model, I examined whether ECR scores interacted with the S-DERS scores in predicting subsequent binge eating and BISS. There was no interaction between the predictor and mediator (all $ps > .05$), indicating that this assumption was met.

Models 7, 8, and 9 (Appendix B) were used to examine paths a and b of the mediation model examining whether the ECR anxiety and avoidance by PANAS Negative Affect/ DASS Depression/ CTS Social Self-Esteem interactions were indirectly related to subsequent binge eating or BISS through each emotion dysregulation subscale. The unstandardized indirect effect estimate represents the expected increase in the outcome through the mediator for each unit increase in the predictor (Preacher & Kelley, 2011).

Predicting binge eating.

Mediating effect of S-DERS Subscales on the relationship between the ECR anxiety/ avoidance by PANAS Negative Affect interaction and binge eating. Table 11 presents results of the analyses examining the S-DERS subscales as mediators of the relationship between the ECR anxiety/ avoidance by previous PANAS Negative Affect interaction and subsequent binge eating. For the model examining the ECR anxiety by previous PANAS Negative Affect interaction as a predictor and S-DERS Nonacceptance as a mediator, paths a and b were both significant. The ECR anxiety by previous PANAS Negative Affect interaction was significantly associated with

previous S-DERS Nonacceptance (path *a*; Table 11). Specifically, for participants higher in ECR anxiety (i.e., at 1 *SD* above the mean on ECR anxiety or at a score of 5.39, representing a mean response option between “Neutral/ Mixed and Agree Strongly”), previous PANAS Negative Affect was significantly positively associated with previous DERS Nonacceptance, $B = 0.43$, $t(53) = 8.35$, $p < .001$, indicating that individuals experiencing greater momentary negative affect had greater difficulty accepting their emotions. This relationship was even stronger for participants lower (i.e., at 1 *SD* below the mean on ECR anxiety or at a score of 3.31, representing a mean response option between “Neutral/ Mixed and Disagree Strongly”) in ECR anxiety, $B = 0.61$, $t(53) = 9.81$, $p < .001$. In turn, previous S-DERS Nonacceptance was significantly positively associated with subsequent binge eating, indicating that greater non-acceptance of emotions was associated with greater probability of binge eating (path *b*; Table 11).

Using the MCMAM to test the significance of this indirect effect, the unstandardized indirect effect equalled $(-0.08)(0.06) = -0.005$, and the 95% confidence interval was $[-0.01233, -0.00006]$. Since the confidence interval did not contain zero, previous S-DERS Nonacceptance significantly mediated the relationship between the ECR anxiety by PANAS Negative Affect interaction and subsequent binge eating (Figure 3). The magnitude of the indirect effect indicates that the probability of binge eating was expected to decrease by 0.005 units for every unit increase in the ECR anxiety by PANAS Negative Affect interaction considering the indirect influence through S-DERS Nonacceptance.

No other model yielded significant effects for both paths *a* and *b*. Therefore, there was no other significant indirect effect for these models.

Mediating effect of S-DERS Subscales on the relationship between the ECR anxiety/

avoidance by DASS Depression interaction and binge eating. Table 12 presents results of the analyses examining the S-DERS subscales as mediators of the relationship between the ECR anxiety/ avoidance x previous DASS Depression interaction and subsequent binge eating. No model yielded significant effects for both paths *a* and *b*, indicating that there was no mediating effect of S-DERS on the relationship between the ECR anxiety/ avoidance by previous DASS Depression interaction and subsequent binge eating.

Mediating effect of S-DERS Subscales on the relationship between the ECR anxiety/ avoidance by CTS Social Self-Esteem interaction and binge eating. Table 13 presents results of the analyses examining the S-DERS scores as mediators of the relationship between the ECR anxiety/ avoidance by previous CTS Social Self-Esteem interaction and subsequent binge eating. For the model examining the ECR anxiety by previous CTS Social Self-Esteem interaction as a predictor and S-DERS Total as a mediator, paths *a* and *b* were significant. The ECR anxiety by previous CTS Social Self-Esteem interaction was significantly associated with previous S-DERS Total (path *a*; Table 13). Specifically, for participants higher in attachment anxiety (i.e., at 1 *SD* above the mean on ECR anxiety or at a score of 5.39, representing a mean response option between “Neutral/ Mixed and Agree Strongly”), greater previous CTS Social Self-Esteem was significantly negatively associated with S-DERS Total, $B = -1.14$, $t(49) = -2.56$, $p < .001$, indicating that participants with greater momentary social self-esteem had fewer difficulties regulating their emotions. For those lower in ECR anxiety (i.e., at 1 *SD* below the mean on ECR anxiety or at a score of 3.31, representing a mean response option between “Neutral/ Mixed and Disagree Strongly”), this negative relationship was weaker but remained significant, $B = -0.76$, $t(49) = -2.92$, $p < .001$. In turn, previous S-DERS Total was significantly positively associated with subsequent binge eating (path *b*; Table 11).

Using the MCMAM method to test the significance of the mediating effect, the unstandardized indirect effect equalled $(-0.18)(0.02) = -0.004$ and the 95% confidence interval was $[-0.01, -0.0004]$, indicating that previous S-DERS Total significantly mediated the relationship between the ECR anxiety by previous CTS Social Self-Esteem interaction and subsequent binge eating. The magnitude of the indirect effect indicates that the probability of binge eating was expected to decrease by 0.004 units for every unit increase in the ECR anxiety by previous CTS Social-Self-Esteem interaction, considering the indirect influence through S-DERS Total.

As shown in Table 13, no other model yielded significant effects for both paths *a* and *b*, indicating that there was no other mediating effect of S-DERS on the relationship between the ECR anxiety/ avoidance x previous CTS Social-Self-Esteem interaction and binge eating.

Predicting body dissatisfaction.

Mediating effect of S-DERS Subscales on the relationship between the ECR anxiety/ avoidance by PANAS Negative Affect interaction and body dissatisfaction. Table 14 presents results of the analyses examining the mediating effect of S-DERS subscales on the relationship between the ECR anxiety/ avoidance by PANAS Negative Affect interaction and body dissatisfaction. For the models examining the ECR anxiety by previous PANAS Negative Affect interaction as the predictor and S-DERS Nonacceptance as the mediator, paths *a* and *b* were significant. The ECR anxiety by previous PANAS Negative Affect interaction was significantly associated with previous S-DERS Nonacceptance (path *a*; Table 14). Specifically, for participants higher in attachment anxiety (i.e., at 1 *SD* above the mean on ECR anxiety or at a score of 5.39, representing a mean response option between “Neutral/ Mixed and Agree Strongly”), previous PANAS Negative Affect was significantly positively associated with

previous DERS Nonacceptance, $B = 0.43$, $t(53) = 8.35$, $p < .001$, indicating that individuals experiencing greater momentary negative affect had greater difficulty accepting their emotions. This relationship was even stronger for participants lower in attachment anxiety (i.e., at 1 *SD* below the mean on ECR anxiety or at a score of 3.31, representing a mean response option between “Neutral/ Mixed and Disagree Strongly”), $B = 0.61$, $t(53) = 9.81$, $p < .001$. In turn, previous S-DERS Nonacceptance was significantly negatively associated with subsequent BISS, $B = -0.03$, $t(52) = -2.87$, $p = .006$, indicating that greater non-acceptance of emotion was associated with greater body dissatisfaction (path *b*; Table 14).

Using the MCMAM method to test the significance of the indirect effect, the estimated indirect effect equalled $(-0.08)(-0.03) = 0.002$, 95% CI = [0.0003, 0.005], indicating that S-DERS Nonacceptance significantly mediated the relationship between the ECR anxiety by PANAS Negative Affect interaction and subsequent BISS. Body dissatisfaction was expected to increase by 0.002 units (on its 9-point scale) for every unit increase in the ECR anxiety by PANAS Negative Affect interaction, when only considering the indirect influence through S-DERS Nonacceptance.

As shown in Table 14, no other model yielded significant effects for both paths *a* and *b*, indicating that there was no other mediating effect of S-DERS on the relationship between the ECR anxiety/ avoidance by previous PANAS Negative Affect interaction and subsequent BISS.

Mediating effect of S-DERS Subscales on the relationship between the ECR anxiety/ avoidance by DASS Depression interaction and body dissatisfaction. Table 15 presents results of the analyses examining the mediating effect of the S-DERS subscales on the ECR anxiety/ avoidance by previous DASS Depression interaction and BISS. No model yielded significant effects for both paths *a* and *b*, indicating that there was no mediating effect of S-DERS on the

relationship between the ECR anxiety/ avoidance by previous DASS Depression interaction and subsequent BISS.

Mediating effect of S-DERS Subscales on the relationship between the ECR anxiety/ avoidance by CTS Social Self-Esteem interaction and body dissatisfaction. Table 16 presents results of the analyses examining the mediating effect of S-DERS on the relationship between the ECR anxiety/ avoidance by previous CTS Social Self-Esteem interaction and body dissatisfaction. For the models examining the ECR anxiety by previous Social Self-Esteem interaction as the predictor and previous S-DERS Total as the mediator, paths *a* and *b* were significant. The ECR anxiety by previous CTS Social Self-Esteem interaction was significantly associated with previous S-DERS Total (path *a*; Table 16). Specifically, for participants higher in attachment anxiety (i.e., at 1 *SD* above the mean on ECR anxiety or at a score of 5.39, representing a mean response option between “Neutral/ Mixed and Agree Strongly”), greater previous CTS Social Self-Esteem was significantly negatively associated with S-DERS Total, $B = -1.14$, $t(49) = -2.56$, $p < .001$. For those lower in ECR anxiety (i.e., at 1 *SD* below the mean on ECR anxiety or at a score of 3.31, representing a mean response option between “Neutral/ Mixed and Disagree Strongly”), this negative relationship was weaker but remained significant, $B = -0.76$, $t(49) = -2.92$, $p < .001$. In turn, previous S-DERS Total was significantly negatively associated with subsequent BISS (path *b*; Table 16), indicating that greater total emotion dysregulation was associated with greater body dissatisfaction.

The estimated indirect effect equalled $(-0.18)(-0.01) = 0.002$, 95% CI = [0.0002, 0.004]. Therefore, S-DERS Total significantly mediated the relationship between the ECR anxiety by CTS Social Self-Esteem interaction and subsequent BISS. The magnitude of the indirect effect indicates that body dissatisfaction was expected to increase by 0.002 units (on its 9-point scale)

for every unit increase in the ECR anxiety by previous CTS Social Self-Esteem interaction if one only considers the indirect influence through S-DERS Total.

As shown in Table 16, no other model yielded significant effects for both paths *a* and *b*, indicating that there was no other mediating effect of S-DERS on the relationship between the ECR anxiety/ avoidance by previous CTS Social Self-Esteem interaction and subsequent BISS.

In sum, the results partially supported Hypothesis 3. Previous S-DERS Nonacceptance significantly mediated the relationship between the ECR anxiety by previous PANAS Negative Affect interaction and subsequent binge eating. Additionally, previous S-DERS Total significantly mediated the relationship between the ECR anxiety by previous CTS Social Self-Esteem interaction and subsequent binge eating. Previous S-DERS Nonacceptance also significantly mediated the relationship between the ECR anxiety by previous PANAS Negative Affect interaction and subsequent body dissatisfaction. Finally, previous S-DERS Total significantly mediated the relationship between the ECR anxiety by previous CTS Social Self-Esteem interaction and subsequent body dissatisfaction. However, S-DERS scores did not mediate any other relationship between the ECR anxiety/ avoidance by previous PANAS Negative Affect/ DASS depression/ CTS Social Self-Esteem interaction and subsequent binge eating/ body dissatisfaction.

Emotion dysregulation as a mediator of the relationship between ECR anxiety/ avoidance and subsequent binge eating and body dissatisfaction. After further consideration of previous cross-sectional research indicating that emotion dysregulation mediates the relationship between attachment insecurity and eating disorder symptoms (e.g., Eggert, Levendosky, & Klump, 2007; Shakory et al., 2015; Tasca et al., 2009; Ty & Francis, 2009; Van Durme, Braet, & Goossens, 2015), follow-up analyses were undertaken to elucidate this

relationship on a moment-to-moment basis. That is, the S-DERS subscales were examined as mediators of the relationship between ECR anxiety/ avoidance and binge eating/ body dissatisfaction. To test these models, I again tested path *a*, the relationship between the predictor (i.e., ECR anxiety/ avoidance) and mediator (i.e., previous S-DERS scores) and path *b*, the relationship between the mediator (i.e., previous S-DERS) and outcome (i.e., binge eating/ BISS) removing the effect of the predictor (i.e., ECR anxiety/ avoidance). To construct the 95% confidence intervals, the MCMAM was again employed using Selig and Preacher's (2008) interactive tool.

Models 10, 11, and 12 (Appendix B) were used to test the mediation models examining the indirect relationship between ECR anxiety/ avoidance and binge eating/ BISS through previous S-DERS subscale scores. The unstandardized indirect effect was again examined as an estimate of effect size.

Examining emotion dysregulation as a mediator of the relationship between ECR anxiety/ avoidance and subsequent binge eating. Table 17 shows the results of the mediation analyses. For the models examining ECR anxiety as the predictor and previous S-DERS Nonacceptance as the mediator, paths *a* and *b* were significant; ECR anxiety was significantly positively associated with previous S-DERS Nonacceptance, indicating that participants higher in attachment anxiety experienced greater difficulty accepting their emotions (path *a*). In turn, previous S-DERS Nonacceptance was significantly positively associated with subsequent binge eating, indicating that greater difficulty accepting one's emotions predicted increased probability of binge eating (path *b*). Using the MCMAM method to test the significance of this indirect effect, the estimated indirect effect equalled $(2.22)(0.06) = 0.13$, 95% CI = [0.04, 0.24]. Therefore, S-DERS Nonacceptance significantly mediated the relationship between ECR anxiety

and subsequent binge eating. The magnitude of the indirect effect indicates that the probability of binge eating was expected to increase by 0.13 units for every unit increase in ECR anxiety if one only considers the indirect influence through S-DERS Nonacceptance.

For the models examining ECR anxiety as the predictor and previous S-DERS Modulate as the mediator, paths *a* and *b* were significant (Table 17). That is, ECR anxiety was significantly positively associated with previous S-DERS Modulate (path *a*), indicating that participants higher in attachment anxiety experienced greater difficulty modulating their emotions. In turn, previous S-DERS Modulate was significantly positively associated with subsequent binge eating, indicating that greater difficulty modulating one's emotions was associated with subsequent binge eating (path *b*). The estimated indirect effect equalled $(2.32)(0.08) = 0.19$, 95% CI = [0.06, 0.31]. Therefore, S-DERS Modulate significantly mediated the relationship between ECR anxiety and subsequent binge eating. The probability of binge eating was expected to increase by 0.19 units for every unit increase in ECR anxiety if one only considers the indirect influence through S-DERS Modulate.

For the models examining ECR anxiety as the predictor, previous S-DERS Total as the mediator, and subsequent binge eating as the outcome, paths *a* and *b* were significant (Table 17); ECR anxiety was significantly positively associated with previous S-DERS Total (path *a*), indicating that participants higher in attachment anxiety experienced greater difficulty regulating their emotions. Previous S-DERS Total, in turn, was significantly positively associated with subsequent binge eating (path *b*), indicating that greater momentary difficulty regulating one's emotions was associated with subsequent binge eating. The estimated indirect effect equalled $(4.52)(0.03) = 0.14$, 95% CI = [0.03, 0.26], indicating that S-DERS Total significantly mediated the relationship between ECR anxiety and subsequent binge eating. The probability of binge

eating was expected to increase by 0.14 units for every unit increase in ECR anxiety if one only considers the indirect influence through S-DERS Total.

As shown in Table 17, no other model yielded significant effects for both paths *a* and *b*, indicating that there was no other mediating effect of S-DERS on the relationship between ECR anxiety/ avoidance and subsequent binge eating.

Examining emotion dysregulation as a mediator of the relationship between ECR anxiety/ avoidance and subsequent body dissatisfaction. Table 18 shows the results of the mediation analyses. For the models examining ECR anxiety as the predictor, previous S-DERS Nonacceptance as the mediator, and subsequent BISS as the outcome, paths *a* and *b* were significant. ECR anxiety was significantly positively associated with previous S-DERS Nonacceptance (path *a*; Table 18), indicating that greater attachment anxiety was associated with greater difficulty accepting one's emotions. S-DERS Nonacceptance was in turn significantly negatively associated with subsequent BISS, indicating that greater nonacceptance of emotion was associated with greater body dissatisfaction (path *b*; Table 18). Using the MCMAM method, the estimated indirect effect equalled $(2.22)(-0.03) = -0.07$, 95% CI = [-0.13, -0.02]. Therefore, S-DERS Nonacceptance significantly mediated the relationship between ECR anxiety and subsequent BISS. BISS was expected to decrease by 0.07 units (on a 9-point scale) for every unit increase in ECR anxiety if one only considers the indirect influence through S-DERS Nonacceptance.

For the models examining the ECR anxiety as the predictor, previous S-DERS Modulate as the mediator, and subsequent BISS as the outcome, paths *a* and *b* were significant. ECR anxiety was significantly positively associated with previous S-DERS Modulate, indicating that greater attachment anxiety was associated with greater difficulty modulating one's emotional

responses (path *a*; Table 18). S-DERS Modulate was in turn significantly negatively associated with subsequent BISS; that is, greater momentary difficulties modulating one's emotions was associated with greater subsequent body dissatisfaction (path *b*; Table 18). The estimated indirect effect equalled $(2.32)(-0.03) = -0.07$, 95% CI = [-0.12, -0.02]. Therefore, S-DERS Modulate significantly mediated the relationship between ECR anxiety and subsequent BISS. BISS was expected to decrease by 0.07 units (on a 9-point scale) for every unit increase in ECR anxiety if one only considers the indirect influence through S-DERS Modulate.

For the models examining ECR anxiety as the predictor, previous S-DERS Clarity as the mediator, and subsequent BISS as the outcome, paths *a* and *b* were significant (Table 18). ECR anxiety was significantly positively associated with previous S-DERS Clarity (path *a*), which in turn was significantly negatively associated with subsequent BISS; that is, greater difficulty clarifying one's emotions was associated with greater body dissatisfaction (path *b*). The estimated indirect effect equalled $(0.42)(-0.09) = -0.04$, 95% CI = [-0.09, -0.005]. Therefore, S-DERS Clarity significantly mediated the relationship between ECR anxiety and subsequent BISS. BISS was expected to decrease by 0.04 units (on a 9-point scale) for every unit increase in ECR anxiety when only considering the indirect influence through S-DERS Clarity.

For the models examining the ECR anxiety as the predictor, previous S-DERS Total as the mediator, and subsequent BISS as the outcome, paths *a* and *b* were significant. ECR anxiety was significantly positively associated with previous S-DERS Total (path *a*), which in turn was significantly negatively associated with subsequent BISS; that is, greater total emotion dysregulation was associated with greater subsequent body dissatisfaction (path *b*). The estimated indirect effect equalled $(4.52)(-0.02) = -0.09$, 95% CI = [-0.17, -0.03]. Therefore, S-DERS Total significantly mediated the relationship between ECR anxiety and subsequent BISS.

The magnitude of the indirect effect indicates that BISS was expected to decrease by 0.09 units (on a 9-point scale) for every unit increase in ECR anxiety if one only considers the indirect influence through S-DERS Total.

As shown in Table 18, no other model yielded significant effects for both paths *a* and *b*, indicating that there was no other mediating effect of S-DERS on the relationship between ECR anxiety/ avoidance and subsequent BISS.

In summary, S-DERS Nonacceptance, S-DERS Modulate, and S-DERS total significantly mediated the relationships between ECR anxiety and both subsequent binge eating and subsequent BISS. Additionally, S-DERS Clarity significantly mediated the relationship between ECR anxiety subsequent momentary BISS. Table 19 summarizes the results of the current study's hypothesis tests and follow-up analyses.

Discussion

Summary of Main Findings

The current study used ecological momentary assessment (EMA) to examine attachment insecurity, momentary negative affect, momentary depression, momentary social self-esteem, and momentary emotion dysregulation as predictors of momentary binge eating and body dissatisfaction. First, it was hypothesized that greater momentary negative affect, greater momentary depression, and momentary lower social self-esteem would predict subsequent binge eating and body dissatisfaction. This hypothesis was partially supported. Both momentary depression and momentary social self-esteem, but not momentary negative affect, predicted subsequent binge eating; furthermore, momentary negative affect, momentary depression, and momentary social self-esteem all predicted subsequent body dissatisfaction.

This study's second hypothesis was that these relationships would be stronger for women

higher in attachment anxiety and avoidance than for those lower in attachment anxiety and avoidance. Results indicated that attachment anxiety moderated the relationship between momentary negative affect and subsequent body dissatisfaction such that greater negative affect was associated with greater body dissatisfaction for those lower in attachment anxiety but not for those higher in attachment anxiety. Neither attachment anxiety, nor attachment avoidance, moderated the relationship between any other momentary predictor and binge eating or body dissatisfaction.

Third, it was expected that several facets of momentary emotion dysregulation would mediate the interaction between attachment insecurity and momentary negative affect, depression, and social self-esteem on binge eating and body dissatisfaction. Results also partially supported this hypothesis. Momentary non-acceptance of emotional responses significantly mediated the interaction between attachment anxiety and momentary negative affect on both binge eating and body dissatisfaction. Additionally, momentary total difficulties regulating emotion significantly mediated the interaction between attachment anxiety and momentary social self-esteem on both binge eating and body dissatisfaction.

Follow-up analyses were based on further consideration of previous research. These analyses indicated that momentary non-acceptance of emotional responses, difficulty modulating one's emotions, and total difficulties regulating emotion mediated the relationship between attachment anxiety and both subsequent binge eating and body dissatisfaction. Momentary difficulty clarifying one's emotions also mediated the relationship between attachment anxiety and subsequent body dissatisfaction.

Discussion of Hypothesis 1 Results

The finding that depression, but not negative affect, predicted subsequent binge eating

was unexpected. Several EMA studies have found that negative affect is associated with binge eating (e.g., Crosby et al., 2009). One explanation for this discrepancy may be the difference between the sample used in the current study and the samples used in previous research. Previous studies that have found this relationship have used samples of individuals with bulimia nervosa (Crosby et al., 2009; Engelberg et al., 2007; Smyth et al., 2007) and binge-eating disorder (Stein et al., 2007), but among college students, negative affect was not associated with subsequent episodes of eating large amounts of food or loss of control over eating (Heron et al., 2014). Taken together, these inconsistent findings suggest that individuals with full-syndrome eating disorders may cope with negative affect by binge eating but that within more normative samples, women's tendency to binge eat subsequent to negative affect may depend more on contextual and personality factors. As discussed below, attachment anxiety may be one trait that influences women's tendency to cope with distress through binge eating.

It could also be that in a more normative sample, facets of negative affect as measured by the PANAS are typically more muted and fluctuate within a smaller range. Indeed, within the current sample, the mean score of 15.04 and the standard deviation of 4.70 suggested that on average, participants' endorsement of items measuring negative affect ranged from "*Very slightly or not at all*" to "*A little*." The repetitive nature of the negative affect items may have led participants to remember and repeat their previous responses, suggesting that an alternative response format, such as a visual analogue scale, may have provided a more accurate measure of negative affect. However, depression was more variable with a standard deviation of 7.67 on the DASS Depression subscale and did tend to trigger binge eating, suggesting that momentary fluctuations in this specific affect construct may more sensitively predict binge eating.

The non-significant relationship between negative affect and binge eating may also be

attributable to the error made when I incorrectly entered the PANAS Negative Affect subscale response options, leading to a slightly truncated range of scores. That is, the reduction in the variance of negative affect would have attenuated the correlation between this variable and binge eating (Linn, Harnisch, & Dunbar, 1981).

The finding that negative affect predicted subsequent body dissatisfaction is consistent with previous research on undergraduate women (Colautti et al., 2011). This relationship appears to generalize to individuals with eating disorders. Stice and Agras (1999) identified two subtypes of individuals with bulimia nervosa: a pure dieting subtype and a mixed dietary-depressive subtype. The group prone to depressive symptoms endorsed greater weight, shape, and eating concerns, indicating that negative affect may lead to biases in self-perception. Alternatively, such individuals may apply their tendency to become distressed to weight and shape concerns (Stice & Agras, 1999).

The finding that momentary depression predicted subsequent binge eating suggests that women binge eat in order to reduce or avoid low mood. Given that self-critical aspects of depression were elevated among those with bulimia nervosa compared to those with anorexia nervosa restricting type and individuals without eating disorders in Speranza et al. (2005), it is possible that momentary depression precipitates feelings of inadequacy from which individuals prone to binge eating feel the urge to escape. This possibility is consistent with escape theory's depiction of binge eating as an escape from the emotional distress arising from awareness of their ability to meet others' high standards (Heatherton & Baumeister, 1991). To escape aversive self-awareness, women may narrow their attention to their immediate environments and seek out "forbidden food" upon which to binge (Heatherton & Baumeister, 1991). Hence, the affective disturbances experienced by individuals prone to binge eating may compromise their capacity to

cope effectively with stressors (Stice & Agras, 1999) and to subsequently avoid such stressors through binge eating.

In line with the notion that interpersonal context is an important influence on eating symptoms, one potential stressor identified in the current study was social self-esteem, which predicted both binge eating and greater body dissatisfaction. This finding is consistent with previous EMA studies that have found that other variables implicated in social self-esteem, including presence of others (Colautti et al., 2011) and appearance-related social comparisons (Leahey et al., 2011), have also precipitated body dissatisfaction and disordered eating. Similarly, cross-sectional research has linked body image disturbance to concerns about displaying one's imperfections to others (Sherry et al., 2009). Additionally, Cattanach, Malley, and Rodin (1988) found that stress in the interpersonal domain was particularly likely to induce the desire to binge eat among female undergraduates. Furthermore, in a nonclinical sample of women, body dissatisfaction was positively related to one's awareness of others' reactions to oneself, social anxiety, and the perception of oneself as phony in Striegel-Moore, Silberstein, and Rodin (1993). Striegel-Moore and colleagues (1993) also found that these variables were more elevated among women with bulimia nervosa compared to women from a control sample. Taken together with these findings, results of the current study indicate that momentary self-consciousness precipitates eating disorder symptoms even among those not diagnosed with an eating disorder but who are prone to binge eating, and that such self-consciousness may also differentiate those with and without eating disorders. Hence, low social self-esteem may be a risk factor in the development of eating disorders.

This link may be attributable to a process in which a focus on eating distracts women from the distress arising from feelings of self-consciousness and potential signs of rejection

during interpersonal situations. Additionally, women who experience moments in which they perceive themselves to be socially inadequate may apply this sense of incompetence to other domains in which they could perceive themselves to fall short. Body image may be a particularly salient domain, given the emphasis that societal messages and social media place on this area and the link between preoccupation with self-presentation and disordered eating (Striegel-Moore et al., 1993). Previous research has highlighted adolescence and emerging adulthood as a particularly high-risk period for the development of disordered eating (Polivy, Herman, Mills, & Wheeler, 2003). A focus on food and body image may allow women confronted with complex developmental tasks, such as adjustment to university, to confine their cognitions and behaviours to one sphere that is heavily socially emphasized (Friedlander & Siegel, 1990).

Discussion of Hypothesis 2 Results

Attachment anxiety moderated the relationship between momentary negative affect and subsequent body dissatisfaction. Specifically, greater negative affect predicted greater body dissatisfaction for those lower in attachment anxiety, but not for those higher in attachment anxiety. Neither attachment anxiety, nor attachment avoidance, significantly moderated the relationship between any other momentary predictor and binge eating or body dissatisfaction.

Given that individuals higher in attachment insecurity have exhibited greater difficulties with regulating distress (e.g., Cassidy, 1994; Lopez, 1995), it was anticipated that individuals higher in attachment anxiety and avoidance, but not those lower in attachment insecurity, would be more likely to cope with negative affect through binge eating. However, results indicated the reverse such that negative affect only predicted subsequent binge eating for those lower in attachment anxiety. One reason for this discrepancy may be that, as indicated through follow-up analyses, attachment anxiety was already strongly associated with momentary negative affect.

Therefore, there may have been minimal variability in negative affect at higher levels of attachment anxiety, since the majority of individuals higher in attachment anxiety would have presented with greater distress. The link between negative affect and binge eating may have been significant at lower levels of attachment anxiety due to greater variability in momentary negative affect available to predict subsequent binge eating.

The restricted range in negative affect (due to the entry error described above) could have further reduced the relationship between negative affect and binge eating. Relatedly, there may have been a ceiling effect such that the error in presenting the PANAS response options may have limited the upper boundary of this measure. In conjunction for the tendency for those higher in attachment anxiety to exhibit heightened negative emotionality (Cassidy, 1994), the error may have constricted the extent to which this construct could increase on a momentary basis. On the other hand, for those lower in attachment anxiety, negative affect was typically lower, leaving greater potential for momentary increases in this variable.

Neither attachment anxiety, nor attachment avoidance, moderated the relationships between the other momentary predictors (i.e., depression and social self-esteem) and binge eating and body dissatisfaction. In conjunction with the finding that both of these variables predicted subsequent binge eating and body dissatisfaction for Hypothesis 1, this finding suggests that these variables predict subsequent binge eating and body dissatisfaction regardless of one's level of attachment insecurity. That is, across all levels of preoccupation and discomfort with closeness in relationships, momentary depressive symptoms and self-consciousness increased participants' likelihood of binge eating and feeling dissatisfied with their bodies.

Discussion of Hypothesis 3 Results

In the current study, the interaction between attachment anxiety and momentary negative

affect indirectly predicted subsequent binge eating and body dissatisfaction through momentary non-acceptance of emotional responses. Additionally, the interaction between attachment anxiety and momentary social self-esteem indirectly predicted subsequent binge eating and body dissatisfaction through momentary total difficulties regulating emotion.

Concerning the finding that non-acceptance of emotional responses mediated the interaction between attachment anxiety and negative affect on binge eating and body dissatisfaction, as with Hypothesis 2, results differed from what had been expected. Specifically, the positive relationship between negative affect and non-acceptance of emotional responses was stronger for participants lower in attachment anxiety and not in those higher in attachment anxiety.

As with Hypotheses 1 and 2, the restricted ranges in negative affect and non-acceptance of emotional responses at higher levels of attachment anxiety may account for this finding. Indeed, follow-up analyses indicated that attachment anxiety was associated with non-acceptance of emotional responses in addition to negative affect. Therefore, among those with higher levels of attachment anxiety, negative affect and non-acceptance of emotion may have already been quite elevated, leaving little variability for prediction. Those higher in attachment anxiety tend to under-regulate their emotions (Lopez et al., 1995). The restricted range in emotion dysregulation may have limited the extent to which this variable could increase subsequent to negative affect. On the other hand, for those lower in attachment anxiety, negative mood and emotion dysregulation were typically lower, leaving a greater potential for momentary increases in these constructs and allowing for the detection of relationships among these variables. For these reasons, conclusions should be tentative and merit further study.

Results of the current study also indicated that momentary total emotion dysregulation

mediated the interaction between attachment anxiety and momentary social self-esteem on subsequent binge eating and body dissatisfaction. That is, participants higher in attachment anxiety had greater difficulty regulating their emotions overall when experiencing low social self-esteem. In turn, total emotion dysregulation significantly predicted binge eating and body dissatisfaction. This finding of a relationship between social concerns and eating disorder symptoms is consistent with previous research. For example, Heesacker and Neimeyer (1990) found that among undergraduate women, women experiencing a greater drive to be thin reported higher social incompetence, which is characterized by interpersonal anxiety, fears of loneliness and abandonment, and shyness. Results of the current study indicate that concerns about being socially inadequate predict eating disorder symptoms on a moment-to-moment basis, and that for those with more preoccupied attachment patterns, this link may be mediated by emotion dysregulation.

The tendency for individuals higher in attachment anxiety to be other-oriented (Hardit & Hannum, 2012) may predispose such individuals to being particularly susceptible to feeling self-conscious and to media influences concerning standards of beauty. Among college women, internalization of the media message that thin bodies are ideal mediates the relationship between attachment anxiety and body dissatisfaction (Cheng & Malinkrodt, 2009). Additionally, Hardit and Hannum (2012) found that among undergraduate women, acceptance of societal attitudes towards appearance was associated with greater body dissatisfaction, and this relationship was stronger for those higher in attachment anxiety. In light of this research, results of the current study indicate that self-consciousness about how one is meeting others' standards may be channelled into concerns about falling short in the area of bodily appearance. The current research further elucidates these relationships on a momentary basis. Specifically, results suggest

that among women who are preoccupied with relationships, momentary feelings of social insecurity can lead to both body dissatisfaction and binge eating through emotion dysregulation.

This finding may also be explained by escape theory, the displacement hypothesis, and attachment theory. During moments of higher self-consciousness and greater feelings of social inadequacy, individuals may experience sensitivity to others' unachievable demands, and then develop aversive views of self (Heatherton & Baumeister, 1991). Subsequently, they may become overwhelmed by feelings of anxiety, depression, and isolation (Heatherton & Baumeister, 1991). Indeed, difficulties with self-soothing have been associated with feelings of aloneness among individuals with bulimia nervosa (Esplen, Garfinkel, & Gallop, 2000). Hence, individuals prone to disordered eating may have difficulty regulating distress associated with feelings of social inadequacy. To escape from such unpleasant self-awareness, an individual may constrict their attention to immediate stimuli, such as eating and their bodies (Bruch, 1978; Heatherton & Baumeister, 1991).

At the same time, individuals higher in attachment anxiety, who tend to devalue themselves, to ruminate about interpersonal shortcomings, and to be vigilant to cues of rejection and interpersonal distress (Jewell et al., 2016; Magai, 1999; Mikulincer & Shaver, 2005), may be particularly sensitive to feelings of inferiority and others' negative perceptions. Moreover, because such individuals are prone to emotion dysregulation (Lopez, 1995), they may be particularly intolerant of distress and likely to cope with emotion dysregulation through a focus on concrete areas such as binge eating and their bodies (Cole-Detke & Kobak, 1999). Similarly, Hardit and Hannum (2012) suggested that body size and shape may be a concrete, visible domain through which young women tend to value and devalue themselves and that while lower attachment anxiety may buffer women from sociocultural influences, higher attachment anxiety

may exacerbate the effects of such influences.

Discussion of Follow-Up Results

After further consideration of previous research as well as the current findings pointing to momentary emotion dysregulation as predictor of binge eating and body dissatisfaction, follow-up analyses were conducted. Specifically, the mediating effect of emotion dysregulation on the relationship between attachment insecurity and both binge eating and body dissatisfaction was examined. Non-acceptance of emotional responses, difficulty modulating one's emotions, and total difficulties regulating emotion in the moment mediated the relationship between attachment anxiety and subsequent binge eating and body dissatisfaction. Additionally, difficulty clarifying one's emotions in the moment mediated the relationship between attachment anxiety and body dissatisfaction.

Together, these findings are consistent with previous cross-sectional findings that emotion dysregulation mediates the relationship between attachment anxiety and eating disorder symptoms (Eggert et al., 2007; Shakory et al., 2015; Tasca et al., 2009; Van Durme et al., 2015), including binge eating and body dissatisfaction. Relatedly, among undergraduate students, emotion dysregulation mediated the relationship between both childhood trauma and childhood emotional abuse and eating pathology (Burns, Fischer, Jackson, & Harding, 2012; Moulton, Newman, Power, Swanson, & Daye, 2015). Additionally, Frewen, Thornley, and Vorstenbosch (in press) found that women perceived dissociation and other symptoms of post-traumatic stress disorder to cause their disordered eating behaviours. Given the link between childhood trauma and insecure attachment (George, 1996; Joubert et al., 2012; Lyons-Ruth & Jacobvitz, 1999; West & George, 1999), it appears that emotion regulation patterns that develop in the context of difficult experiences with early caregivers may predispose individuals to develop eating disorder

symptoms. Importantly though, the current findings demonstrate that how individuals with varying attachment patterns cope with their emotions *in the moment* determines whether binge eating or body distress occur. This study is the first to reveal these associations in a naturalistic context.

These findings illustrate the day-to-day implications of research on the neurobiology of attachment. Researchers have proposed that when attachment figures provide infants with social feedback by mirroring their infants' emotional displays, infants' brains release neurohormones that facilitate their ability to regulate affect (Gergely & Watson, 1996; Schore, 1994). This mirroring also contributes to the infant's establishment of representations associated with affect states, thereby providing the infant with a means to cognitively access their emotions (Gergely & Watson, 1996). Deprivation of such emotionally attuned connections with caregivers may lead the infant to have difficulty regulating and identifying affect, and subsequently to suppress and dissociate from distress, such as by channelling negative affect into an excessive preoccupation with food, appearance, and weight (Pearlman, 2005; Slade, 1999). Fonagy, Bateman, and Luyten (2012) posited that when the brain is highly aroused, its activity switches from responding flexibly to automatically, compromising the capacity to reflect on and understand one's behaviour in terms of emotional and cognitive states. Individuals with insecure attachment patterns have particular difficulty maintaining this capacity (Jewell et al., 2016). In the current study, more anxiously attached participants' susceptibility to emotion dysregulation may have compromised their capacity to reflect on, accept, and address the negative emotions underlying their binge eating, and they may have switched to a more automatic mode of processing in which they binged to cope with experiences of being overwhelmed. The finding that momentary non-acceptance of negative emotions mediated the relationship between attachment anxiety and both

binge eating and body dissatisfaction suggests that difficulty tolerating negative affect may have compromised participants' self-regulation capacities.

The finding that difficulty modulating one's emotions in the moment mediated the relationship between attachment anxiety and both binge eating and body dissatisfaction is consistent with research indicating that greater difficulties identifying emotions and limited access to strategies for regulating emotion are associated with binge eating (Speranza et al., 2005; Whiteside et al., 2007). Individuals who have difficulty with adaptively and flexibly using strategies to modulate the intensity of emotions may binge eat so as to alleviate discomfort.

The specific mediating effect of difficulty clarifying one's emotions on the relationship between attachment anxiety and body dissatisfaction indicates the potential role of emotion recognition in the development of poor body image. In light of research indicating that facial emotion recognition is significantly worse among individuals with eating disorders than among those without an eating disorder (Zonnevijlle-Bender, Van Goozen, Cohen-Kettenis, Van Elburg, & Van Engeland, 2002), results of the current study suggest that individuals prone to body dissatisfaction have difficulty recognizing their own as well as others' emotions. Fairburn (2008) discusses how "feeling fat" among individuals with disordered eating is a result of a mislabelling of bodily experiences and emotions. The current findings suggest that individuals higher in attachment anxiety may have difficulty with labelling and identifying their emotions.

The mediating effect of having difficulty clarifying one's emotions in the moment is also consistent with research indicating a link between dissociative experiences and disordered eating (Frewen et al., in press). Dissociative symptoms in a clinical context include *depersonalization*, the experience of being detached from and observing oneself, and *derealisation*, the experience of one's surroundings as unreal (American Psychiatric Association [APA], 2013; Frewen et al.,

in press). In previous studies, dissociative experiences mediated the relationship between trauma history and eating disorder symptoms among men and women (Frewen et al., in press; Moulton et al., 2015). An EMA study found that among women with bulimic symptoms, dissociation was elevated prior to binge episodes (Engelberg et al., 2007). These findings suggest that a sense of disconnection from oneself, one's inner experiences, and one's surroundings prevents individuals from identifying and monitoring their emotional and internal states, and lead individuals to binge eat. Such disconnection may prevent individuals from attending to satiety cues. Although the current study did not assess dissociative symptoms, binge eating may be used as a mechanism to maintain distance between oneself and painful emotions, particularly given that individuals higher in attachment anxiety tend to become overwhelmed by interpersonal concerns (Slade, 1999).

Minimal Role Found for Attachment Avoidance and for Direct Effect of Attachment Anxiety

The current study found that attachment avoidance, the direct effect of attachment anxiety, and limited awareness of current emotions were minimally implicated in binge eating and body dissatisfaction. While attachment avoidance predicted body dissatisfaction, this construct was not directly related to binge eating, or indirectly to either binge eating or body satisfaction through emotion dysregulation. Previous research has indicated that attachment avoidance is related to body image among women with eating disorders (Keating et al., 2013), and that attachment avoidance predicts dropout from eating disorders treatment (Tasca et al., 2004). However, the majority of research on attachment insecurity and eating disorders has indicated a stronger role for attachment anxiety. Troisi and colleagues (2005) found that compared to women in a control group, those with eating disorders scored higher on measures of

childhood separation anxiety and attachment anxiety, but not on measures of attachment avoidance. Similarly, Hardit and Hannum (2012) found that young women who reported greater anxiety about their interpersonal relationships experienced greater concerns with their body shape and size.

On the other hand, previous research has indicated that 67% of individuals with high eating pathology endorse avoidant attachment patterns (Cole-Detke & Kobak, 1996). Additionally, emotion dysregulation mediated the relationship between attachment avoidance and binge eating among bariatric surgery candidates (Shakory et al., 2015) and children aged 10 to 15 (Van Durme et al., 2015). Moreover, alexithymia mediated the relationship between attachment avoidance and body esteem among women with anorexia nervosa, bulimia nervosa, and eating disorders not otherwise specified (Keating et al., 2013).

This discrepancy may be accounted for by the difference in methodology. Most studies on emotion dysregulation as a mediator of the relationship between attachment avoidance and disordered eating have used cross-sectional samples. However, researchers have argued that cross-sectional approaches preclude mediation as mediation proposes causal processes that develop over time and that cross-sectional models yield biased estimates (Cole & Maxwell, 2007). Therefore while previous research suggests that attachment avoidance and trait-level emotion dysregulation may predispose an individual to the pattern of binge eating, the current study suggests that this combination of variables has a minimal role in predicting binge eating on a moment-to-moment basis.

Another reason for this discrepancy may be in the samples. For example, the mean age of the current sample (i.e., 21.20 years) was considerably younger than Shakory and colleagues' (2015) sample (i.e., 44.69 years) and considerably older than Van Durme and colleagues' (2015)

sample. Therefore, the strength of this relationship may depend on an individual's stage of life. Additionally, in contrast to the current study's moment-to-moment examination of undergraduate students, Shakory and colleagues and Keating and colleagues (2013) used a treatment-seeking, cross-sectional sample. Individuals seeking treatment for weight management and eating disorders may be particularly vulnerable to coping with the emotional sequelae of attachment avoidance through binge eating and overemphasizing their bodily appearance.

Given that emotion dysregulation did not mediate the relationship between attachment avoidance and binge eating or body dissatisfaction in the current study, other factors in addition to emotion dysregulation may indirectly account for these relationships among undergraduate students. For example, in a community sample, perfectionistic self-promotion mediated the relationship between attachment avoidance towards one's father and binge eating, and socially prescribed perfectionism mediated the relationship between attachment avoidance towards one's mother and binge eating (Boone, 2013). Future EMA research may examine whether other momentary predictors related to perfectionism (e.g., self-criticism) mediate the relationship between attachment avoidance and binge eating during individuals' day-to-day lives.

It is also noteworthy that in the current study, attachment anxiety had no main effect on momentary binge eating or body dissatisfaction. This finding contradicts previous cross-sectional research on the relationship between attachment anxiety and both body dissatisfaction and disordered eating (Brennan & Shaver, 1995; Hardit & Hannum, 2012; Troisi et al., 2005). This discrepancy suggests that while trait-level attachment anxiety is associated with eating disorder symptoms in general, other factors, such as momentary emotion dysregulation, are implicated in this relationship. The relationship between attachment anxiety and binge eating and body image appears to be more distal among undergraduate students. This possibility is consistent with

attachment theory's proposal that internal working models result from early experiences with caregivers (Kobak, 1999; Lopez, 1995) and do not, on their own, predict episodes of binge eating or body dissatisfaction.

Strengths, Limitations, and Future Directions

The present study had several strengths. First, the utilization of EMA allowed for an examination of the relationships among momentary states of interest. Eating behaviour and body image are complex, and it is important for researchers and clinicians to consider which factors *in the moment* predict episodes of binge eating and body dissatisfaction – both core features of eating disorders. EMA improves accuracy of the assessment of eating behaviour. Previous research has found that binge eating rates were objectively lower when measured by EMA than with an interview format (Stein & Corte, 2003), suggesting that interview responses may be prone to reconstruction biases that lead participants to recall particularly salient events (Stone & Shiffman, 1994). By capturing participants' momentary behaviours and psychological states over shorter time spans, EMA circumvents such biases. Moreover, previous researchers who have examined the cross-sectional relationships among attachment, depression, and eating disorder symptoms have suggested that to examine the temporal relations among these constructs, future research collect data over multiple time points while controlling for extraneous variables (Iannantuono & Tylka, 2012). The current study has addressed this suggestion by obtaining data over 98 time points and by consideration of several covariates including BMI, social desirability, and whether participants completed the assessments over the weekend.

The utilization of an ethnically diverse sample was an additional strength of the current study. Utilization of samples that are homogeneous in terms of ethnicity, socioeconomic status, and age restricts generalizability (Iannantuono & Tylka, 2012). Results of the current study may

generalize to women from a variety of cultural backgrounds. However, all participants had similar education levels (i.e., were undergraduates) and were typically in their early twenties. Given the discrepancies in findings between results of the current study and previous research (e.g., Shakory et al., 2013), future research may examine the momentary relationships among attachment, negative affect, depression, social self-esteem, emotion dysregulation, binge eating, and body dissatisfaction in samples at different life stages.

An additional strength was the current study's utilization of a sample of women who endorsed at least subclinical binge eating (i.e., who had binge eaten at least once in the past 28 days). Research has indicated that the 12-month prevalence rate for binge-eating disorder is 1.6% (Hudson et al., 2007) and that an additional 13.7% of Canadian women binge at subclinical levels (i.e., one to five days in the previous month; Gauvin et al., 2009). Additionally, individuals with binge-eating disorder have been found to differ minimally from those who have binged at least once per month in the preceding 6 months on measures of disordered eating and distress (Striegel-Moore et al., 2000). Therefore, the sample used in this study included a substantial proportion of women experiencing considerable eating pathology, and results would likely generalize to women with both clinical and subclinical eating disorders. Striegel-Moore and colleagues (1993) suggested that to identify factors that shift some women along the continuum of disordered eating, researchers study women who share similarities with those with eating disorders, yet who do not necessarily have diagnosable eating disorders. Additionally, Jewell and colleagues (2016) pointed out that research on attachment and eating disorders might be biased by recruitment of chronically unwell individuals who are recruited using non-random sampling procedures. The wide range of binge eating severity in the current study's sample likely increases the generalizability of the findings and aids in identifying risk factors for disordered

eating among those prone to binge eating.

However, the sample used in the current study also presents some limitations. It is unknown whether participants currently presented with full-syndrome eating disorders. Striegel-Moore and colleagues (1993) identified a group of women who fell between those with bulimia nervosa and those without eating disorders on measures of disordered eating, body esteem, perceived fraudulence, and psychiatric distress. They interpreted these findings to suggest that eating disorders lie on a continuum and that further research on this middle group is warranted. While the majority of the women in the current study likely fell within this middle group and did not meet a diagnosis of an eating disorder, the high frequencies of binge eating as assessed by the initial EDE interview and the momentary assessments suggests that some participants would have met criteria for binge-eating disorder or bulimia nervosa. On the other hand, a transdiagnostic view of disordered eating is regularly emphasized in models of the etiology of eating disorders (Fairburn, Cooper, & Shafran, 2003). To further clarify the nature of participants' eating pathology, it would be helpful to conduct the full EDE interview.

The current study had several other limitations. There were many missing responses and while completion rate was not associated with the majority of the demographic or predictor variables, it was associated with momentary binge eating. Difficulty clarifying one's emotions was controlled for as a pattern of missingness but there is no definitive way to determine whether participants who did not submit data at a given time point had just binged. Individuals who signed up for the study presented as motivated and committed. It is reasonable to think that participants would have been more likely to ignore assessment prompts during times when they were not experiencing any noteworthy events but we cannot know for certain, particularly given that participants with higher completion rates were less likely to binge during a given moment.

The current study's completion rate was considerably lower than in previous EMA studies on disordered eating and body dissatisfaction. In Colautti and colleagues' (2011) EMA study, all but two of the 55 participants completed at least 50% of the momentary responses. Participants in Heron and Smyth's (2007) study completed 75% of all EMA assessments, those in Ranzenhofer and colleagues' (2014) study completed 69.4% of momentary assessments, those in Stein and colleagues' (2007) study completed 92.9% of assessments, and those in Crosby and colleagues' (2009) EMA study completed daily assessments on 88% of days. On the other hand, participants in LePage and Crowther's (2010) EMA study completed only 37.5 to 40% of assessments.

One reason for the current study's comparatively low completion rates may have been the high number of momentary questionnaires included and the high number of assessment time points (seven times per day). Participants were asked to report on their negative affect, depressive symptoms, social self-esteem, state emotion dysregulation, body dissatisfaction, and binge eating at 98 different time points. Participants may have felt uncomfortable reflecting on such domains and avoided doing so. Moreover, while participants' confidentiality and anonymity were ensured, participants may have felt self-conscious about disclosing such personal information. In a previous study, women with bulimia nervosa and women who endorse considerable eating pathology reported greater social anxiety and public self-consciousness than those in a control group (Stiegel-Moore et al., 1993), indicating that the current sample may have been particularly resistant to self-disclosure.

Relatedly, other EMA researchers have noted that the influence of self-monitoring one's psychological state and behaviours on one's experience of such constructs is unknown (Smyth et al., 2007). While the current study indicated minimal between-week change in the outcome

variables, the significant decline in completion rates from weeks 1 to 2 suggests that missingness itself was a form of reactivity. Participants may have gotten bored or tired of completing the measures. This challenge limits the current study's understanding of the influence of the process of self-monitoring on the study constructs.

Another limitation of the current study was the strategy used to test potential covariates. Examination of the relationship between potential covariates and outcomes provided an indication of the bivariate relationships between these variables. On the other hand, covariates could also act as suppressors such that inclusion of such covariates may lead a predictor to become significant even if the covariate itself is not associated with the outcome (Cohen et al., 2003). However, in the current study, the smaller sample sizes and the large number of variables necessitated using less complex models. Nevertheless, the omission of covariates lacking bivariate relationships with the outcomes is a limitation of the current study.

An additional limitation is that results may not generalize to individuals living outside of the Greater Toronto Area, to men, to younger girls or older women, or to non-undergraduate students. Van IJzendoorn and Kroonenberg (1988) reported that anxious attachment patterns were more prevalent in Japan and Israel whereas avoidant attachment patterns were more prevalent in Western European countries, suggesting cultural factors at play. These differential prevalence rates, and the potential variability in the meaning of attachment to individuals living within different communities, may influence the extent to which such patterns are indirectly related to binge eating and body dissatisfaction. Additionally, while the utilization of an undergraduate sample of women is consistent with research indicating that emerging adults are at particular risk of developing disordered eating (Polivy et al., 2003), future research may examine the relationships assessed in the current study among individuals prone to greater levels of

distress. For example, individuals with borderline personality disorder would likely present with greater variability in negative affect.

An additional limitation is that dieting, sociocultural attitudes towards thinness, positive affect, and hunger were not assessed. According to the dual-pathway model, binge eating is rooted in dieting, affective disturbances, or some combination of these factors (Stice, 1994). Momentary assessment of dieting, such as by assessing whether participants have restricted their food intake while hungry, would have added to current understanding of the relative importance of each of these constructs to binge eating and enhanced current understanding of the relationship between attachment insecurity and dieting behaviours. Additionally, previous research has found positive relationships among endorsement of sociocultural attitudes towards thinness, attachment anxiety, and body dissatisfaction (e.g., Cheng & Malinkrodt, 2009; Hardit & Hannum, 2012), between increasing positive affect and bulimia nervosa symptoms (Smyth et al., 2007), and between hunger and binge eating (Stein et al., 2007). Therefore, assessment of sociocultural attitudes, positive affect, and hunger could provide a more complete picture of the trait and momentary predictors implicated in binge eating. However, given that the high number of constructs assessed may have already compromised participants' response rates, inclusion of such covariates may have further limited the proportion of complete data.

As noted above, the error in entering the responses for the PANAS Negative Affect subscale was an additional limitation. This error likely introduced a ceiling effect, thereby restricting the variance in negative affect and subsequently attenuating the correlation between negative affect and other variables.

It is also noteworthy that while the current study's design was longitudinal and provided evidence of the temporal ordering among attachment insecurity, negative affect, depression,

social self-esteem, emotion dysregulation, binge eating, and body dissatisfaction, these relationships are correlational and rely on participants' accurate reporting, thereby precluding the establishment of causality (Smyth et al., 2007).

A further limitation was that, unlike Engelberg and colleagues' (2007) study, no handout describing an "unusually large" amount of food was provided to participants. However, participants were provided with descriptions and examples of binges and with contextual factors that would qualify whether certain unusually large eating episodes constituted binges (e.g., eating a large plate of food at a potluck). Nevertheless, participants may not have retained such information throughout the study period.

An additional limitation was that it is unclear whom participants were referring to when filling out the measure of attachment, as the ECR instructed respondents to complete the questionnaire while considering "people with whom you feel close" (Lo et al., 2009). Research on adolescents has found that peer attachment is a stronger predictor of abnormal eating than is parental attachment (Le Grange et al., 2014). On the other hand, the wording of the scale ensured that participants responded to the items while considering their most important relationships. Additionally, the scale has the advantage of measuring attachment styles among individuals with little experience in romantic relationships (Lo et al., 2009).

The current study also used a self-report measure of attachment. Such measures only assess relational patterns of which respondents are consciously aware. One direction of future research may be to conduct interview-based measures of attachment, such as the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1986). The AAI classifies interviewees' attachment patterns based on their language while discussing early attachment experiences (Hesse, 2008) and assesses aspects of attachment representations that are not consciously

available to respondents (Jewell et al., 2016).

Of note is that the current study did not control for the number of comparisons made. This decision was based on the concern that reducing the Type I error rate for null relationships increases the Type II error rate for non-null relationships. That is, reducing the probability required to infer a significant relationship increases the probability of failing to infer a relationship, when such a relationship actually does generalize to the population. Rothman (1990) argues that adjusting for multiple comparisons can lead scientists to miss important information in the data, and that refraining from adjusting for multiple comparisons leads to fewer errors of interpretation when the data are observations of nature. Given that the current study examined naturalistic observations among psychological and behavioural constructs, this decision was deemed appropriate. Rothman (1990) also contended that other tested relationships have no bearing on the one currently being tested, meaning that adjusting for the number of comparisons can render relationships that would be of interest if examined alone into much less notable associations.

Future research should also continue to elucidate the relationship between trait-level attachment insecurity and momentary binge eating as well as other eating disorder symptoms. To date, most research indicating a link between attachment anxiety and disordered eating has examined eating disorder symptoms such as body image (e.g., Hardit & Hannum, 2012) and presence of an eating disorder (e.g., Troisi et al., 2005), rather than the specific symptom of binge eating. Preoccupation with maintaining relationships may be more directly related to restricting, given the relationship between attachment anxiety and internalization of the thin ideal (Cheng & Malinkrodt, 2009).

Implications

Treatment implications. The current study has several implications for the prevention and treatment of binge eating and body dissatisfaction. Overall, the results confirmed that both momentary states and personality vulnerability factors lead to body dissatisfaction and binge eating, and that both should be addressed in treatment for disordered eating. Treatment of eating disorders is challenging, and dropout and relapse rates are high (Carter, Blackore, Sutandar-Pinnock, & Woodside, 2004; Weiss, Mills, Westra, & Carter, 2013). Motivational interviewing has been found to increase individuals' readiness for change, confidence in their ability to improve binge eating (Vella-Zarb, Mills, Westra, Carter, & Keating, 2015), and rate of treatment completion (Weiss et al., 2013). In addition to addressing clients' readiness for change, personalized interventions that target the specific factors that predispose an individual to eating disorder symptoms are sorely needed. The current study points towards several personality and momentary factors that clinicians should target in treatment. Such factors include attachment anxiety as well as momentary experiences of depression, of oneself as socially inadequate, and of emotion dysregulation. Previous research identifies treatment targets and evidence-based strategies in the treatment of disordered eating that fit with the current findings.

Hardit and Hannum (2012) suggest that to prevent body dissatisfaction among clients who are higher in attachment anxiety, clinicians may focus on helping clients to cope with overarousal of anxiety, address clients' perception that one must appear a certain way to be accepted, and challenge such clients' reliance on the standards of beauty perpetuated by the media to determine self-worth. Results of the current study suggest that an additional treatment target may be attuning to and accepting negative emotional states, as well as hunger and satiety cues.

In line with this suggestion, previous researchers have proposed that clinicians should attend to the extent to which a client's attachment anxiety and associated neurotic traits can exacerbate eating disorder symptoms (Eggert et al., 2007), that they should assist individuals who binge eat to cope adaptively with negative affect (Engelberg et al., 2007), and that they should facilitate acceptance of emotional responses and impulse regulation when working with clients higher in attachment anxiety (Tasca et al., 2009). The current study's finding that non-acceptance of emotional responses and difficulties modulating emotional responses mediated the relationship between attachment anxiety and both binge eating and body dissatisfaction further suggests that interventions should focus on reducing attachment anxiety and emotional difficulties (Eggert et al., 2007) as well as on decreasing binge eating.

Given the finding that difficulty in clarifying one's feelings mediates the relationship between attachment anxiety and body dissatisfaction, as well as the previous finding that dissociation is associated with binge eating (Engelberg et al., 2007), therapists may assist clients to attend to and differentiate between their emotions. Such an emphasis would assist patients to tolerate negative self-awareness (Engelberg et al., 2007). This emphasis may assist women to regulate attachment-related affect, thereby obviating the urge to binge eat. Such an approach may enhance treatment outcomes among individuals who present with disordered eating and prevent binge eating and body dissatisfaction among those experiencing anxious preoccupation in relationships.

The current study's results also have implications for the selection of specific treatment modalities. Researchers have suggested that individuals with eating disorders who binge eat to regulate emotional disturbances may not benefit greatly from cognitive-behavioural treatments, which do not directly target affect disturbances and accompanying social impairment in

treatment (Stice & Agras, 1999). However, more recently, enhanced cognitive behaviour therapy for eating disorders has incorporated the treatment of mood intolerance and interpersonal problems into treatment for individuals with this challenge (Fairburn, 2008). Results of the current study suggest that in planning treatment for clients with eating disorders, cognitive-behavioural therapists should assess clients for level of attachment anxiety at the onset of therapy so as to gauge the potential necessity of addressing such issues.

The notion of modifying treatment according to clients' attachment needs is in line with research indicating that attachment anxiety moderates treatment outcomes among women with binge-eating disorder and that, while group cognitive-behavioural therapy is more helpful for those lower in attachment anxiety, group psychodynamic interpersonal psychotherapy is more helpful for those higher in attachment anxiety (Tasca et al., 2006). The current study's identification of a link from attachment anxiety to binge eating and body dissatisfaction through emotion dysregulation further suggests that individuals higher in attachment anxiety may benefit from approaches that address their relational and affective concerns.

Further research may also examine whether individuals who are high in attachment anxiety may benefit from dialectical behaviour therapy (DBT) with its emphasis on emotion regulation and interpersonal effectiveness (Linehan, 1993). Among men and women who received a guided self-help form of DBT for binge-eating disorder, greater pre- to posttreatment improvement in emotion dysregulation predicted abstinence from binge eating at 4-month follow up (Wallace, Masson, Safer, & von Ranson, 2014). Given the mediating effects of difficulties clarifying and accepting one's emotions identified in the current study, DBT's utilization of mindfulness as a strategy for increasing awareness and acceptance of experience (Wiser & Telch, 1999) may be particularly helpful. Likewise, the mediating effect of difficulty modulating one's

emotions suggests that clients may benefit from DBT's emphasis on tolerating negative affect and decreasing maladaptive responses to aversive emotional experiences (Wiser & Telch, 1999).

The finding that social self-esteem predicted binge eating and body dissatisfaction, and that attachment anxiety moderated the associations between social self-esteem and these outcomes, suggests that when working with clients higher in attachment anxiety, clinicians should place particular emphasis on relational factors, such as the therapeutic alliance, as a mechanism of change. Researchers have suggested that when working with clients who have experienced attachment-related losses and child abuse, therapists may place particular emphasis on the formation of a trusting relationship (Mahon et al., 2001). In line with this suggestion, improvements in group therapy alliance predicted improvements in binge eating for women higher in attachment anxiety but not for those lower in attachment anxiety (Tasca et al., 2013). However, Striegel-Moore and colleagues (1993) have noted that clients' preoccupation with impression management may challenge the development of a strong therapeutic alliance. Due to concerns about their therapists' perceptions, clients may attempt to identify and meet the therapist's expectations (Striegel-Moore et al., 1993). Therefore, clinicians may place particular emphasis on providing validation to clients prone to binge eating, and on enhancing a sense of agency and personal adequacy among such individuals.

The factors identified in the current study have been shown to improve during psychotherapy. For example, attachment insecurity improved following inpatient trauma treatment, psychodynamic therapy, and CBT (Muller & Rosenkranz, 2009; Tasca, Balfour, Ritchie, & Bissada, 2007; Lawson, Barnes, Madkins, & Francios-Lamonte, 2006; Levy et al., 2006; Travis, Binder, Bliwise, & Horne-Moyer, 2001). Additionally, emotion dysregulation has been found to decrease during DBT for binge-eating disorder, supportive group therapy, and

attachment-focused group therapy (Cameron, Booth, Schlatter, Ziginskias, & Harman, 2007; Giese-Davis et al., 2002; Kilmann, Urbaniak, & Parnell, 2006; Wallace et al., 2014). By facilitating such changes in the treatment of binge eating and body dissatisfaction, clinicians may assist women to circumvent the urge to binge eat, as well as to live healthier and more meaningful lives.

Theoretical implications. Consistent with Engelberg and colleagues' (2007) depiction of binge eating as a multi-determined behaviour that is related to diverse affective, behavioural, and cognitive systems, results of the current study suggest that binge eating and body dissatisfaction can be explained from the synthesis of several perspectives, including a sociocultural perspective, the transdiagnostic theory of eating disorders (Fairburn, 2008), objectification theory (Fredrickson & Roberts, 1997), escape theory (Heatherton & Baumeister, 1991), the interpersonal model (Tanofsky-Kraff et al., 2007), and the affect regulation model (Wiser & Telch, 1999), as well as attachment theory.

Dieting occurs when exposure media-portrayed thin body ideals lead to discrepancies between media ideals and women's self-perceptions, which in turn precipitate eating disorder symptoms (Harrison, 2001; Mills, Polivy, Herman, & Tiggemann, 2002). While the majority of women in Western society are exposed to the media-idealized bodies, not all women internalize this ideal to an extent that leads to disordered eating. Certain factors, such as overvaluation of shape and weight and attachment anxiety, may place women at risk of disordered eating. According to the transdiagnostic model, overvaluation of shape and weight predisposes individuals to dieting and dieting and mood disturbances in turn predict binge eating (Fairburn, 2008). A strong emphasis on shape and weight may be accounted for by self-objectification theory, which proposes that women are uniquely susceptible to interpersonal and cultural

experiences of their bodies being scrutinized and evaluated as objects for others' scrutiny (Fredrickson & Roberts, 1997). These experiences then socialize women to perceive themselves from an observer's standpoint (Fredrickson & Roberts, 1997). Such self-objectification directs women's attention to monitoring and evaluating their observable bodies from a third-person perspective (Fredrickson & Roberts, 1997). The tendencies for women higher in attachment anxiety to be vigilant to cues of rejection and to ruminate about their perceived shortcomings (Magai, 1999; Mikulincer & Shaver, 2005) may predispose such women to viewing themselves from another's perspective in order to remain attuned to threats of abandonment. Subsequently, these women may be particularly likely to objectify themselves. In conjunction with their preoccupation with obtaining others' approval (Feeney, Noller, & Hanrahan, 1994), such self-objectification may predispose women higher in attachment anxiety to focus on meeting others' and society's standards of attractiveness, and to overvalue their shape and weight.

According to the transdiagnostic model, individuals cope with an overvaluation of shape and weight through dieting (Fairburn, 2008). However, low mood may compromise one's internal resources to restrict one's food intake, and subsequently trigger the urge to break one's diet (Fairburn, 2008). Consistent with this possibility, among undergraduate students, difficulty regulating one's emotions accounted for unique variance in binge eating over and above both food restriction and overvaluation of shape and weight (Whiteside et al., 2007). Individuals higher in attachment anxiety may be particularly susceptible to these processes, as they may be more prone to dieting in order to gain others' acceptance. Given the current study's finding that such individuals have difficulties with emotion regulation during moments of low social self-esteem, such individuals may lack the cognitive resources to continue dieting during periods of interpersonal and psychological distress.

This possibility may be further understood from the perspective of escape theory, according to which an individual may attempt to escape from distress subsequent to aversive self-awareness through disinhibited eating (Heatherton & Baumeister, 1991). Results of the current study suggest that with their particular sensitivity to emotion dysregulation during episodes of low social self-esteem, individuals higher in attachment anxiety may experience particularly strong urges to escape from such distress.

The affect regulation model of binge eating underlying DBT similarly also postulates that unpleasant emotional experiences precipitate binges. Aversive personal meanings may exacerbate emotional distress (Wiser & Telch, 1999). The internal working models of individuals higher in attachment anxiety, which characterize others in positive terms and oneself in negative terms (Jewell et al., 2016; Lopez, 1995), may be one form of personal meaning that could increase distress. Such personal beliefs tend to intensify negative affect and to lead to secondary emotional experiences (Wiser & Telch, 1999). According to the interpersonal model, interpersonal problems arising from maladaptive relational patterns are particularly likely to result in such negative affect, which is likely to precipitate loss of control eating (Tanofsky-Kraff et al., 2007).

In sum, in conjunction with the current findings, sociocultural perspectives, the transdiagnostic model, objectification theory, escape theory, the affect regulation model, the interpersonal model, and attachment theory suggest that for those higher in attachment anxiety, a pattern involving underregulation of attachment-related emotion in response to moments of problematic social self-esteem may lead to urges to escape from aversive self-awareness through binge eating. This behaviour may be particularly likely following prolonged periods of dieting, which are aimed towards meeting the high standards associated with overvaluation of shape and

weight. Since binge eating may assist to counterbalance negative emotional experiences in the absence of other emotion regulation skills, this behaviour is likely reinforcing (Wiser & Telch, 1999).

Because a multitude of factors appears to predispose and precipitate binge eating, individuals with eating disorders may benefit from an integration of apparently opposing perspectives (Linehan, 1993). In line with the philosophy of the DBT model, all approaches may present different truthful and useful perspectives (Linehan, 1993). Accordingly, clinicians may structure treatments around concepts that account for the multitude of implicated processes (Engelberg et al., 2007). Consideration of these processes from a broad biopsychosocial perspective may allow clinicians to identify specific treatment targets and select relevant models on a case-by-case basis. The consideration of the complex array of factors involved in eating disorders may facilitate the development of individualized treatment plans that are parsimonious enough to be understandable and feasible, and yet comprehensive enough to effectively optimize short- and long-term outcomes for eating disorder symptoms as well as factors underlying eating disorders.

References

- Allen, J., & Le, H. (2008). An additional measure of overall effect size for logistic regression models. *Journal of Educational and Behavioral Statistics, 33*, 416-444.
doi:10.3102/1076998607306081
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.), Arlington, VA: American Psychiatric Association.
- Anestis, M. D., Selby, E. A., Crosby, R. D., Wonderlich, S. A., Engel, S. G., & Joiner, T. E. (2010). A comparison of retrospective self-report versus ecological momentary assessment measures of affective lability in the examination of its relationship with bulimic symptomatology. *Behaviour Research and Therapy, 48*, 607-613.
doi:10.1016/j.brat.2010.03.012
- Asperg, K. K., & Wagaman, A. (2010). Emotion regulation abilities and perceived stress as predictors of negative body image and problematic eating behaviors in emerging adults. *American Journal of Psychological Research, 6*, 193-217.
- Bagby, R. M., Parker, J. D. A., & Taylor, G. J. (1994). The twenty-item Toronto Alexithymia Scale-I. Item selection and cross-validation of the factor structure. *Journal of Psychosomatic Research, 38*, 23-32. doi:10.1016/0022-3999(94)90005-1
- Bauer, D. J., Preacher, K. J., & Gil, K. M. (2006). Conceptualizing and testing random indirect effects and moderated mediation in multilevel models: New procedures and recommendations. *Psychological Methods, 11*, 142-163. doi:10.1037/1082989X.11.2.142
- Bearman, S. K., Presnell, K., Martinez, E., & Stice, E. (2006). The skinny on body dissatisfaction: A longitudinal study of adolescent girls and boys. *Journal of Youth and Adolescence, 35*, 229-241. doi:10.1007/s10964-005-9010-9

- Boone, L. (2013). Are attachment styles differentially related to interpersonal perfectionism and binge eating symptoms? *Personality and Individual Differences, 54*, 931-935.
doi:10.1016/j.paid.2013.01.006
- Bowlby, J. (1969). *Attachment and loss: Vol. 1. Attachment*. New York: Basic Books.
- Bowlby, J. (1979). *The making and breaking of affectional bonds*. London: Tavistock.
- Brennan, K. A., Clark, C. L., & Shaver, P. R. (1998). Self-report measurement of adult attachment: An integrative overview. In J. A. Simpson & W. S. Rholes (Eds.), *Attachment theory and close relationships* (pp. 46–76). New York: Guilford.
- Bowlby, J. (1982). *Attachment and loss: Vol 1: Attachment* (2nd ed.). New York, NY: Basic Books.
- Bretherton, I., & Munholland, K. A. (1999). Internal working models in attachment relationships: A construct revisited. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical applications* (pp. 89-111). New York, NY: The Guilford Press.
- Bruch, H. (1978). *The golden cage: The enigma of anorexia nervosa*. Cambridge, MA: Harvard University Press.
- Bryk, A. S., & Raudenbush, S. W. (1992). *Hierarchical linear models in social and behavioral research: Applications and data analysis methods* (1st ed.). Newbury Park, CA: Sage Publications.
- Buckholdt, K. E., Parra, G. R., & Jobe-Shields, L. (2010). Emotion dysregulation as a mechanism through which parental magnification of sadness increases risk for binge eating and limited control of eating behaviors. *Eating Behaviors, 11*, 122-126.
doi:10.1016/j.eatbeh.2009.10.003

- Bulik, C. M., Sullivan, P. F., & Kendler, K. S. (2002). Medical and psychiatric morbidity in obese women with and without binge eating. *International Journal of Eating Disorders*, *32*, 72-78. doi:10.1002/eat.10072
- Burge, D., Hammen, C., Davila, J., Daley, S. E., Paley, B., Lindberg, N., ... Rudolph, K. D. (1997). The relationship between attachment cognitions and psychological adjustment in late adolescent women. *Development and Psychopathology*, *9*, 151-187.
- Burns, E. E., Fischer, S., Jackson, J. L., & Harding, H. G. (2012). Deficits in emotion regulation mediate the relationship between childhood abuse and later eating disorder symptoms. *Child Abuse & Neglect*, *36*, 32-39. doi:10.1016/j.chiabu.2011.08.005
- Cameron, L. D., Booth, R. J., Schlatter, M., Ziginskis, D., & Harman, J. E. (2007). Changes in emotion regulation and psychological adjustment following use of a group psychosocial support program for women recently diagnosed with breast cancer. *Psycho-Oncology*, *16*, 171-180. doi:10.1002/pon.1050
- Carano, A., De Berardis, D., Gambi, F., Di Paolo, C., Campanella, D., Pelusi, L., ... Ferro, F. M. (2006). Alexithymia and body image in adult patients with binge eating disorder. *International Journal of Eating Disorders*, *39*, 332-340. doi:10.1102/eat.20238
- Carter, J. C., Backmore, E., Sutandar-Pinnock, K., & Woodside, D. B. (2004). Relapse in anorexia nervosa: A survival analysis. *Psychological Medicine*, *34*, 671-679. doi:10.1017/S0033291703001168
- Cash, T. F., Fleming, E. C., Alindogan, J., Steadman, L., & Whitehead, A. (2002). Beyond body image as a trait: The development and validation of the Body Image States Scale. *Eating Disorders: The Journal of Treatment & Prevention*, *10*, 103-113. doi:10.1080/1064026029008167 8

- Cash, T. F., Thériault, J., Annis, N. M. (2004). Body image in an interpersonal context: Adult attachment, fear of intimacy and social anxiety [Special issue]. *Journal of Social and Clinical Psychology, 23*, 89-103. doi:10.1521/jscp.23.1.89.26987
- Cassidy, J. (1994). Emotion regulation: Influences of attachment relationships. In N. A. Fox (Ed.), *The development of emotion regulation: Biological and behavioral considerations. Monographs of the Society for Research in Child Development, 59*(2-3, Serial No. 240).
- Cattanach, L., Malley, R., & Rodin, J. (1988). Psychologic and physiologic reactivity to stressors in eating disordered individuals. *Psychosomatic Medicine, 50*, 591–599.
- Cheng, H. L., & Malinkrodt, B. (2009). Parental bonds, anxious attachment, media internalization, and body image dissatisfaction: Exploring a mediation model. *Journal of Counseling Psychology, 56*, 365–375. doi:10.1037/a0015067
- Clark, L. A., & Watson, D. (1995). Constructing validity: Basic issues in objective scale development. *Psychological Assessment, 7*, 309-319. doi:10.1037/1040-3590.7.3.309
- Clinton, J. D. (2004). Sphericity assumption. In M. S. Lewis-Beck, A. Bryman, & T. F. Liao (Eds.), *The Sage encyclopedia of social science research methods* (Vol. 3, pp. 1057-1058). Thousand Oaks, CA: Sage Publications.
- Cochrane, C. E., Brewerton, T. D., Wilson, D. B., & Hodges, E. L. (1993). Alexithymia in the eating disorders. *International Journal of Eating Disorders, 14*, 219-222.
doi:10.1002/1098-108X(199309)14:2<219::AID-EAT2260140212>3.0.CO;2-G
- Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Mahwah, NJ: Lawrence Erlbaum Associates.
- Colautti, L. A., Fuller- Tyszkiewicz, M., McCabe, M., Blackburn, S., & Wyett, E. (2011).

- Accounting for fluctuations in body dissatisfaction. *Body Image*, 8, 315-321.
doi:10.1016/j.bodyim.2011.07.001
- Cole-Detke, H., & Kobak, R. (1996). Attachment processes in eating disorders and depression. *Journal of Consulting and Clinical Psychology*, 64, 282-290.
doi:10.1037/0022006X.64.2.282
- Collins, N. L., & Read, S. J. (1990). Adult attachment, working models, and relationship quality in dating couples. *Journal of Personality and Social Psychology*, 58, 644-663.
doi:10.1037/0022-3514.58.4.644
- Crawford, J. R., & Henry, J. D. (2004). The Positive and Negative Affect Schedule (PANAS): Construct validity, measurement properties and normative data in a large non-clinical sample. *British Journal of Clinical Psychology*, 43, 245-265.
doi:10.1348/0144665031752934
- Crosby, R. D., Wonderlich, S. A., Engel, S. G., Simonich, H., Smyth, J., & Mitchell, J. E. (2009). Daily mood patterns and bulimic behaviors in the natural environment. *Behaviour Research and Therapy*, 41, 181-188. doi:10.1016/j.brat.2008.11.006
- Dozier, M. (1999). Attachment and psychopathology in adulthood. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical applications* (pp. 718-744). New York, NY: The Guilford Press.
- Eggert, J., Levendosky, A., & Klump, K. (2007). Relationships among attachment styles, personality characteristics, and disordered eating. *International Journal of Eating Disorders*, 40, 149-155. doi:10.1002/eat.20351
- Enders, C. K., & Tofighi, D. (2007). Centering predictor variables in cross-sectional multilevel models: A new look at an old issue. *Psychological Methods*, 12, 121-138.

doi:10.1037/1082-989.12.2.121

- Engel, S. G., Adair, C. E., Hayas, C. L., & Abraham, S. (2009). Health-related quality of life and eating disorders: A review and update. *International Journal of Eating Disorders, 42*, 179–187. doi:10.1002/eat.20602
- Engelberg, M. J., Steiger, H., Gauvin, L., & Wonderlich, S. A. (2007). Binge antecedents in bulimic syndromes: An examination of dissociation and negative affect. *International Journal of Eating Disorders, 40*, 531-536. doi:10.1002/eat.20399
- Esplen, M. J., Garfinkel, P., & Gallop, R. (2000). Relationship between self-soothing, aloneness, and evocative memory in Bulimia Nervosa. *International Journal of Eating Disorders, 27*, 96-100. doi:10.1002/(SICI)1098-108X(200001)27:1<96::AID-EAT11>3.0.CO;2-S
- Fairburn, C. G., & Cooper, Z. (1993). The Eating Disorder Examination (12th ed.). In: C. G. Fairburn & C. T. Wilson (Eds.). *Binge Eating: Nature, Assessment, and Treatment* (pp. 317-360). New York, NY: Guilford Press.
- Fairburn, C. G., Cooper, Z., & O'Connor, M. (2008). Eating Disorder Examination (Ed. 16.0D). In C. G. Fairburn (Ed.). *Cognitive Behavior Therapy and Eating Disorders*. New York, NY: Guilford Press.
- Fairburn, C. G., Cooper, Z., & Shafran, R. (2003). Cognitive behaviour therapy for eating disorders: a “transdiagnostic” theory and treatment. *Behaviour Research and Therapy, 41*, 509-528. doi:10.1016/S0005-7967(02)00088-8
- Fitzgibbon, M. L., Sánchez-Johnson, L. A. P., & Martinovich, Z. (2003). A test of the continuity perspective across bulimic and binge eating pathology. *International Journal of Eating Disorders, 34*, 83-97. doi:10.1002/eat.10160
- FluidSurveys. (2016). *FluidSurveys*. Retrieved from <http://fluidsurveys.com/>

- Fonagy P., Bateman A., & Luyten P. Introduction and overview. In: Bateman, A.W, & Fonagy P. (Eds), *Handbook of mentalizing in mental health practice* (pp. 3-42). Arlington, TX: American Psychiatric Publishers.
- Frewen, P., Thornley, E., & Vorstenbosch, V. (in press). Gender differences in perceived causal relations between trauma-related symptoms and eating disorders in online community and inpatient samples. *Traumatology*.
- Friedlander, M. L., & Siegel, S. M. (1990). Separation-individuation difficulties and cognitive-behavioral indicators of eating disorders among college women. *Journal of Counseling Psychology, 37*, 74-78. doi: 10.1037/0022-0167.37.1.74
- Gallop, R., & Tasca, G. A. (2009). Multilevel modeling of longitudinal data for psychotherapy researchers: II. The complexities. *Psychotherapy Research, 19*, 438-452.
doi:10.1080/10503300902849475
- Gauvin, L., Steiger, H., & Brodeur, J. (2009). Eating-disorder symptoms and syndromes in a sample of urban-dwelling Canadian women: Contributions toward a population health perspective. *International Journal of Eating Disorders, 42*, 158- 165.
doi:10.1002/eat.20590
- George, C. (1996). A representational perspective of child abuse and prevention: Internal working models of attachment and caregiving. *Child Abuse & Neglect, 20*, 411-424.
doi:10.1016/0145-2134(96)00016-6
- George, C., Kaplan, N., & Main, M. (1984/1985/1996). *Attachment interview for adults*. Unpublished manuscript. University of California, Berkeley.
- Gergely, G., & Watson, J. S. (1996). The social biofeedback theory of parental affect mirroring: The development of emotional self-awareness and self-control in infancy. *International*

- Journal of Psycho-Analysis*, 77,1181-1212. Retrieved from
[http://onlinelibrary.wiley.com/journal/10.1111/\(ISSN\)1745-8315](http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1745-8315)
- Giese-Davis, J., Koopman, C., Butler, L. S., Classen, C., Cordova, M., Fobair, P., ... Spiegel, D. (2002). Change in emotion-regulation strategy for women with metastatic breast cancer following supportive–expressive group therapy. *Journal of Consulting and Clinical Psychology*, 70, 916-925. doi:10.1037//0022-006X.70.4.916
- Gilbert, M. L. (2007). *Insecure attachment, negative affectivity, alexithymia, level of emotional awareness, and body image disturbance as predictors of binge eating severity in women who binge*. Retrieved from from ProQuest Dissertations and Theses database. (UMI No. 3255523)
- Google. (2013). *Our Mobile Planet: Canada*. Retrieved from
<http://services.google.com/fh/files/misc/omp-2013-ca-en.pdf>
- Goossens, L., Braet, C., Van Durme, K., Decaluwé V, & Bosmans, G. (2012). *Journal of Clinical Child and Adolescent Psychology*, 41, 445-457.
doi:10.1080/15374416.2012.660690
- Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the difficulties in emotion regulation scale. *Journal of Psychopathology and Behavioral Assessment*, 26, 41-54. doi:10.1007/s10862-008-9102-4
- Grenon, R., Tasca, G. A., Cwinn, E., Coyle, D., Sumber, A., Gick, M., & Bissada, H. (2010). Depressive symptoms are associated with medication use and lower health-related quality of life in overweight women with binge eating disorder. *Women's Health Issues*, 6, 435-440. doi:10.1016/j.whi.2010.07.004

- Grilo, C. M., Masheb, R. M., Brody, M., Burke-Martindale, C. H., & Rothschild, B. S. (2005). Binge eating and self-esteem predict body image dissatisfaction among obese men and women seeking bariatric surgery. *International Journal of Eating Disorders, 37*, 347-351. doi:10.1002/eat.20130
- Gruza, R. A., Przybeck, T. R., & Cloninger, C. R. (2007). Prevalence and correlates of binge eating disorder in a community sample. *Comprehensive Psychiatry, 48*, 124-131. doi:10.1016/j.comppsy.2006.08.002
- Haedt-Matt, A. A., Zalta, A. K., Forbush, K. T., & Keel, P. K. (2012). Experimental evidence that changes in mood cause changes in body dissatisfaction among undergraduate women. *Body Image, 9*, 216-220. doi:10.1016/j.bodyim.2011.11.004
- Hardit, S. K., & Hannum, J. W. (2012). Attachment, the tripartite influence model, and the development of body dissatisfaction. *Body Image, 9*, 469-475. doi:10.1016/j.bodyim.2012.06.003
- Harrison, K. (2001). Ourselves, our bodies: Thin-ideal media, self discrepancies, and eating disorder symptomatology in adolescents. *Journal of Social and Clinical Psychology, 20*, 289-323. doi:10.1521/jscp.20.3.289.22303
- Hazan, C., & Shaver, P. (1987). Romantic love conceptualized as an attachment process. *Journal of Personality and Social Psychology, 52*, 511-524. doi:10.1037/0022-3514.52.3.511
- Heatherton, T. F., & Baumeister, R. F. (1991). Binge eating as escape from self-awareness. *Psychological Bulletin, 110*, 86-108. doi:10.1037/0033-2909.110.1.86
- Heatherton, T. F., & Polivy, J. (1991). Development and validation of a scale for measuring state self-esteem. *Journal of Personality and Social Psychology, 60*, 895-910. doi:10.1037/0022 3514.60.6.895

- Heesacker, R. S., & Neimeyer, G. J. (1990). Assessing object relations and social cognitive correlates of eating disorder. *Journal of Counseling Psychology, 1990*, 419-426.
doi:10.1037/0022-0167.37.4.419
- Herman, C. P., & Polivy, J. (1996). What does abnormal eating tell us about normal eating? In H. L. Meiselman & H. J. H. MacFie (Eds.), *Food choice, acceptance and consumption* (pp. 207-238). London, UK: Blackie Academic & Professional.
- Heron, K. E., Scott, S. B., Sliwinski, M. J., & Smyth, J. M. (2014). Eating behaviors and negative affect in college women's everyday lives. *International Journal of Eating Disorders, 47*, 853-859. doi:10.1002/eat.22292
- Heron, K. E., & Smyth, J. M. (2013). Body image discrepancy and negative affect in women's every lives: An ecological momentary assessment evaluation of self-discrepancy theory. *Journal of Social and Clinical Psychology, 32*, 276-295. doi:10.1521/jscp.2013.32.3.276
- Hesse, E. (2008). The Adult Attachment Interview: Protocol, method of analysis, and empirical studies. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical applications* (pp. 552-598). New York, NY: The Guilford Press.
- Hoek, H. W. (2006). Incidence, prevalence and mortality of anorexia nervosa and eating disorders. *Current Opinion in Psychiatry, 19*, 389-394.
doi:10.1097/01.yco.0000228759.95237.78
- Hudson, J. I., Hiripi, E., Pope, H. G., & Kessler, R. C. (2007). The prevalence and correlates of eating disorders in the National Comorbidity Survey Replication. *Biological Psychiatry, 61*, 348-358. doi:10.1016/j.biopsych.2006.03.040
- Iannantuono, A. C., & Tylka, T. L. (2012). Interpersonal and intrapersonal links to body appreciation in college women: An exploratory model. *Body Image, 9*, 227-235.

doi:10.1016/j.bodyim.2012.01.004

Illing, V., Tasca, G. A., Balfour, L., & Bissada, H. (2010). Attachment insecurity predicts eating disorder symptoms and treatment outcomes in a clinical sample of women. *Journal of Nervous and Mental Disease, 198*, 653-659. doi:10.1097/NMD.0b013e3181ef34b2

Jewell, T., Collyer, H., Gardner, T., Tchanturia, K., Simic, M., Fonagy, P., & Eisler, I. (2016). Attachment and mentalization and their association with child and adolescent eating pathology: A systematic review. *International Journal of Eating Disorders, 49*, 354-373.

doi:10.1002/eat.22473

Johnson, J. G., Spitzer, R. L., & Williams, B. W. (2001). Health problems, impairment, and illnesses associated with bulimia nervosa and binge eating disorder among primary care and obstetric gynaecology patients. *Psychological Medicine, 31*, 1455-1466.

doi:10.1017/S0033291701004640

Johnson, C., & Larson, R. (1982). Bulimia: An analysis of moods and behaviour. *Psychosomatic Medicine, 44*, 341-351. doi:10.1097/00006842-198209000-00003

Johnson, F. & Wardle, J. (2005). Dietary restraint, body dissatisfaction, and psychological distress: A prospective analysis. *Journal of Abnormal Psychology, 114*, 119-125.

doi:10.1037/0021-843X.114.1.119

Joubert, D., Webster, L., & Hackett, R. K. (2012). Unresolved Attachment Status and Trauma-Related Symptomatology in Maltreated Adolescents: An Examination of Cognitive Mediators. *Child Psychiatry & Human Development, 43*, 471-483.

doi:10.1007/s10578011-0276-8

Judd, C.M., & Kenny, D. A. (1981). *Estimating the effects of social interventions*. Cambridge, UK: Cambridge University Press.

- Keating, L., Tasca, G. A., & Bissada, H. (2015). Pre-treatment attachment anxiety predicts change in depressive symptoms in women who complete day hospital treatment for anorexia and bulimia nervosa. *Psychology and Psychotherapy*, 88, 54-70.
doi:10.1111/papt.12028
- Keating, L., Tasca, G. A., & Hill, R. (2013). Structural relationships among attachment insecurity, alexithymia, and body esteem in women with eating disorders. *Eating Behaviors*, 14, 366-373. doi:10.1016/j.eatbeh.2013.06.013
- Keel, P. K., Mitchell, J. E., Davis, T. L., & Crow, S. J. (2001). Relationship between depression and body dissatisfaction in women diagnosed with bulimia nervosa. *International Journal of Eating Disorders*, 30, 48-56. doi:10.1002/eat.1053
- Kilmann, P. R., Urbaniak, G. C., & Parnell, M. (2006). Effects of attachment-focused versus relationship skills-focused group interventions for college students with insecure attachment patterns. *Attachment & Human Development*, 8, 47-62.
doi:10.1080/14616730600585219
- Kim, G. Y. (2007). *Consequences of normative body image dissatisfaction: The development of two scales* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses database. (UMI No.. 3305508)
- Kobak, R. (1999). The emotional dynamics of disruptions in attachment relationships: Implications for theory, research, and clinical intervention. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical applications* (pp. 21- 43). New York, NY: The Guilford Press.
- Krull, J.L., & MacKinnon, D. P. (1999). Multilevel mediation modeling in group-based intervention studies. *Evaluation Review*, 23, 418-444.

doi:10.1177/0193841X9902300404

Lavender, J. M., & Anderson, D. A. (2010). Contribution of emotion regulation difficulties to disordered eating and body dissatisfaction in college men. *International Journal of Eating Disorders, 43*, 352-357. doi:10.1002/eat.20705

Lavender, J. M., Happel, K., Anestis, M. D., Tull, M. T., & Gratz, K. L. (2015). The interactive role of distress tolerance and eating expectancies in bulimic symptoms among substance abusers. *Eating Behaviors, 16*, 88-91. doi:10.1016/j.eatbeh.2014.10.006

Lavender, J. M., Tull, M. T., DiLillo, D., Messman-Moore, T., & Gratz, K. L. (2015). Development and Validation of a state-based measure of emotion dysregulation: The State Difficulties in Emotion Regulation Scale (S-DERS). *Assessment*. doi:10.1177/1073191115601218

Lawson, D. M., Barnes, A. D., Madkins, J. P., & Francio-Lamonte, B. M. (2006). Changes in male partner abuser attachment styles in group treatment. *Psychotherapy: Theory, Research, Practice, Training, 43*, 232-237. doi:10.1037/0033-3204.43.2.232

Le Grange, D., O'Connor, M., Hughes, E. K., Macdonald, J., Little, K., & Olsson, C. A. (2014). Developmental antecedents of abnormal eating attitudes and behaviors in adolescence. *International Journal of Eating Disorders, 47*, 813-824. doi:10.1002/eat.22331

Leahey, T. M., Crowther, J. H., & Ciesla, J. A. (2011). An ecological momentary assessment of the effects of weight and shape social comparisons on women with eating pathology, high body dissatisfaction, and low body dissatisfaction. *Behavior Therapy, 42*, 197-210. doi:10.1016/j.beth.2010.07.003

LePage, M. L., & Crowther, J. H. (2010). The effects of exercise on body dissatisfaction and affect. *Body Image, 7*, 124-130. doi: 10.1016/j.bodyim.2009.12.002

- Levy, K. N., Meehan, K. B., Kelly, K. M., Reynoso, J. S., Weber, M., Clarkin, J. F., & Kernberg, O. F. (2006). Change in attachment patterns and reflective function in a randomized control trial of transference-focused psychotherapy for borderline personality disorder. *Journal of Consulting and Clinical Psychology, 74*, 1027-1040.
doi:10.1037/0022006X.74.6.1027
- Linehan, M. M. (1993). *Skills training manual for treating borderline personality disorder*. New York, NY: Guilford Press.
- Linn, R. L., Hamisch, D. L., & Dunbar, S. B. (1981). Correction for range restriction: An empirical investigation of conditions resulting in conservative corrections. *Journal of Applied Psychology, 6*, 655-663. doi:10.1037/0021-9010.66.6.655
- Little, R., & Rubin, D. (2002). *Statistical analysis with missing data*. New York, NY: John Wiley.
- Lo, C., Walsh, A., Mikulincer, M., Gagliese, L., Zimmermann, C., & Rodin, G. (2009). Measuring attachment security in patients with advanced cancer: Psychometric properties of a modified and brief Experiences in Close Relationships Scale. *Psycho-Oncology, 18*, 490-499. doi:10.1002/pon.1417
- Lopez, F. G. (1995). Contemporary attachment theory: An introduction with implications for counseling psychology. *The Counseling Psychologist, 23*, 395-414.
doi:10.1177/0011000095233001
- Lovibond, P.F. & Lovibond, S.H. (1995). The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour Research and Therapy, 33*, 335-343.
doi:10.1016/0005-7967(94)00075-U

- Lyons-Ruth K., & Jacobvitz D. Attachment disorganization: Unresolved loss, relational violence, and lapses in behavioural and attentional strategies. In: Cassidy J, Shaver PR, eds. *Handbook of attachment: Theory, research, and clinical applications*. New York, NY: Guilford Press; 1999:520-554.
- MacKinnon, D. P., Krull, J. L., & Lockwood, C. M. (2000). Equivalence of the mediation, confounding and suppression effect. *Prevention Science, 1*, 173-181.
doi:10.1023/A:1026595011371
- MacKinnon, D. P., Lockwood, C. M., & Williams, J. (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate Behavioral Research, 39*, 99-128. doi:10.1207/s15327906mbr3901_4
- Magai, C. (1999). Affect, imagery, and attachment: Working models of interpersonal affect and the socialization of emotion. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical applications* (pp. 787- 802). New York, NY: The Guilford Press.
- Mahon, J., Bradley, S. N., Harvey, P. K., Winston, A. P., & Palner, R. L. (2001). Childhood trauma has dose-effect relationship with dropping out from psychotherapeutic treatment for bulimia nervosa: A replication. *International Journal of Eating Disorders, 30*, 138-148. doi:10.1002/eat.1066
- Marvin, R. S., & Britner, P. A. (1999). Normative development: The ontogeny of attachment. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical applications* (pp. 44-67). New York, NY: The Guilford Press.
- Maxwell, S. E., & Cole, D. A. (2007). Bias in cross-sectional analyses of longitudinal mediation. *Psychological Methods, 12*, 23-44. doi:10.1037/1082-989X.12.1.23

- McFarlane, T., Urbaszat, D., & Olmsted, M. P. (2011). "I feel fat": An experimental induction of body displacement in disordered eating. *Behaviour Research and Therapy*, *49*, 289-293. doi:10.1016/j.brat.2011.01.008
- Meins, E., Fernyhough, C., de Rosnay, M., Arnott, B., Leekam, S. R., & Turner, C. M. (2012). Mind-mindedness as a multidimensional construct: Appropriate and nonattuned mind-related comments independently predict infant–mother attachment in a socially diverse sample. *Infancy*, *17*, 393-415. doi:10.1111/j.1532-7078.2011.00087.x
- Michopoulos, V., Powers, A., Moore, C., Villarreal, S., Bessler, K. J., & Bradle, Bekh. (2015). The mediating role of emotion dysregulation and depression on the relationship between childhood trauma exposure and emotional eating. *Appetite*, *91*, 129-136. doi:10.1016/j.appet.2015.03.036
- Mikulincer, M., & Shaver, P. R. (2005). Attachment security, compassion, and altruism. *Current Directions in Psychological Science*, *14*, 34-38. doi:10.1111/j.09637214.2005.00330.x
- Mills, J. S., Polivy, J., Herman, P. C., & Tiggemann, M. (2002). Effects of exposure to thin media images: Evidence of self-enhancement among restrained eaters. *Personality and Social Psychology Bulletin*, *28*, 1687-1699. doi:10.1177/014616702237650
- Moulton, S. J., Newman, E., Power, K., Sanson, V., & Day, K. (2015). Childhood trauma and eating psychopathology: A mediating role for dissociation and emotion dysregulation. *Child Abuse & Neglect*, *39*, 167-174. doi:10.1016/j.chiabu.2014.07.003
- Muller, R. T., & Rosenkranz, S. E. (2009). Attachment and treatment response among adults in inpatient treatment for posttraumatic stress disorder. *Psychotherapy Theory, Research, Practice, Training*, *46*, 82-96. doi:10.1037/a0015137
- NEDIC. (2008). Information on eating disorders and weight preoccupation. Retrieved January

- 20, 2014, from <http://www.nedic.ca/index.shtml>
- Nezlek, J. B. (2008). An introduction to multilevel modeling for social and personality psychology. *Social and Personality Psychology Compass*, 2, 842-860.
doi:10.1111/j.1751-9004.2007.00059.x
- Park, L. E. (2007). Appearance-based rejection sensitivity: Implications for mental and physical health, affect, and motivation. *Personality and Social Psychology Bulletin*, 33, 490-504.
doi:10.1177/0146167206296301
- Pearlman, E. (2005). Terror of desire: The etiology of eating disorders from an attachment theory perspective. *Psychoanalytic Review*, 92, 223-235. doi:10.1521/prev.92.2.223.62354
- Pew Research Center. (2013). *Smartphone Ownership- 2013 Update*. Retrieved from http://www.pewinternet.org/~media/Files/Reports/2013/PIP_Smartphone_adoption_2013.pdf
- Polivy, J., Herman, C.P., Mills, J.S., & Wheeler, H.B. (2003). Eating disorders in adolescence. In G. Adams & M. Berzonsky (Eds.), *Blackwell Handbook of Adolescence* (pp. 523-549). Oxford: Blackwell Publishing.
- Preacher, K. J., & Kelley, K. (2011). Effect size measures for mediation models: Quantitative strategies for communicating indirect effects. *Psychological Methods*, 16, 93-115.
doi:10.1037/a0022658
- Preacher, K. J., & Selig, J. P. (2012). Advantages of Monte Carlo confidence intervals for indirect effects. *Communication Methods and Measures*, 6, 77-98.
doi:10.1080/19312458.2012.679848
- Ranzenhofer, L. M., Engel, S. G., Crosby, R. D., Anderson, M., Vannucci, A., Cohen, L. A., ... Tanofsky-Kraff, M. (2014). Using ecological momentary assessment to examine

- interpersonal and affective predictors of loss of control eating in adolescent girls. *International Journal of Eating Disorders*, 47, 748-757. doi:10.1002/eat.22333
- Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models* (2nd ed.). Thousand Oaks, CA: Sage Publications.
- Raudenbush, S. W., Bryk, A. S., Cheong, Y. F., Congdon, R. T., & du Toit, M. (2011). HLM7: Hierarchical linear and nonlinear modeling. Chicago, IL: Scientific Software International.
- Red Oxygen. (2010). *Red Oxygen*. Retrieved from <http://www.redoxygen.com/>
- Reichborn-Kjennerud, T., Bulik, C. M., Sullivan, P. F., Tambs, K., & Harris, J. R. (2004). Psychiatric and medical symptoms in binge eating in the absence of compensatory behaviors. *Obesity Research*, 12, 1445-1454. doi:10.1038/oby.2004.181
- Rogers, C. R. (1961). *On becoming a person*. Boston: Houghton Mifflin.
- Rothman, K. J. (1990). No adjustments are needed for multiple comparisons. *Epidemiology*, 1, 43-46. doi:10.1097/00001648-199001000-00010
- Schore, A. N. (1994). *Affect regulation and the origin of the self: The neurobiology of emotional development*. Hillsdale, NJ: Erlbaum.
- Selig, J. P., & Preacher, K. J. (2008). Monte Carlo method for assessing mediation: An interactive tool for creating confidence intervals for indirect effects [Computer software]. Retrieved from <http://quantpsy.org/>
- Shakory, S., Van Exan, J., Mills, J. S., Sockalingam, S., Keating, L., & Taube-Schiff, M. (2015). Binge eating in bariatric surgery candidates: The role of insecure attachment and emotion regulation. *Appetite*, 91, 69-75. doi:10.1016/j.appet.2015.03.026
- Sharpe, T. M., Killen, J. D., Bryson, S. W., Shisslak, C. M., Estes, L. S., Gray, N., ... Taylor, C.

- B. (1998). Attachment style and weight concerns in preadolescent and adolescent girls. *International Journal of Eating Disorders*, *23*, 39-44.
doi:10.1002/(SICI)1098108X(199801)23:1<39::AID-EAT5>3.0.CO;2-2
- Shaver, P. R., & Mikulincer, M. (2002). Attachment-related psychodynamics. *Attachment and human development*, *4*, 133-161. doi:10.1080/14616730210154171
- Sherry, S. B., Vriend, J. L., Hewitt, P. L., Sherry, D. L., Flett, G. L., & Wardop, A. A. (2009). Perfectionism dimensions, appearance schemas, and body image disturbance in community members and university students. *Body Image*, *6*, 83-89.
doi:10.1016/j.bodyim.2008.12.002
- Sim, L., & Zeman, J. (2006). The contribution of emotion regulation to body dissatisfaction and disordered eating in early adolescent girls. *Journal of Youth and Adolescence*, *35*, 219-228. doi:10.1007/s10964-005-9003-8
- Slade, A. (1999). Attachment theory and research: Implications for the theory and practice of individual psychotherapy with adults. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical applications* (pp. 575-594). New York, NY: The Guilford Press.
- Smyth, J., Wonderlich, S., Crosby, R., Miltenberger, R., Mitchell, J., & Rorty, M. (2001). The use of ecological momentary assessment approaches in eating disorder research. *International Journal of Eating Disorders*, *30*, 83-95. doi:10.1002/eat.1057
- Smyth, J. M., Wonderlich, S. A., Heron, K. E., Sliwinski, M. J., Crosby, R. D., Mitchell, J. E., & Engel, S. G. (2007). Daily and momentary mood and stress are associated with binge eating. *Journal of Consulting and Clinical Psychology*, *75*, 629-638.
doi:10.1037/0022006X.75.4.629

- Sorbara, M., & Geliebter, A. (2002). Body image disturbance in obese outpatients before and after weight loss in relation to race, gender, binge eating, and age of onset in obesity. *International Journal of Eating Disorders, 31*, 416-423. doi:10.1002/eat.10046
- Speranza, M., Corcos, M., Loas, G., Stephan, P., Guilbaud, O., Perez-Diaz, F., ... Jeammet, P. (2005). Depressive personality dimensions and alexithymia in eating disorders. *Psychiatry Research, 135*, 153-163. doi:10.1016/j.psychres.2005.04.001
- Spoor, S. T. P., Bekker, M. H. J., Van Strien, T., & van Heck, G. L. Relations between negative affect, coping, and emotional eating. *Appetite, 48*, 368-376.
doi:10.1016/j.appet.2006.10.005
- Stein, K. F., & Corte, C. M. (2003). Ecologic momentary assessment of eating-disordered behaviors. *International Journal of Eating Disorders, 34*, 349-360.
doi:10.1002/eat.10194
- Stein, R. I., Kenardy, J., Wiseman, C. V., Dounchis, J. Z., Arnow, B. A., & Wilfley, D. E. (2007). What's driving the binge in binge eating disorder?: A prospective examination of precursors and consequences. *International Journal of Eating Disorders, 40*, 195-203.
doi:10.1002/eat.20352
- Stevens, J. P. (2002). *Applied multivariate statistics for the social sciences* (4th ed.). Mahwah, NJ: Erlbaum.
- Stice, E. (1994). A review of the evidence for a sociocultural model of bulimia nervosa and an exploration of the mechanisms of action. *Clinical Psychology Review, 14*, 633-661.
10.1016/0272-7358(94)90002-7
- Stice, E., & Agras, W. S. (1999). Subtyping bulimic women along dietary restraint and negative affect dimensions. *Journal of Consulting and Clinical Psychology, 67*, 460-469.

doi:10.1037/0022-006X.67.4.460

Stice, E., & Shaw, H. E. (2002). Role of body dissatisfaction in the onset and maintenance of eating pathology: A synthesis of research findings. *Journal of Psychosomatic Research*, *53*, 985-993. doi:10.1016/S0022-3999(02)00488-9

Stice, E., & Whitenton, K. (2002). Risk factors for body dissatisfaction in adolescent girls: A longitudinal investigation. *Developmental Psychology*, *38*, 669-678.

doi:10.1037//00121649.38.5.669

Stöber, J. (1999). Die Soziale-Erwünschtheits-Skala-17 (SES-17): Entwicklung und erste Befunde zu Reliabilität und Validität [The Social Desirability Scale-17 (SDS-17): Development and first results on reliability and validity]. *Diagnostica*, *45*, 173-177.

Retrieved from <http://www.hogrefe.de/zeitschriften/diagnostica/>

Stöber, J. (2001). The Social Desirability Scale-17 (SDS-17): Convergent validity, discriminant validity, and relationship with age. *European Journal of Psychological Assessment*, *17*, 222-232. doi:10.1027//1015-5759.17.3.222

Stone, A. A., & Shiffman, S. (1994). Ecological momentary assessment (EMA) in behavioral science. *Annals of Behavioral Medicine*, *16*, 199-202. Retrieved from

<http://www.springer.com/medicine/journal/12160>

Striegel-Moore, R. H., Dohm, F. A., Solomon, E. E., Fairburn, C. G., Pike, K. M., & Wilfley, D. E. (2000). Subthreshold binge eating disorder. *International Journal of Eating Disorders*, *27*, 270-278. doi:10.1002/(SICI)1098-108X(200004)27:3<270::AID-EAT3>3.0.CO;2-1

Striegel-Moore, R. H., Silbterstein, L. R., & Rodin, J. (1993). The social self in bulimia nervosa: Public self-consciousness, social anxiety, and perceived fraudulence. *Journal of Abnormal Psychology*, *102*, 297-303. doi:10.1037/0021-843.X.102.2.207

- Suldo, S. M., & Sandberg, D. A. (2000). Relationship between attachment styles and eating disorder symptomatology among college women. *Journal of College Student Psychotherapy, 15*, 59-73. doi:10.1300/J035v15n01_07
- Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Boston, MA: Pearson Education Inc.
- Tanofsky-Kraff, M., Wilfley, D. E., Young, J. F., Mufson, L., Yanovski, S. Z., Glasofer, D. R., & Salaita, C. G. (2007). Preventing excessive weight gain in adolescents: Interpersonal psychotherapy for binge eating. *Obesity, 15*, 1345-1355. doi:10.1038/oby.2007.162
- Tasca, G., Balfour, L., Ritchie, K., & Bissada, H. (2007). Change in attachment anxiety is associated with improved depression among women with binge eating disorder. *Psychotherapy: Theory, Research, Practice, Training, 44*, 423-433. doi:10.1037/00333204.44.4.423
- Tasca, G. A., & Balfour, L. (2014). Attachment and eating disorders: A review of current research. *International Journal of Eating Disorders, 47*, 710-717. doi:10.1002/eat.22302
- Tasca, G. A., Mikail, S., & Hewitt, P. (2005). Group psychodynamic interpersonal psychotherapy: A manual for time limited treatment of binge eating disorder. In M. E. Abelian (Ed.), *Focus on psychotherapy research* (pp. 159-188). Hauppauge, NY: Nova.
- Tasca, G. A., Ramsay, T., Corace, K., Illing, V., Bone, M., Bissada, H., & Balfour, L. (2010). Modeling longitudinal data from a rolling therapy group program with membership turnover: Does group culture affect individual alliance? *Group Dynamics: Theory, Research, and Practice, 14*, 151-162. doi:10.1037/a0018778
- Tasca, G. A., Ritchie, K., Conrad, G., Balfour, L., Gayton, J., Daigle, V., & Bissada, H. (2006). Attachment scales predict outcome in a randomized controlled trial of two group

- therapies for binge eating disorder: An aptitude by treatment interaction. *Psychotherapy Research*, *16*, 106-121. doi:10.1080/10503300500090928
- Tasca, G. A., Szadkowski, L., Illing, V., Trinneer, A., Grenon, R., Demidenko, N., ... Bissada, H. (2009). Adult attachment, depression, and eating disorder symptoms: The mediating role of affect regulation strategies. *Personality and Individual Differences*, *47*, 662-667. doi:10.1016/j.paid.2009.06.006
- Tasca, G. A., Taylor, D., Bissada, H., Ritchie, K., & Balfour, L. (2004). Attachment predicts treatment completion in an eating disorders partial hospital program among women with anorexia nervosa. *Journal of Personality and Assessment*, *83*, 201-212. doi:10.1207/s15327752jpa8303_04
- Travis, L. A., Binder, J. L., Bliwise, N. G., & Horne-Moyer, H. L. (2001). Changes in clients attachment styles over the course of time-limited dynamic therapy. *Psychotherapy: Theory, Research, Practice, Training*, *38*, 149-159. doi:10.1037/0033-3204.38.2.149
- Tribole, E., & Resch, E. (1995). *Intuitive eating: A recovery book for the chronic dieter*. New York, NY: St. Martin's Press.
- Troisi, A., D'Argenio, A., Peracchio, F., & Petti, P. (2001). Insecure attachment and alexithymia in young men with mood symptoms. *The Journal of Nervous and Mental Disease*, *189*, 311-316. Retrieved from http://journals.lww.com/jonmd/Abstract/2001/05000/Insecure_Attachment_and_Alexithymia_in_Young_Men.7.aspx
- Troisi, A., Massaroni, P., & Cuzzolaro, M. (2005). Early separation anxiety and adult attachment style in women with eating disorders. *British Journal of Clinical Psychology*, *44*, 89-97. doi:10.1348/014466504X20053
- Ty, M., & Francis, A. J. (2013). Insecure attachment and disordered eating in women: The

- mediating processes of social comparison and emotion dysregulation. *Eating Disorders*, 21, 154-174. doi:10.1080/10640266.2013.761089
- Tylka, T. L., & Subich, L. M. (2004). Examining a multidimensional model of eating disorder symptomatology among college women. *Journal of Counselling Psychology*, 51, 314-328. doi:10.1037/0022-0167.51.3.314
- Tylka, T. L., & Wilcox, J. A. (2006). Are intuitive eating and eating disorder symptomatology opposite poles of the same construct? *Journal of Counseling Psychology*, 53, 474-485. doi:10.1037/0022-0167.53.4.474474
- van Durme, K., Braet, C., & Goossens, L. (2015). Insecure attachment and eating pathology in early adolescence: Role of emotion regulation. *Journal of Early Adolescence*, 35, 54-78. doi:10.1177/0272431614523130
- van IJzendoorn, M. H., & Kroonenberg, P. M. (1988). Cross-cultural patterns of attachment: A meta-analysis of the strange situation. *Child Development*, 59, 147-156. doi:10.2307/1130396
- Vella-Zarb, R., Mills, J.S., Westra, H., Carter, J.C., & Keating, L. (2015). A randomized controlled trial of motivational interviewing for binge eating. *International Journal of Eating Disorders*, 48, 328-332. doi:10.1002/eat.22242
- Wallace, L. M., Masson, P. C., Safer, D. L., & von Ranson, K. (2014). Change in emotion regulation during the course of treatment predicts binge abstinence in guided self-help dialectical behaviour therapy for binge eating disorder. *Journal of Eating Disorders*, 2. doi:10.1186/s40337-014-0035-x
- Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality & Social*

Psychology, 54, 1063-1070. doi:10.1037/0022-3514.54.6.1063

- Wearden, A. J., Lambertson, N., Crook, N., & Walsh, V. (2005). Adult attachment, alexithymia and symptom reporting: An extension to the four category model of attachment. *Journal of Psychosomatic Research*, 58, 279-288. doi:10.1016/j.jpsychores.2004.09.010
- Wegner, K. E., Smyth, J. M., Crosby, R. D., Wittrock, D. Wonderlich, S. A., Mitchel, J. E. (2002). An evaluation of the relationship between mood and binge eating using ecological momentary assessment. *International Journal of Eating Disorders*, 32, 352-361. doi:10.1002/eat.10086
- Wei, M., Vogel, D. L., Ku, T., & Zakalik, R. A. (2005). Adult attachment, affect regulation, negative mood, and interpersonal problems: The mediating roles of emotional reactivity and emotional cutoff. *Journal of Counseling Psychology*, 52, 14-24. doi:10.1037/00220167.52.1.14
- Weiss, C., Mills, J.S., Westra, H., & Carter, J.C. (2013). A preliminary study of motivational interviewing as a prelude to intensive treatment for an eating disorder. *Journal of Eating Disorders*, 1:34. doi:10.1186/2050-2974-1-34
- West. M., & George, C. (1999). Abuse and violence in intimate adult relationships: New perspectives from attachment theory. *Attachment & Human Development*, 1, 137-156. doi:10.1080/14616739900134201
- Wheeler, K., Greiner, P., & Boulton, M. (2005). Exploring alexithymia, depression, and binge eating in self-reported eating disorders in women. *Perspectives in Psychiatric Care*, 41, 114-123. doi:10.1111/j.1744-6163.2005.00022.
- Wearden, A., Cook, L., & Vaughan-Jones, J. (2003). Adult attachment, alexithymia, symptom reporting, and health-related coping. *Journal of Psychosomatic Research*, 55, 341-347.

doi:10.1016/S0022-3999(02)00635-9

- Whiteside, U., Chen, E., Neighbors, C., Hunter, D., Lo, T., & Larimer, M. (2007). Difficulties regulating emotions: Do binge eaters have fewer strategies to modulate and tolerate negative affect? *Eating Behaviors*, 8, 162-169. doi:10.1016/j.eatbeh.2006.04.001
- Wilfley, D. E., Stein, R. I., Friedman, M. A., Beren, S. A., & Wiseman, C. V. (1996). Group cognitive-behavioral therapy for binge eating disorder. Unpublished manuscript.
- Wilfley, D. E., Welch, R. R., Stein, R. I., Spurrell, E. B., Cohen, L. R., Saelens, B. E., ... Matt, G. E. (2002). A randomized comparison of group cognitive-behavioral therapy and group interpersonal psychotherapy for the treatment of overweight individuals with binge-eating disorder. *Archives of General Psychiatry*, 59, 713-721.
doi:10.1001/archpsyc.59.8.713
- Wilson, G. T., & Shafran, R. (2005). Eating disorders guidelines from NICE. *Lancet*, 365, 79-81. doi:10.1016/S0140-6736(04)17669-1
- Wiser, S., & Telch, C. F. (1999). Dialectical behaviour therapy for binge-eating disorder. *Journal of Clinical Psychology*, 55, 755-768.
doi:10.1002/(SICI)10974679(199906)55:6<755::AID-JCLP8>3.0.CO;2-
- Womble, L. G., Williamson, D. A., Martin, C. K., Zucker, N. L., Thaw, J. M., Netemeyer, R., ... Greenway, F. L. (2001). Psychosocial variables associated with binge eating in obese males and females. *International Journal of Eating Disorders*, 30, 217-221.
doi:10.1002/eat.1076
- Wood-Barcalow, N. L., Tylka, T. L., & Augustus-Horvath, C. L. (2010). "But I like my body": Positive body image characteristics and a holistic model for young-adult women. *Body Image*, 7, 106-116. doi:10.1016/j.bodyim.2010.01.001

World Health Organization. (2012, May). Obesity and overweight. Retrieved from
<http://www.who.int/mediacentre/factsheets/fs311/en/>

Zonnevijlle-Bender, M. J. S., Van Goozen, S. H. M., Cohen-Kettenis, P. T., Van Elburg, A., Van Engeland, H. (2002). Do adolescent anorexia nervosa patients have deficits in emotional functioning? *European Child and Adolescent Psychiatry, 11*, 38-42.
doi:10.1007/s007870200006

Table 1

Descriptive Statistics and Comparisons of Weekly Scores on Momentary Study Variables

Variable	Total	Week 1	Week 2	$F(1, 50)^a$	MSE	η_p^2
Mean binge rate	0.27 (0.23)	.26 (.20)	.25 (.27)	0.09	0.02	.002
BISS	3.73 (1.24)	3.70 (1.23)	3.65 (1.45)	0.20	0.22	.004
PANAS Negative Affect	15.04 (4.70)	15.24 (4.62)	14.60 (5.69)	9.14	0.00005	.16
DASS Depression	8.71 (7.67)	8.52 (7.44)	8.21 (8.98)	0.15	16.17	.003
CTS Social Self-Esteem	23.54 (7.52)	23.23 (7.21)	25.34 (7.49)	18.95	5.97	.28
S-DERS Nonacceptance	13.23 (5.42)	13.34 (5.04)	12.11 (5.95)	6.44*	5.97	.11
S-DERS Modulate	14.40 (5.83)	14.50 (5.45)	13.20 (6.23)	10.25*	4.16	.17
S-DERS Aware	16.95 (4.66)	16.66 (4.68)	17.14 (5.14)	14.69*	0.07	.23
S-DERS Clarity	3.69 (1.32)	3.74 (1.37)	3.47 (1.47)	5.85*	0.01	.11
S-DERS Total	48.27 (12.54)	48.25 (11.80)	45.95 (13.20)	5.24*	25.77	.10

Note. MSE = mean square error. η_p^2 = partial eta squared. Binge rate = total number of binges/total number of complete responses. BISS = Body Image States Scale. PANAS = Positive and Negative Affect Schedule. DASS = Depression Anxiety Stress Scales. CTS = Current Thoughts Scale. S-DERS Nonacceptance = State Difficulties in Emotion Regulation Scale Nonacceptance of Emotional Responses. S-DERS Modulate = S-DERS Limited Ability to Modulate Current Emotional and Behavioral Responses. S-DERS Aware = S-DERS Lack of Awareness of Current Emotions. S-DERS Strategies = S-DERS Limited Access to Emotion Regulation Strategies. S-DERS Clarity = S-DERS Lack of Clarity about Current Emotions. S-DERS Total = S-DERS Total score. Standard deviations appear in parentheses.

^a Results of repeated-measures analysis of variance comparing weeks 1 and 2.

* $p < .05$

Table 2

Bivariate Correlations Among Momentary Predictors at First and Last Time Points

	1	2	3	4	5	6	7
1. PANAS Negative Affect	-	.80 *	-.72*	.92*	.88*	-.27	.48*
2. DASS Depression	.61*	-	-.86*	.86*	.88*	-.31	.54*
3. CTS Social Self- Esteem	-.41*	-.54*	-	-.84*	-.81*	.31	-.46*
4. S-DERS Nonacceptance	.62*	.69*	-.71*	-	.95*	-.35	.45*
5. S-DERS Modulate	.48*	.70*	-.82*	.85*	-	-.33	.51*
6. S-DERS Aware	.17	.32*	.01	.21	.14	-	-.08
7. S-DERS Clarity	.30	.38*	-.35*	.41*	.45*	.38*	-

Note. Lower triangle comprises correlations among momentary predictors at Day 1 Observation 1 (i.e., at the first time point). Upper triangle comprises comparisons among momentary predictors at Day 14 Observation 7 (i.e., at the last time point). PANAS = Positive and Negative Affect Schedule. DASS = Depression Anxiety Stress Scales. CTS = Current Thoughts Scale. S-DERS Nonacceptance = State Difficulties in Emotion Regulation Scale Nonacceptance of Emotional Responses. S-DERS Modulate = S-DERS Limited Ability to Modulate Current Emotional and Behavioral Responses. S-DERS Aware = S-DERS Lack of Awareness of Current Emotions. S-DERS Strategies = S-DERS Limited Access to Emotion Regulation Strategies. S-DERS Clarity = S-DERS Lack of Clarity about Current Emotions. S-DERS Total = S-DERS Total score.

* $p < .05$

Table 3

Fixed and Random Effects for Model Predicting Momentary Binge Eating from Previous Momentary PANAS Negative Affect

Parameter	Fixed effects			
	β (<i>SE</i>)	<i>t</i>	<i>OR</i>	95% <i>CI</i>
Intercept, β_{00}	-1.67 * (0.18)	-9.42	0.19	[0.13, 0.27]
Previous DERS Clarity ^a , β_{10}	0.07 (0.06)	1.13	1.07	[0.95, 1.22]
Previous PANAS Negative Affect ^a , β_{20}	0.01 (0.03)	0.91	1.01	[0.99, 1.04]
Random effects				
Level 2				
Average binge, τ_{00} (<i>SD</i>)	1.23* (1.11)			
Previous S-DERS Clarity, τ_{10} (<i>SD</i>)	0.21 (0.04)			
Previous PANAS Negative Affect, τ_{20} (<i>SD</i>)	0.02 (0.0005)			
-2*log likelihood	4712.52			

Note. $N = 55$. S-DERS Clarity = State Difficulties in Emotion Regulation Scale Lack of Clarity about Current Emotions. PANAS = Positive and Negative Affect Schedule. *SE* = standard error. *OR* = odds ratio. *CI* = confidence interval for *OR*. τ_{00} = variance component representing residual variance between participants in probability of binge eating. τ_{10} = variance component representing residual variance between participants' S-DERS Clarity slopes. τ_{20} = variance component representing residual variance between participants' PANAS Negative Affect slopes.

^aVariable was group-mean centered.

* $p < .05$

Table 4

Fixed and Random Effects for Model Predicting Momentary Binge Eating from Previous Momentary DASS Depression

Parameter	Fixed effects			
	β (<i>SE</i>)	<i>t</i>	<i>OR</i>	95% <i>CI</i>
Intercept, β_{00}	-1.68* (0.19)	-8.89	0.19	[0.13, 0.27]
Level 1				
Previous S-DERS Clarity ^a , β_{10}	-0.01 (0.06)	-0.24	0.99	[0.88, 1.11]
Previous DASS Depression ^a , β_{20}	0.04* (0.06)	3.39	1.04	[1.02, 1.07]
Level 2				
BMI ^b , β_{01}	-0.03 (0.03)	-1.08	0.97	[0.91, 1.03]
Random effects				
Level 2				
Average binge, τ_{00} (<i>SD</i>)		1.34* (1.16)		
Previous S-DERS Clarity, τ_{10} (<i>SD</i>)		0.02 (0.13)		
Previous DASS Depression, τ_{20} (<i>SD</i>)		0.001 (0.03)		
-2*log likelihood		4,384.72		

Note. $N = 51$. S-DERS Clarity = State Difficulties in Emotion Regulation Scale Lack of Clarity about Current Emotions. DASS = Depression Anxiety Stress Scales. *SE* = standard error. *OR* = odds ratio. *CI* = confidence interval for *OR*. τ_{00} = variance component representing residual variance between participants in probability of binge eating. τ_{10} = variance component representing residual variance between participants' S-DERS Clarity slopes. τ_{20} = variance component representing residual variance between participants' DASS Depression slopes.

^aVariable was group-mean centered.

^bVariable was grand-mean centered.

* $p < .05$

Table 5

Fixed and Random Effects for Model Predicting Momentary Binge Eating from Previous Momentary CTS Social Self-Esteem

Parameter	Fixed effects			
	β (<i>SE</i>)	<i>t</i>	<i>OR</i>	95% <i>CI</i>
Intercept, β_{00}	-1.67* (0.19)	-8.85	0.19	[0.13, 0.27]
Level 1				
Previous S-DERS Clarity ^a , β_{10}	0.001 (0.05)	0.01	1.00	[0.90, 1.11]
Previous CTS Social Self-Esteem ^a , β_{20}	-0.04* (0.02)	-2.25	0.96	[0.93, 0.996]
Level 2				
BMI ^b , β_{01}	-0.03 (0.03)	-0.99	0.97	[0.92, 1.03]
Random effects				
Level 2				
Average binge, τ_{00} (<i>SD</i>)	1.34* (1.16)			
Previous S-DERS Clarity, τ_{10} (<i>SD</i>)	0.01 (0.11)			
Previous CTS Social Self-Esteem, τ_{20} (<i>SD</i>)	0.002 (0.05)			
-2*log likelihood	4,420.18			

Note. $N = 51$. S-DERS Clarity = State Difficulties in Emotion Regulation Scale Lack of Clarity

about Current Emotions. CTS = Current Thoughts Scale. *SE* = standard error. *OR* = odds ratio.

CI = confidence interval for *OR*. τ_{00} = variance component representing residual variance

between participants in probability of binge eating. τ_{10} = variance component representing

residual variance between participants' S-DERS Clarity slopes. τ_{20} = variance component

representing residual variance between participants' CTS Social Self-Esteem slopes.

^aVariable was group-mean centered.

^bVariable was grand-mean centered.

* $p < .05$

Table 6

*Fixed and Random Effects for Model Predicting Momentary BISS from Previous Momentary**PANAS Negative Affect*

Parameter	Fixed effects	
	β (<i>SE</i>)	<i>t</i>
Intercept, β_{00}	3.74* (0.17)	22.07
S-DERS Clarity ^a , β_{10}	-0.09* (0.03)	-3.02
Previous PANAS Negative Affect ^a , β_{20}	-0.02* (0.01)	-2.15
Random effects		
Level 2		
Body dissatisfaction mean, τ_{00} (<i>SD</i>)	1.49* (1.22)	
S-DERS Clarity, τ_{10} (<i>SD</i>)	0.02* (0.12)	
Previous PANAS Negative Affect, τ_{20} (<i>SD</i>)	0.002 (0.02)	
Level 1		
Within-person variability, σ^2 (<i>SD</i>)	0.85 (0.92)	
Variance explained	.01	
-2*log likelihood	4,797.11	

Note. $N = 55$. BISS = Body Image States Scale. S-DERS Clarity = State Difficulties in Emotion

Regulation Scale Lack of Clarity about Current Emotions. PANAS = Positive and Negative

Affect Schedule. *SE* = standard error. τ_{00} = variance component representing residual variance

between participants in BISS. τ_{10} = variance component representing residual variance between

participants' S-DERS Clarity slopes. τ_{20} = variance component representing residual variance

between participants' PANAS Negative Affect slopes. σ^2 = variance component representing

residual within-person variance with previous PANAS Negative Affect was added to the model

($df = 7$). Variance explained = proportion of within-person variance with only S-DERS Clarity in

the model accounted for by adding previous PANAS Negative Affect.

^aVariable was group-mean centered.

* $p < .05$

Table 7

*Fixed and Random Effects for Model Predicting Momentary BISS from Previous DASS**Depression*

Parameter	Fixed effects	
	β (<i>SE</i>)	<i>t</i>
Intercept, β_{00}	3.85* (0.16)	23.45
Level 1		
S-DERS Clarity ^a , β_{10}	-.07* (0.03)	-2.63
Previous DASS Depression ^a , β_{20}	-0.02* (0.005)	-3.29
Level 2		
BMI ^b , β_{01}	-0.02 (0.02)	-1.13
Random effects		
Level 2		
Body dissatisfaction mean, τ_{00} (<i>SD</i>)	1.31* (1.14)	
S-DERS Clarity, τ_{10} (<i>SD</i>)	0.01* (0.10)	
Previous DASS Depression, τ_{20} (<i>SD</i>)	0.0002* (0.01)	
Level 1		
Within-person variability, σ^2 (<i>SD</i>)	0.86 (0.93)	
Variance explained	.01	
-2*log likelihood	4,479.94	

Note. $N = 51$. BISS = Body Image States Scale. *SE* = standard error. S-DERS Clarity = State

Difficulties in Emotion Regulation Scale Lack of Clarity about Current Emotions. DASS =

Depression Anxiety Stress Scales. τ_{00} = variance component representing residual variance

between participants in BISS. τ_{10} = variance component representing residual variance between

participants' S-DERS Clarity slopes. τ_{20} = variance component representing residual variance

between participants' previous DASS Depression slopes. σ^2 = variance component representing

residual within-person variance from a model with previous DASS Depression ($df = 7$). Variance

explained = the proportion of total within-person variance with only S-DERS Clarity in the

model accounted for by adding previous DASS Depression to the model.

^aVariable was group-mean centered.

^bVariable was grand-mean centered.

* $p < .05$

Table 8

Fixed and Random Effects for Model Predicting Momentary BISS from Previous CTS Social Self-Esteem

Parameter	Fixed effects	
	β (SE)	<i>t</i>
Intercept, β_{00}	3.86* (0.16)	23.44
Level 1		
Previous S-DERS Clarity ^a , β_{10}	-0.04 (0.03)	-1.56
Previous CTS Social Self-Esteem ^a , β_{20}	0.03* (0.01)	5.52
Level 2		
BMI ^b , β_{01}	-0.02 (0.02)	-0.79
Random effects		
Level 2		
Body dissatisfaction mean, τ_{00} (SD)	1.32* (1.15)	
Previous S-DERS Clarity, τ_{10} (SD)	0.01 (0.10)	
Previous CTS Social Self-Esteem, τ_{20} (SD)	0.003 (0.02)	
Level 1		
Within-person variability, σ^2 (SD)	0.85 (0.92)	
Variance explained	.02	
-2*log likelihood	4,503.22	

Note. $N = 51$. BISS = Body Image States Scale. SE = standard error. S-DERS Clarity = State

Difficulties in Emotion Regulation Scale Lack of Clarity about Current Emotions. CTS =

Current Thoughts Scale. τ_{00} = variance component representing residual variance between

participants in BISS. τ_{10} = variance component representing residual variance between

participants' S-DERS Clarity slopes. τ_{20} = variance component representing residual variance

between participants' previous CTS Social Self-Esteem slopes. σ^2 = variance component

representing residual within-person variance from a model with previous CTS Social Self-

Esteem ($df = 7$). Variance explained = the proportion of total within-person variance with only S-

DERS Clarity in the model accounted for by adding previous CTS Social Self-Esteem.

^aVariable was group-mean centered.

^bVariable was grand-mean centered.

* $p < .05$

Table 9

Results of Model Predicting Momentary Binge Eating from Cross-Level ECR Anxiety/ Avoidance x PANAS Negative Affect/ DASS Depression/ CTS Social Self-Esteem Interaction

Level 1 Predictor	Level 2 Moderators							
	ECR anxiety ^b				ECR avoidance ^b			
	β_{anx} (SE)	t_{anx}	OR_{anx}	95% CI_{anx}	β_{avoid} (SE)	t_{avoid}	OR_{avoid}	95% CI_{avoid}
PANAS Negative Affect ^a	-0.02 (0.02)	-0.92	0.98	[0.95, 1.02]	0.01 (0.01)	0.67	1.01	[0.99, 1.03]
DASS Depression ^a	-0.02 (0.01)	-1.72	0.98	[0.96, 1.003]	-0.01 (0.01)	-0.74	0.99	[0.97, 1.01]
CTS Social Self-Esteem ^a	-0.02 (0.03)	-0.53	0.98	[0.92, 1.05]	-0.02 (0.02)	-1.51	0.98	[0.95, 1.01]

Note. S-DERS Clarity = State Difficulties in Emotion Regulation Scale Lack of Clarity about Current Emotions. PANAS = Positive and Negative Affect Schedule. DASS = Depression Anxiety Stress Scale. CTS = Current Thoughts Scale. ECR anxiety = Modified Experiences in Close Relationships Scale attachment anxiety. ECR avoidance = Modified Experiences in Close Relationships Scale attachment avoidance. *SE* = standard error. *OR* = odds ratio. *CI* = confidence interval for *OR*.

^aVariable was group-mean centered.

^bVariable was grand-mean centered.

Table 10

Results of Model Predicting Momentary Body Satisfaction from Cross-Level ECR Anxiety/ Avoidance x PANAS Negative Affect/ DASS Depression/ CTS Social Self-Esteem Interaction

Level 1 Predictor	Level 2 Moderators									
	ECR anxiety ^b					ECR avoidance ^b				
	β_{anx} (SE)	t_{anx}	τ_{u}	τ_{v}	Variance explained	β_{avoid} (SE)	t_{avoid}	τ_{u}	τ_{v}	Variance explained
PANAS Negative Affect ^a	0.02* (0.01)	2.11	.0005	.0005	.04	-0.01 (0.01)	-1.21	0.00056	0.00029	.48
DASS Depression ^a	-0.001 (0.005)	-0.17	0.0002	0.0002	.00	-0.0009 (0.005)	-0.19	0.0002	.0002	.000
CTS Social Self-Esteem ^a	0.03 (0.02)	1.61	0.00024	0.00029	.00	0.02 (0.03)	0.84	.00022	.00023	.00

Note. PANAS = Positive and Negative Affect Schedule. DASS = Depression Anxiety Stress Scale. CTS = Current Thoughts Scale.

ECR anxiety = Modified Experiences in Close Relationships Scale attachment anxiety. ECR avoidance = Modified Experiences in Close Relationships Scale attachment avoidance. *SE* = standard error. τ_{u} = variance component from a model with only S-DERS Clarity, PANAS Negative Affect/ DASS Depression/ CTS Social Self-Esteem, and level 2 intercept ECR anxiety/ avoidance (in the level 2 intercept) in the model. τ_{v} = variance component from the model with ECR anxiety/ avoidance added to the model. Variance explained = the proportion of total within-person variance with only S-DERS Clarity, PANAS Negative Affect/ DASS Depression/ CTS Social Self-Esteem, and BMI (for the models with DASS Depression/ CTS Social Self-Esteem) and ECR anxiety/ avoidance (in the level 2 intercept) in the model (τ_{u}) accounted for by adding ECR anxiety/ avoidance to the PANAS Negative Affect/ DASS Depression/ CTS Social Self-Esteem slope.

^aVariable was group-mean centered.

^bVariable was grand-mean centered.

* $p < .05$

Table 11

Fixed Effects for Models Evaluating Emotion Dysregulation as a Mediator of the Relationship between Attachment Anxiety/Avoidance x Negative Affect Interactions and Binge Eating (ECR Anxiety/Avoidance^a x Momentary PANAS Negative Affect^b → Momentary S-DERS Subscale^b → Momentary Binge Eating)

ECR Predictor/ Momentary S-DERS Mediator	Path a		Path b			
	β	<i>t</i>	β	<i>t</i>	OR	95% CI
Anxiety/ Nonacceptance	-0.08*	-2.52	0.06*	2.99	1.06	[1.02, 1.11]
Anxiety/ Modulate	-0.06	-1.75	0.08*	4.42	1.09	[1.05, 1.13]
Anxiety/ Aware	-0.01	0.50	-0.02	-0.67	0.98	[0.94, 1.03]
Anxiety/ Clarity	-0.003	-0.23	0.06	1.00	1.06	[0.94, 1.21]
Anxiety/ Total	-0.13	-1.47	0.03	3.44	1.03	[1.01, 1.05]
Avoidance/ Nonacceptance	0.05	1.08	0.06*	3.02	1.06	[1.02, 1.11]
Avoidance/ Modulate	0.06	1.73	0.09*	4.68	1.09	[1.05, 1.13]
Avoidance/ Aware	0.01	0.30	-0.02	-0.76	0.98	[0.93, 1.03]
Avoidance/ Clarity	-0.02	-1.49	0.07	1.14	1.08	[0.95, 1.22]
Avoidance/ Total	0.07	0.74	0.03*	3.44	1.03	[1.01, 1.05]

Note. *N* = 55. PANAS = Positive and Negative Affect Schedule. ECR = Modified Experiences in Close Relationships Scale. S-DERS Nonacceptance = State Difficulties in Emotion Regulation Scale Nonacceptance of Emotional Responses. S-DERS Modulate = S-DERS Limited Ability to Modulate Current Emotional and Behavioral Responses. S-DERS Aware = S-DERS Lack of Awareness of Current Emotions. S-DERS Strategies = S-DERS Limited Access to Emotion Regulation Strategies. S-DERS Clarity = S-DERS Lack of Clarity about Current Emotions. S-DERS Total = S-DERS Total score. Path a = relationship between PANAS x ECR anxiety/

avoidance interaction and mediating S-DERS subscale, controlling for S-DERS Clarity. Path b = relationship between S-DERS subscale and binge eating, controlling for S-DERS Clarity (with the exceptions of models examining S-DERS Clarity and S-DERS Total as mediators) and previous PANAS Negative Affect x ECR anxiety/ avoidance interaction. *SE* = standard error. *OR* = odds ratio. *CI* = confidence interval for *OR*.

^aVariable was grand-mean centered.

^bVariable was group-mean centered.

* $p < .05$

Table 12

Fixed Effects for Models Evaluating Emotion Dysregulation as a Mediator of the Relationship between Attachment Anxiety/

Avoidance x Depression Interactions and Binge Eating (ECR Anxiety/ Avoidance^a x Momentary DASS Depression^b → Momentary S-DERS Subscale^b → Momentary Binge Eating)

ECR Predictor/ Momentary S-DERS Mediator	Path a		Path b			
	β	<i>t</i>	β	<i>t</i>	<i>OR</i>	95% CI
Anxiety/ Nonacceptance	-0.01	-0.52	0.04*	2.11	1.04	[1.002, 1.09]
Anxiety/ Modulate	-0.02	-0.96	0.08*	3.26	1.08	[1.03, 1.14]
Anxiety/ Aware	-0.01	-0.52	0.005	0.18	1.00	[0.95, 1.06]
Anxiety/ Clarity	0.01	1.54	-0.01	-0.15	0.99	[0.88, 1.11]
Anxiety/ Total	0.002	-0.04	0.03*	2.37	1.03	[1.004, 1.05]
Avoidance/ Nonacceptance	-0.01	-0.23	0.04*	2.06	1.05	[1.00, 1.09]
Avoidance/ Modulate	0.01	0.83	0.08*	3.01	1.08	[1.03, 1.14]
Avoidance/ Aware	0.02	0.75	0.005	0.18	1.01	[0.95, 1.07]
Avoidance/ Clarity	-0.03	-1.77	-0.02	-0.28	0.98	[0.88, 1.11]
Avoidance/ Total	-0.06	-0.60	0.02*	2.36	1.02	[1.00, 1.05]

Note. *N* = 51. DASS = Depression Anxiety and Stress Scales. ECR = Modified Experiences in Close Relationships Scale. S-DERS

Nonacceptance = State Difficulties in Emotion Regulation Scale Nonacceptance of Emotional Responses. S-DERS Modulate = S-

DERS Limited Ability to Modulate Current Emotional and Behavioral Responses. S-DERS Aware = S-DERS Lack of Awareness of

Current Emotions. S-DERS Strategies = S-DERS Limited Access to Emotion Regulation Strategies. S-DERS Clarity = S-DERS Lack

of Clarity about Current Emotions. S-DERS Total = S-DERS Total score. Path a = relationship between DASS Depression x ECR

anxiety/ avoidance interaction and mediating S-DERS subscale, controlling for Clarity (with the exceptions of models examining S-

DERS Clarity and S-DERS Total as mediators) and BMI. Path b = relationship between S-DERS subscale and binge eating, controlling for BMI, S-DERS Clarity (with the exceptions of models examining S-DERS Clarity and S-DERS Total as mediators), and previous DASS Depression x ECR anxiety/ avoidance interaction. *SE* = standard error. *OR* = odds ratio. *CI* = confidence interval for *OR*.

^aVariable was grand-mean centered.

^bVariable was group-mean centered.

* $p < .05$

Table 13

Fixed Effects for Models Evaluating Emotion Dysregulation as a Mediator of the Relationship between Attachment Anxiety/

Avoidance x Social Self-Esteem Interactions and Binge Eating (ECR Anxiety/ Avoidance^a x Momentary CTS Social Self-Esteem^b →

Momentary S-DERS Subscale^b → Momentary Binge Eating)

ECR Predictor/ Momentary S-DERS Mediator	Path a		Path b			
	β	<i>t</i>	β	<i>t</i>	<i>OR</i>	95% CI
Anxiety/ Nonacceptance	-0.06*	-2.09	0.04	1.91	1.04	[1.00, 1.08]
Anxiety/ Modulate	-0.04	-1.66	0.08*	4.89	1.08	[1.05, 1.12]
Anxiety/ Aware	0.003	0.13	0.003	0.13	1.00	[0.96, 1.05]
Anxiety/ Clarity	-0.03*	-2.43	-0.01	-0.26	0.99	[0.89, 1.10]
Anxiety/ Total	-0.18*	-2.92	0.02*	2.34	1.02	[1.00, 1.05]
Avoidance/ Nonacceptance	0.01	0.18	0.04	1.96	1.04	[1.00, 1.08]
Avoidance/ Modulate	0.005	-0.18	0.08*	4.99	1.08	[1.05, 1.12]
Avoidance/ Aware	-0.02	0.48	0.003	0.11	1.00	[0.96, 1.05]
Avoidance/ Clarity	0.03	1.88	0.01	0.15	1.01	[0.91, 1.12]
Avoidance/ Total	0.07	0.93	0.02*	2.60	1.03	[1.01, 1.05]

Note. *N* = 51. CTS = Current Thought Scale. ECR = Modified Experiences in Close Relationships Scale. S-DERS Nonacceptance = State Difficulties in Emotion Regulation Scale Nonacceptance of Emotional Responses. S-DERS Modulate = S-DERS Limited Ability to Modulate Current Emotional and Behavioral Responses. S-DERS Aware = S-DERS Lack of Awareness of Current Emotions. S-DERS Strategies = S-DERS Limited Access to Emotion Regulation Strategies. S-DERS Clarity = S-DERS Lack of Clarity about Current Emotions. S-DERS Total = S-DERS Total score. Path a = relationship between CTS Social Self-Esteem x ECR anxiety/

avoidance interaction and S-DERS mediating subscale, controlling for S-DERS Clarity (with the exceptions of models examining S-DERS Clarity and S-DERS Total as mediators) and BMI. Path b = relationship between S-DERS subscale and binge eating, controlling for BMI, S-DERS Clarity (with the exceptions of models examining S-DERS Clarity and S-DERS Total as mediators), and previous CTS Social Self-Esteem x ECR anxiety/ avoidance interaction. *SE* = standard error. *OR* = odds ratio. *CI* = confidence interval for *OR*.

^aVariable was grand-mean centered.

^bVariable was group-mean centered.

* $p < .05$

Table 14

Fixed Effects for Models Evaluating Emotion Dysregulation as a Mediator of the Relationship between Attachment Anxiety/Avoidance x Negative Affect Interactions and Body Satisfaction (ECR Anxiety/Avoidance^a x Momentary PANAS Negative Affect^b → Momentary S-DERS Subscale^b → Momentary Body Satisfaction)

ECR Predictor/ Momentary S-DERS Mediator	Path a		Path b	
	β	<i>t</i>	β	<i>t</i>
Anxiety/ Nonacceptance	-0.08*	-2.52	-0.03*	-2.87
Anxiety/ Modulate	-0.06	-1.75	-0.03*	-2.91
Anxiety/ Aware	-0.01	0.50	-0.02*	-2.12
Anxiety/ Clarity	-0.003	-0.23	-0.08*	-2.84
Anxiety/ Total	-0.13	-1.47	-0.02*	-4.03
Avoidance/ Nonacceptance	0.05	1.20	-0.03*	-2.89
Avoidance/ Modulate	0.06	1.73	-0.03*	-2.95
Avoidance/ Aware	0.01	0.30	-0.02*	-2.03
Avoidance/ Clarity	-0.02	-1.49	-0.09*	-3.07
Avoidance/ Total	0.07	0.74	-0.02*	-3.93

Note. $N = 55$. PANAS = Positive and Negative Affect Schedule. ECR = Modified Experiences in Close Relationships Scale. BISS = Body Image States Scale. S-DERS Nonacceptance = State Difficulties in Emotion Regulation Scale Nonacceptance of Emotional Responses. S-DERS Modulate = State Difficulties in Emotion Regulation Scale Limited Ability to Modulate Current Emotional and Behavioral Responses. S-DERS Aware = State Difficulties in Emotion Regulation Scale Lack of Awareness of Current Emotions. S-DERS Strategies = State Difficulties in Emotion Regulation Scale Limited Access to Emotion Regulation Strategies. S-DERS Clarity

= State Difficulties in Emotion Regulation Scale Lack of Clarity about Current Emotions. S-DERS Total = State Difficulties in Emotion Regulation Scale Total score. Path a = relationship between previous PANAS Negative Affect x ECR anxiety/ avoidance interaction, controlling for S-DERS mediating subscale and S-DERS Clarity (with the exceptions of models examining S-DERS Clarity and S-DERS Total as mediators). Path b = relationship between S-DERS subscale and BISS, controlling for S-DERS Clarity (with the exceptions of models examining S-DERS Clarity and S-DERS Total as mediators) and previous PANAS Negative Affect x ECR anxiety/ avoidance interaction.

^aVariable was grand-mean centered.

^bVariable was group-mean centered.

* $p < .05$

Table 15

Fixed Effects for Models Evaluating Emotion Dysregulation as a Mediator of the Relationship between Attachment Anxiety/

Avoidance x Depression Interactions and Body Satisfaction (ECR Anxiety/ Avoidance^a x DASS Depression^b → Momentary S-DERS

Subscale^b → Momentary Body Satisfaction)

ECR Predictor/ Momentary S-DERS Mediator	Path a		Path b	
	β	<i>t</i>	β	<i>t</i>
Anxiety/ Nonacceptance	-0.01	-0.52	-0.02*	-2.50
Anxiety/ Modulate	-0.02	-0.96	-0.02*	-2.75
Anxiety/ Aware	-0.01	-0.52	-0.02*	-2.43
Anxiety/ Clarity	0.01	1.54	-0.07*	-2.63
Anxiety/ Total	0.002	-0.04	-0.02*	-3.83
Avoidance/ Nonacceptance	-0.01	-0.23	-0.02*	-2.56
Avoidance/ Modulate	0.01	0.83	-0.02*	-2.70
Avoidance/ Aware	0.02	0.75	-0.02*	-2.06
Avoidance/ Clarity	-0.03	-1.77	-0.07*	-2.62
Avoidance/ Total	-0.06	-0.60	-0.02*	-3.82

Note. $N = 51$. DASS = Depression Anxiety Stress Scales. ECR = Modified Experiences in Close Relationships Scale. BISS = Body Image States Scale. S-DERS Nonacceptance = State Difficulties in Emotion Regulation Scale Nonacceptance of Emotional Responses. S-DERS Modulate = S-DERS Limited Ability to Modulate Current Emotional and Behavioral Responses. S-DERS Aware = S-DERS Lack of Awareness of Current Emotions. S-DERS Strategies = S-DERS Limited Access to Emotion Regulation Strategies. S-DERS Clarity = S-DERS Lack of Clarity about Current Emotions. S-DERS Total = S-DERS Total score. Path a = relationship

between previous DASS Depression x ECR anxiety/ avoidance interaction and mediating S-DERS subscale, controlling for S-DERS Clarity (with the exceptions of models examining S-DERS Clarity and S-DERS Total as mediators) and BMI. Path b = relationship between S-DERS subscale and BISS, controlling for S-DERS Clarity (with the exceptions of models examining S-DERS Clarity and S-DERS Total as mediators), previous DASS Depression x ECR anxiety/ avoidance interaction, and BMI.

^aVariable was grand-mean centered.

^bVariable was group-mean centered.

* $p < .05$

Table 16

Fixed Effects for Models Evaluating Emotion Dysregulation as a Mediator of the Relationship between Attachment Anxiety/ Avoidance x Social Self-Esteem Interactions and Body Satisfaction (ECR Anxiety/ Avoidance^a x CTS Social Self-Esteem^b → Momentary S-DERS Subscale^b → Momentary Body Satisfaction)

ECR Predictor/ Momentary S-DERS Mediator	Path a		Path b	
	β	<i>t</i>	β	<i>t</i>
Anxiety/ Nonacceptance	-0.06*	-2.09	-0.003	-0.28
Anxiety/ Modulate	-0.04	-1.66	-0.01	-0.73
Anxiety/ Aware	0.003	0.13	-0.03*	-3.06
Anxiety/ Clarity	-0.03*	-2.43	-0.04	-1.48
Anxiety/ Total	-0.18*	-2.92	-0.01*	-2.25
Avoidance/ Nonacceptance	0.01	0.18	-0.003	-0.36
Avoidance/ Modulate	0.005	0.18	-0.01	-0.87
Avoidance/ Aware	0.02	0.48	-0.03*	-3.00
Avoidance/ Clarity	0.03	1.88	-0.04	-1.55
Avoidance/ Total	0.07	0.93	-0.01*	-2.39

Note. $N = 51$. CTS = Current Thoughts Scale. ECR Modified Experiences in Close Relationships Scale. BISS = Body Image States Scale. S-DERS Nonacceptance = State Difficulties in Emotion Regulation Scale Nonacceptance of Emotional Responses. S-DERS Modulate = S-DERS Limited Ability to Modulate Current Emotional and Behavioral Responses. S-DERS Aware = S-DERS Lack of Awareness of Current Emotions. S-DERS Strategies = S-DERS Limited Access to Emotion Regulation Strategies. S-DERS Clarity = S-DERS Lack of Clarity about Current Emotions. S-DERS Total = S-DERS Total score. Path a = relationship between previous CTS

Social Self-Esteem x ECR anxiety/ avoidance interaction and mediating S-DERS subscale, controlling for S-DERS Clarity (with the exceptions of models examining S-DERS Clarity and S-DERS Total as mediators) and BMI. Path b = relationship between S-DERS subscale and BISS, controlling for S-DERS Clarity (with the exceptions of models examining S-DERS Clarity and S-DERS Total as mediators), and previous CTS Social Self-Esteem x ECR anxiety/ avoidance interaction, and BMI.

^aVariable was grand-mean centered.

^bVariable was group-mean centered.

* $p < .05$

Table 17

Fixed Effects for Models Evaluating Emotion Dysregulation as a Mediator of the Relationship between Attachment Anxiety/Avoidance and Binge Eating (ECR Anxiety/Avoidance^a → Momentary S-DERS Subscale^b → Momentary Binge Eating)

ECR Predictor/ Momentary S-DERS Mediator	Path a		Path b			
	β	<i>t</i>	β	<i>t</i>	<i>OR</i>	95% CI
Anxiety/ Nonacceptance	2.22*	3.49	0.06*	3.39	1.06	[1.02, 1.09]
Anxiety/ Modulate	2.32*	3.37	0.08*	4.73	1.08	[1.04, 1.11]
Anxiety/ Aware	-0.45	-0.98	-0.02	-0.86	0.98	[0.93, 1.03]
Anxiety/ Clarity	.42*	2.36	0.07	1.29	1.08	[0.96, 1.20]
Anxiety/ Total	4.52*	2.99	0.03*	3.67	1.03	[1.01, 1.05]
Avoidance/ Nonacceptance	1.02	1.46	0.05*	3.48	1.06	[1.02, 1.09]
Avoidance/ Modulate	1.48	1.96	0.08*	4.97	1.08	[1.05, 1.12]
Avoidance/ Aware	-0.18	-0.45	-0.02	-0.88	0.98	[0.93, 1.03]
Avoidance/ Clarity	0.14	0.84	0.08	1.45	1.09	[0.97, 1.22]
Avoidance/ Total	2.37	1.49	0.03*	3.94	1.03	[1.02, 1.05]

Note. *N* = 55. ECR = Modified Experiences in Close Relationships Scale. S-DERS Nonacceptance = State Difficulties in Emotion Regulation Scale Nonacceptance of Emotional Responses. S-DERS Modulate = S-DERS Limited Ability to Modulate Current Emotional and Behavioral Responses. S-DERS Aware = S-DERS Lack of Awareness of Current Emotions. S-DERS Strategies = S-DERS Limited Access to Emotion Regulation Strategies. S-DERS Clarity = S-DERS Lack of Clarity about Current Emotions. S-DERS Total = S-DERS Total score. Path a = relationship between ECR anxiety/ avoidance and S-DERS mediating subscale, controlling for S-DERS Clarity (with the exceptions of models examining S-DERS Clarity and S-DERS Total as mediators). Path b =

relationship between S-DERS subscale and binge eating, controlling for S-DERS Clarity (with the exceptions of models examining S-DERS Clarity and S-DERS Total as mediators) and ECR anxiety/ avoidance interaction. *SE* = standard error. *OR* = odds ratio. *CI* = confidence interval for *OR*.

^aVariable was grand-mean centered.

^bVariable was group-mean centered.

* $p < .05$

Table 18

Fixed Effects for Models Evaluating Emotion Dysregulation as a Mediator of the Relationship between Attachment Anxiety/

Avoidance and Body Satisfaction (ECR Anxiety/ Avoidance^a → Momentary S-DERS Subscale^b → Momentary Body Satisfaction)

ECR Predictor/ Momentary S-DERS Mediator	Path a		Path b	
	β	<i>t</i>	β	<i>t</i>
Anxiety/ Nonacceptance	2.22*	3.49	-0.03*	-3.86
Anxiety/ Modulate	2.32*	3.37	-0.03*	-3.85
Anxiety/ Aware	-0.45	-0.98	-0.02	-1.66
Anxiety/ Clarity	.42*	2.36	-0.09*	-3.26
Anxiety/ Total	4.52*	2.99	-0.02*	-4.45
Avoidance/ Nonacceptance	1.02	1.46	-0.03*	-3.88
Avoidance/ Modulate	1.48	1.96	-0.03*	-4.09
Avoidance/ Aware	-0.18	-0.45	-0.02	-1.66
Avoidance/ Clarity	0.14	0.84	-0.10*	-3.21
Avoidance/ Total	2.37	1.49	-0.02*	-4.37

Note. *N* = 55. ECR = Modified Experiences in Close Relationships Scale. BISS = Body Image States Scale. S-DERS Nonacceptance = State Difficulties in Emotion Regulation Scale Nonacceptance of Emotional Responses. S-DERS Modulate = S-DERS Limited Ability to Modulate Current Emotional and Behavioral Responses. S-DERS Aware = S-DERS Lack of Awareness of Current Emotions. S-DERS Strategies = S-DERS Limited Access to Emotion Regulation Strategies. S-DERS Clarity = S-DERS Lack of Clarity about Current Emotions. S-DERS Total = S-DERS Total score. Path a = relationship between ECR anxiety/ avoidance interaction and S-DERS mediating subscale, controlling for S-DERS Clarity (with the exceptions of models examining S-DERS Clarity and S-DERS

Total as mediators). Path b = relationship between S-DERS subscale and BISS, controlling for S-DERS Clarity (with the exceptions of models examining S-DERS Clarity and S-DERS Total as mediators) and ECR anxiety/ avoidance.

^aVariable was grand-mean centered.

^bVariable was group-mean centered.

* $p < .05$

Table 19

Summary of Results of Hypothesis Tests and Significant Findings

Hypothesis/ Exploratory Analysis	Result
1. Greater momentary negative affect and depression, and lower social self-esteem, will predict subsequent momentary binge eating and body dissatisfaction.	<p style="text-align: center;"><i>Partially supported:</i></p> <p>Momentary depression and momentary social self-esteem, but not momentary negative affect, predicted subsequent binge eating.</p> <p>Momentary negative affect, momentary depression, and momentary social self-esteem predicted subsequent body dissatisfaction.</p>
2. The relationships in (1) would be stronger for women higher in baseline attachment anxiety and avoidance than for those lower in attachment anxiety and avoidance.	<p style="text-align: center;"><i>Not supported:</i></p> <p>Attachment anxiety moderated the relationship between momentary negative affect and subsequent body dissatisfaction in the opposite direction than expected; greater negative affect was associated with greater body dissatisfaction for those lower in attachment anxiety but not those higher in attachment anxiety.</p> <p>Neither attachment anxiety, nor attachment avoidance, moderated the relationship between any other momentary predictor and binge eating or body dissatisfaction.</p>
3. Momentary emotion regulation would mediate the relationships in (2).	<p style="text-align: center;"><i>Partially supported:</i></p> <p>Momentary nonacceptance of emotional responses significantly mediated the interaction between attachment anxiety and momentary negative affect on both binge eating and body dissatisfaction.</p> <p>Momentary total difficulties regulating emotion significantly mediated the interaction between attachment anxiety and momentary social self-esteem on both binge eating and body dissatisfaction.</p> <p>No other momentary emotion regulation variable mediated the interaction between attachment anxiety or avoidance and any momentary variable on binge eating or body dissatisfaction.</p>
Follow-up: Momentary emotion dysregulation as a mediator of the relationship between attachment anxiety and avoidance and momentary binge eating and body dissatisfaction.	<p>Momentary nonacceptance of emotional responses, difficulty modulating one's emotions, and total difficulties regulating emotion mediated the relationship between attachment anxiety and both subsequent binge eating and body dissatisfaction.</p> <p>Momentary difficulty clarifying one's emotions mediated the relationship between attachment anxiety and subsequent body dissatisfaction, but not subsequent binge eating.</p> <p>Momentary lack of awareness of current emotions and limited access to emotion regulation strategies did not mediate these relationships.</p>

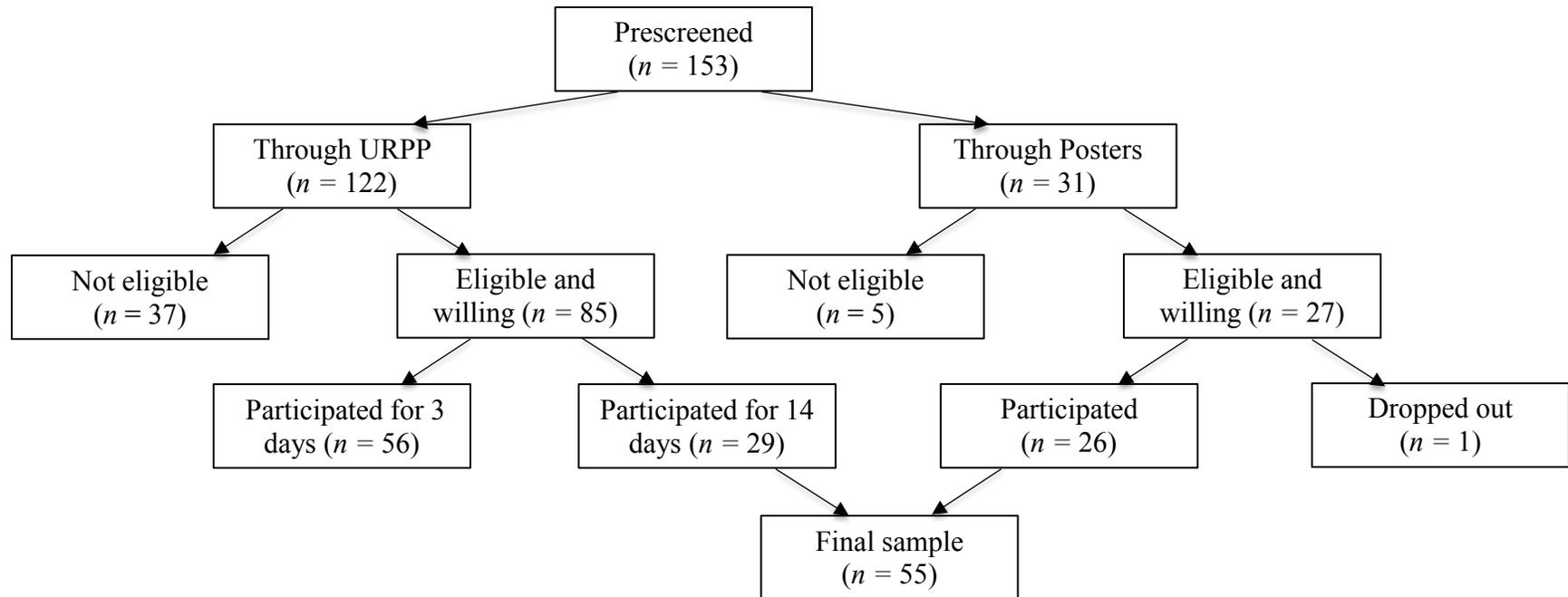


Figure 1. Participant flow chart throughout recruitment process.

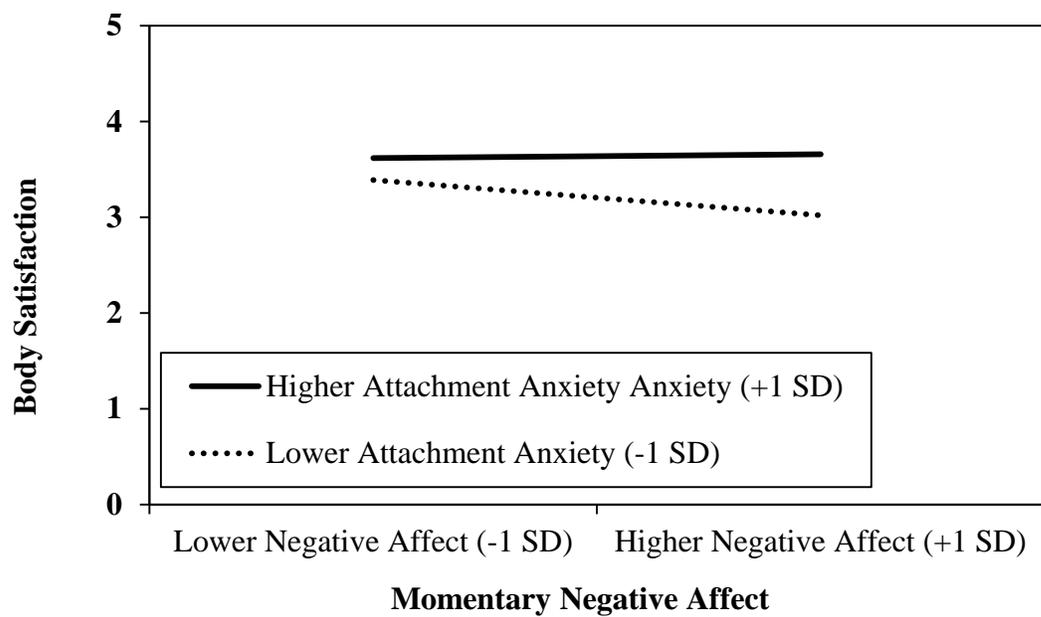


Figure 2. Body dissatisfaction scores at higher and lower levels of attachment anxiety and for higher and lower levels of momentary negative affect.

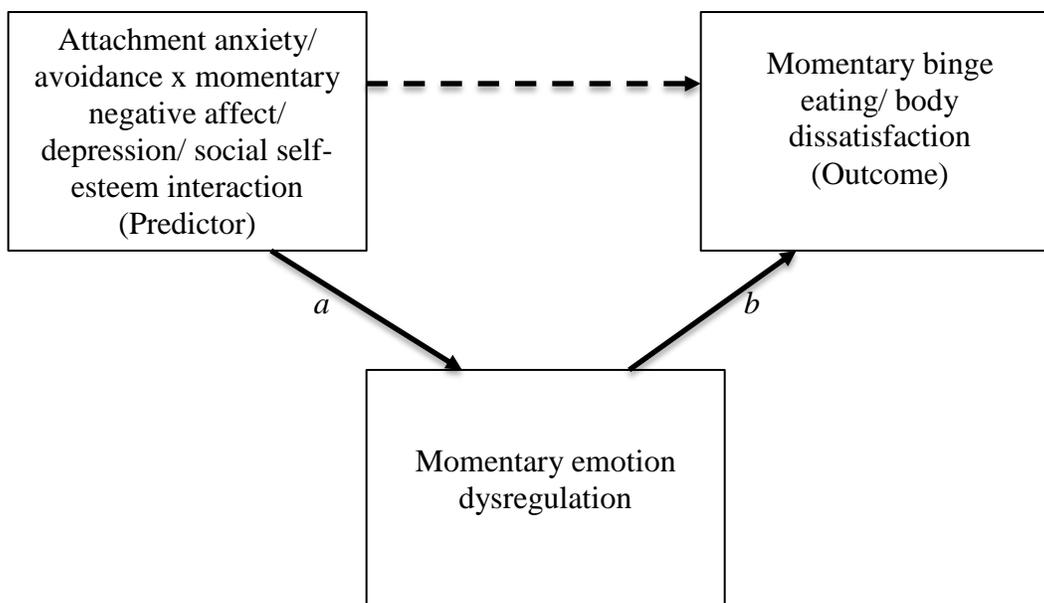


Figure 3. Mediation model for Hypothesis 3.

Appendix A

Recruitment Poster

FEMALE UNDERGRADUATE STUDENTS NEEDED FOR RESEARCH ON BODY IMAGE AND BINGE EATING**You would be asked to:**

1. Attend an **initial session** to meet with a researcher to (a) complete an interview about binge eating so as to determine your eligibility; (b) complete questionnaires on your demographic information and interpersonal patterns. This session would last approximately 30 minutes.
2. Receive seven **text messages** per day at random intervals between 9:00 a.m. and 11:00 p.m. over 14 days; these texts would contain a link to questions on your eating and psychological state. Each set of questions would take approximately 5 minutes.
3. Attend a **follow-up session** with a researcher to debrief and be weighed. This session would be about 30 minutes long.

Eligible participants will:

1. Own a smartphone
2. Identify as women
3. Be able to answer yes to the following questions: In the past 28 days, have there been any times when you have (a) felt that you have eaten, or might have eaten, too much at one time; and (b) lost control over eating?

Eligible and willing participants will receive \$50.00.

To schedule a time to volunteer for this study, please contact:

Leah Keating

Department of Psychology

Email: lkeating@yorku.ca

**This study has been reviewed by, and received ethics clearance
by the York University Research Ethics Board.**

Contact Leah Keating:
lkeating@yorku.ca

Appendix B

Multilevel Models and Calculations

Model 1: Predicting Binge Eating from Negative Affect for Hypothesis 1

Level 1: $\text{Prob}(\text{BINGE}_{ti} = 1 | \pi_i) = \Phi_{ti}$

$$\log(\Phi_{ti}/[1 - \Phi_{ti}]) = \eta_{ti}$$

$$\eta_{ti} = \pi_{0i} + \pi_{1i}\text{S-DERS Clarity}_{(t-1)i} + \pi_{2i}\text{Negative Affect}_{(t-1)i} + e_{ti}$$

Level 2: $\pi_{0i} = \beta_{00} + r_{0i}$

$$\pi_{1i} = \beta_{10} + r_{1i}$$

$$\pi_{2i} = \beta_{20} + r_{2i}$$

Level 1 represents the within-person level, and level 2 represents the between-person level. Φ_{ij} represents the predicted probability that a participant binged. Level 1 variables were group-mean centered (i.e., cluster-mean centered) so that the level 1 slopes would represent the pooled within-person effects of the variable on the outcome (Enders & Tofhigi, 2007).

Model 2: Predicting Binge Eating from Depressive Symptoms/ Social Self-Esteem for Hypothesis 1

Level 1: $\text{Prob}(\text{BINGE}_{ti} = 1 | \pi_i) = \Phi_{ti}$

$$\log(\Phi_{ti}/[1 - \Phi_{ti}]) = \eta_{ti}$$

$$\eta_{ti} = \pi_{0i} + \pi_{1i}\text{S-DERS Clarity}_{(t-1)i} + \pi_{2i}\text{Negative affect/ depressive symptoms/ social self-esteem}_{(t-1)i} + e_{ti}$$

Level 2: $\pi_{0i} = \beta_{00} + \beta_{01i}\text{BMI} + r_{0i}$

$$\pi_{1i} = \beta_{10} + r_{1i}$$

$$\pi_{2i} = \beta_{20} + r_{2i}$$

Level 1 represents the within-person level, and level 2 represents the between-person level. Φ_{ij}

represents the predicted probability that a participant binged. Level 1 variables were group-mean centered (i.e., cluster-mean centered) so that the level 1 slopes would represent the pooled within-person effects of the variable on the outcome. Level 2 variables were grand-mean centered so as to represent parameters as the average effect rather than as the effect coded zero on the variables (Cohen et al., 2003; Enders & Tofighi, 2007).

Model 3: Predicting Body Dissatisfaction from Negative Affect for Hypothesis 1

Level 1: $BISS_{it} = \pi_{0i} + \pi_{1i}S\text{-DERS Clarity}_{(t-1)i} + \pi_{2i}Negative\ Affect_{(t-1)i} + e_{it}$

Level 2: $\pi_{0i} = \beta_{00} + r_{0i}$

$$\pi_{1i} = \beta_{10} + r_{1i}$$

$$\pi_{2i} = \beta_{20} + r_{2i}$$

Level 1 represents the within-person level, and level 2 represents the between-person level.

Level 1 variables were group-mean centered (i.e., cluster-mean centered) so that the level 1 slopes would represent the pooled within-person effects of the variable on the outcome (Enders & Tofighi, 2007).

Model 4: Predicting Body Dissatisfaction from Depressive Symptoms/ Social Self-Esteem for Hypothesis 1

Level 1: $BISS_{it} = \pi_{0i} + \pi_{1i}S\text{-DERS Clarity}_{(t-1)i} + \pi_{2i} Depressive\ symptoms/\ social\ self\text{-esteem}_{(t-1)i} + e_{it}$

Level 2: $\pi_{0i} = \beta_{00} + \beta_{01i}BMI + r_{0i}$

$$\pi_{1i} = \beta_{10} + r_{1i}$$

$$\pi_{2i} = \beta_{20} + r_{2i}$$

Level 1 represents the within-person level, and level 2 represents the between-person level.

Level 1 variables were group-mean centered (i.e., cluster-mean centered) so that the level 1

slopes would represent the pooled within-person effects of the variable on the outcome. Level 2 variables were grand-mean centered so as to represent parameters as the average effect rather than as the effect coded zero on variables (Cohen et al., 2003; Enders & Tofhigi, 2007).

Calculation 1: Variance explained for Models 3 and 4

$$\text{variance explained} = (\sigma_u^2 - \sigma_v^2) / \sigma_u^2$$

The variance explained was equal to the proportion of total within-person variance (σ_u^2) from a model with S-DERS Clarity (and BMI, when examining the effects of DASS Depression and CTS Social Self-Esteem) accounted for by adding the variable of interest (i.e., previous PANAS Negative Affect/ DASS Depression/ CTS Social Self-Esteem) to the model, where σ_v^2 is the within-person variance with the momentary predictor in the model (Raudenbush & Bryk, 2002).

Model 5: Predicting Binge Eating from Negative Affect/ Depressive Symptoms/ Social Self-Esteem x Attachment Anxiety/ Avoidance Interaction for Hypothesis 2

$$\text{Level 1: Prob}(\text{BINGE}_{ti} = 1 | \pi_i) = \Phi_{ti}$$

$$\log(\Phi_{ti} / [1 - \Phi_{ti}]) = \eta_{ti}$$

$$\eta_{ti} = \pi_{0i} + \pi_{1i} \text{S-DERS Clarity}_{(t-1)i} + \pi_{2i} \text{Negative Affect/ DASS Depression/ CTS Social Self-Esteem}_{(t-1)i} + e_{ti}$$

$$\text{Level 2: } \pi_{0i} = \beta_{00} + \beta_{01i} \text{BMI} + \beta_{02i} \text{Attachment Anxiety/ Avoidance} + r_{0i}$$

$$\pi_{1i} = \beta_{10} + r_{1i}$$

$$\pi_{2i} = \beta_{20} + \beta_{21i} \text{Attachment Anxiety/ Avoidance} + r_{2i}$$

$$\pi_{3i} = \beta_{30} + r_{3i}$$

Level 1 represents the within-person level, and level 2 represents the between-person level. ϕ_{ij} represents the predicted probability that a participant binged. Level 1 variables were group-mean centered (i.e., cluster-mean centered) so that the level 1 slopes would represent the pooled

within-person effects of the variable on the outcome. Level 2 variables were grand-mean centered so as to reduce multicollinearity, and to represent parameters as the average effect rather than as the effect coded zero on the variables (Cohen et al., 2003; Enders & Tofhigi, 2007). For the models including PANAS Negative Affect as a predictor, BMI was not controlled for as this variable did not significantly predict momentary PANAS Negative Affect.

**Model 6: Predicting Body Dissatisfaction from Negative Affect/ Depressive Symptoms/
Social Self-Esteem x Attachment Anxiety/ Avoidance Interaction for Hypothesis 2**

Level 1: $BISS_{ti} = \pi_{0i} + \pi_{1i}S\text{-DERS Clarity}_{(t-1)i} + \pi_{2i} \text{Negative Affect/ DASS Depression/ CTS}$
 $\text{Social Self-Esteem}_{(t-1)i} + e_{ti}$

Level 2: $\pi_{0i} = \beta_{00} + \beta_{01i}BMI + \beta_{02i}\text{AttachmentAnxiety/ Avoidance} + r_{0i}$

$$\pi_{1i} = \beta_{10} + r_{1i}$$

$$\pi_{2i} = \beta_{20} + \beta_{21i}\text{Attachment Anxiety/ Avoidance} + r_{2i}$$

$$\pi_{3i} = \beta_{30} + r_{3i}$$

Level 1 represents the within-person level, and level 2 represents the between-person level.

Level 1 variables were group-mean centered (i.e., cluster-mean centered) so that the level 1 slopes would represent the pooled within-person effects of the variable on the outcome. Level 2 variables were grand-mean centered so as to reduce multicollinearity, and to represent parameters as the average effect rather than as the effect coded zero on the variables (Cohen et al., 2003; Enders & Tofhigi, 2007). For the models including PANAS Negative Affect as a predictor, BMI was not controlled for as this variable did not significantly predict momentary PANAS Negative Affect.

Calculation 2: Variance explained for Models 6 and 7

$$\text{variance explained} = (\tau_u^2 - \tau_v^2) / \tau_u^2$$

The variance explained was equal to the proportion of total between-person variance with only previous S-DERS Clarity and previous PANAS Negative Affect/ DASS Depression/ CTS Social Self-Esteem entered at level 1, and BMI, ECR anxiety/ avoidance entered at the level 2 intercept (τ^2_u) accounted for by adding ECR anxiety/ avoidance to the level 2 slope (τ^2_v ; Raudenbush & Bryk, 2002).

Model 7: Predicting Emotion Dysregulation from Negative Affect/ Depressive Symptoms/ Social Self-Esteem x Attachment Anxiety/ Avoidance Interaction for Path a of Hypothesis 3

Level 1: $S\text{-DERS Score}_{it} = \pi_{0i} + \pi_{1i}S\text{-DERS Clarity}_{(t-1)i} + \pi_{2i}\text{Negative Affect/ Depressive symptoms/ social self-esteem}_{(t-1)i} + e_{it}$

Level 2: $\pi_{0i} = \beta_{00} + \beta_{01i}\text{BMI} + \beta_{02i}\text{Attachment Anxiety/ Avoidance} + r_{0i}$

$$\pi_{1i} = \beta_{10} + r_{1i}$$

$$\pi_{2i} = \beta_{20} + \beta_{21i}\text{Attachment Anxiety/ Avoidance} + r_{2i}$$

$$\pi_{3i} = \beta_{30} + r_{3i}$$

Level 1 represents the within-person level, and level 2 represents the between-person level.

Level 1 variables were group-mean centered (i.e., cluster-mean centered) so that the level 1 slopes would represent the pooled within-person effects of the variable on the outcome. Level 2 variables were grand-mean centered so as to reduce multicollinearity, and to represent parameters as the average effect rather than as the effect coded zero on the variables (Cohen et al., 2003; Enders & Tofhigi, 2007). For the models examining the mediating effects of previous S-DERS Clarity and previous S-DERS Total, S-DERS Clarity was not controlled for so as to circumvent singularity (Tabachnick & Fidell, 2007). For the models including PANAS Negative Affect as a predictor, BMI was not controlled for as this variable did not significantly predict momentary PANAS Negative Affect.

Model 8: Predicting Binge Eating from Negative Affect/ Depressive Symptoms/ Social Self-Esteem x Attachment Anxiety/ Avoidance Interaction and Emotion Dysregulation for Path b of Hypothesis 3

Level 1: $\text{Prob}(\text{BINGE}_{ti} = 1 | \pi_i) = \Phi_{ti}$

$$\log(\Phi_{ti}/[1 - \Phi_{ti}]) = \eta_{ti}$$

$$\eta_{ti} = \pi_{0i} + \pi_{1i}\text{S-DERS Clarity}_{(t-1)i} + \pi_{2i}\text{Negative Affect/ Depressive symptoms/ social self-esteem}_{(t-1)i} + \pi_{3i}\text{S-DERS Score}_{(t-1)i} + e_{ti}$$

Level 2: $\pi_{0i} = \beta_{00} + \beta_{01i}\text{BMI} + \beta_{02i}\text{Attachment Anxiety/ Avoidance} + r_{0i}$

$$\pi_{1i} = \beta_{10} + r_{1i}$$

$$\pi_{2i} = \beta_{20} + \beta_{21i}\text{Attachment Anxiety/ Avoidance} + r_{2i}$$

$$\pi_{3i} = \beta_{30} + r_{3i}$$

Level 1 represents the within-person level, and level 2 represents the between-person level. Φ_{ij} represents the predicted probability that a participant would binge eat. Level 1 variables were group-mean centered (i.e., cluster-mean centered) so that the level 1 slopes would represent the pooled within-person effects of the variable on the outcome. Level 2 variables were grand-mean centered so as to reduce multicollinearity, and to represent parameters as the average effect rather than as the effect coded zero on the variables (Cohen et al., 2003; Enders & Tofhigi, 2007). For the models examining the mediating effects of previous S-DERS Clarity and previous S-DERS Total, S-DERS Clarity was not controlled for so as to circumvent singularity (Tabachnick & Fidell, 2007). For the models including PANAS Negative Affect as a predictor, BMI was not controlled for as this variable did not significantly predict momentary PANAS Negative Affect.

**Model 9: Predicting Body Dissatisfaction from Negative Affect/ Depressive Symptoms/
Social Self-Esteem x Attachment Anxiety/ Avoidance Interaction and Emotion**

Dysregulation for Path b of Hypothesis 3

Level 1: $BISS_{it} = \pi_{0i} + \pi_{1i}S\text{-DERS Clarity}_{(t-1)i} + \pi_{2i}Negative\ Affect/\ Depressive\ symptoms/
social\ self\text{-}esteem_{(t-1)i} + \pi_{3i}S\text{-DERS Score}_{(t-1)i} + e_{it}$

Level 2: $\pi_{0i} = \beta_{00} + \beta_{01i}BMI + \beta_{02i}Attachment\ Anxiety/\ Avoidance + r_{0i}$

$$\pi_{1i} = \beta_{10} + r_{1i}$$

$$\pi_{2i} = \beta_{20} + \beta_{21i}Attachment\ Anxiety/\ Avoidance + r_{2i}$$

$$\pi_{3i} = \beta_{30} + r_{3i}$$

Level 1 represents the within-person level, and level 2 represents the between-person level.

Level 1 variables were group-mean centered (i.e., cluster-mean centered) so that the level 1 slopes would represent the pooled within-person effects of the variable on the outcome. Level 2 variables were grand-mean centered so as to reduce multicollinearity, and to represent parameters as the average effect rather than as the effect coded zero on the variables (Cohen et al., 2003; Enders & Tofhigi, 2007). For the models examining the mediating effects of previous S-DERS Clarity and previous S-DERS Total, S-DERS Clarity was not controlled for so as to circumvent singularity (Tabachnick & Fidell, 2007).

**Model 10: Predicting Emotion Dysregulation from Attachment Anxiety/ Avoidance for
Path a of Additional Analyses**

Level 1: $S\text{-DERS Score}_{it} = \pi_{0i} + \pi_{1i}S\text{-DERS Clarity}_{(t-1)i} + e_{it}$

Level 2: $\pi_{0i} = \beta_{00} + \beta_{02i}Attachment\ Anxiety/\ Avoidance + r_{0i}$

$$\pi_{1i} = \beta_{10} + r_{1i}$$

Level 1 represents the within-person level, and level 2 represents the between-person level.

Level 1 variables were group-mean centered (i.e., cluster-mean centered) so that the level 1 slopes would represent the pooled within-person effects of the variable on the outcome. Level 2 variables were grand-mean centered so as to represent parameters as the average effect rather than as the effect coded zero on the variables (Cohen et al., 2003; Enders & Tofhigi, 2007). For the models examining the mediating effects of previous S-DERS Clarity and previous S-DERS Total, S-DERS Clarity was not controlled for to circumvent singularity (Tabachnick & Fidell, 2007).

Model 11: Predicting Binge Eating from Attachment Anxiety/ Avoidance and Emotion

Dysregulation for Path b of Additional Analyses

Level 1: $\text{Prob}(\text{BINGE}_{ti} = 1 | \pi_i) = \Phi_{ti}$

$$\log(\Phi_{ti}/[1 - \Phi_{ti}]) = \eta_{ti}$$

$$\eta_{ti} = \pi_{0i} + \pi_{1i} \text{S-DERS Clarity}_{(t-1)i} + \pi_{2i} \text{S-DERS Score}_{(t-1)i} + e_{ti}$$

Level 2: $\pi_{0i} = \beta_{00} + \beta_{01i} \text{Attachment Anxiety/ Avoidance} + r_{0i}$

$$\pi_{1i} = \beta_{10} + r_{1i}$$

$$\pi_{2i} = \beta_{20} + r_{2i}$$

Level 1 represents the within-person level, and level 2 represents the between-person level. ϕ_{ij} represents the predicted probability that a participant binged. Level 1 variables were group-mean centered (i.e., cluster-mean centered) so that the level 1 slopes would represent the pooled within-person effects of the variable on the outcome. Level 2 variables were grand-mean centered so as to represent parameters as the average effect rather than as the effect coded zero on variables (Cohen et al., 2003; Enders & Tofhigi, 2007). For the models examining the mediating effects of previous S-DERS Clarity and previous S-DERS Total, S-DERS Clarity was not controlled for so as to circumvent singularity (Tabachnick & Fidell, 2007).

Model 12: Predicting Body Dissatisfaction from Attachment Anxiety/ Avoidance and Emotion Dysregulation for Path b of Additional Analyses

$$\text{Level 1: } \text{BISS}_{it} = \pi_{0i} + \pi_{1i} \text{S-DERS Clarity}_{(t-1)i} + \pi_{2i} \text{S-DERS Score}_{(t-1)i} + e_{it}$$

$$\text{Level 2: } \pi_{0i} = \beta_{00} + \beta_{01i} \text{AttachmentAnxiety/ Avoidance} + r_{0i}$$

$$\pi_{1i} = \beta_{10} + r_{1i}$$

$$\pi_{2i} = \beta_{20} + r_{2i}$$

Level 1 represents the within-person level, and level 2 represents the between-person level. ϕ_{ij} represents the predicted probability that a participant would binge eat. Level 1 variables were group-mean centered (i.e., cluster-mean centered) so that the level 1 slopes would represent the pooled within-person effects of the variable on the outcome. Level 2 variables were grand-mean centered so as to represent parameters as the average effect rather than as the effect coded zero on the variables (Cohen et al., 2003; Enders & Tofhigi, 2007). For the models examining the mediating effects of previous S-DERS Clarity and previous S-DERS Total, S-DERS Clarity was not controlled for so as to circumvent singularity (Tabachnick & Fidell, 2007).