

Binge-Eating Disorder and Obesity in Women: The Role of Attachment States of Mind

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Abstract

There is evidence that functions related to attachment may play an important role in the etiology and maintenance of eating disorders, particularly anorexia and bulimia nervosa (Kuipers & Bekker, 2012; Tasca & Balfour, 2014). However, there is little research available on attachment functioning in those with binge-eating disorder (BED). This dissertation consists of three studies that examine the role of attachment states of mind and attachment dimensions in understanding BED and co-morbid overweight, and to examine mechanisms related to group treatment response for those with BED. The first study assessed attachment state of mind classifications (i.e., attachment categories) to understand better: 1) the psychopathology and maintenance of BED and co-morbid overweight, and 2) the treatment response of women with BED who receive Group Psychodynamic Interpersonal Psychotherapy (GPIP; Tasca, Mikail, & Hewitt, 2005). Overweight women with BED (subsequently referred to as women with BED), overweight women without BED, and normal weight women without BED completed the Adult Attachment Interview (AAI; Main, Goldwyn, & Hesse, 2002). Those with BED completed the AAI pre- and six months post- GPIP and those without BED completed the AAI at one-time point. Women with BED have significantly higher rates of insecure (preoccupied) and unresolved/disorganized attachment states of mind compared to normal weight women without BED. Women with BED had similar rates of insecure and unresolved/disorganized attachment states of mind as overweight women without BED. With respect to treatment completers, changes in attachment states of mind were not statistically significant. However, follow-up analyses indicated clinically meaningful changes which are discussed in the study. The second study used attachment dimensions of coherence of mind and reflective functioning (measured using the AAI) to add to our understanding of the psychopathology and maintenance of BED and

co-morbid overweight. Higher Reflective Functioning scores differentiated normal weight women from both women with BED and overweight women without BED, and the latter two groups did not differ from each other. Coherence of Mind scores did not differentiate the groups. The third study used attachment dimensions of coherence of mind and reflective functioning to understand better group psychotherapy response for those with BED who received GPIP. Greater reflective functioning at pre-treatment was associated with a decline in binge eating frequency at 12 months post-treatment. Pre-treatment levels of coherence of mind was not related to group treatment outcomes. Reflective Functioning scores significantly improved from pre- to six months post-treatment. Further, more than 39% of participants demonstrated clinically reliable improvement and almost 32% experienced clinically reliable recovery with respect to reflective functioning. These results were moderated by pre-treatment self-reported attachment anxiety. That is, those with lower attachment anxiety showed significant improvement in reflective functioning, whereas those with higher attachment anxiety did not show this improvement. A third of participants experienced clinically significant improvement in coherence of mind, but this change was not statistically significant. Overall, attachment dimensions and attachment state of mind classification contribute to our understanding of the etiology and maintenance of BED and co-morbid overweight, as well as to our understanding of the group treatment response of those with BED. Addressing attachment insecurity and low reflective functioning in those with BED may improve treatment outcomes.

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Content of Thesis and Contribution of Authors

This thesis contains three studies. The three studies were prepared in collaboration with Dr. Giorgio A. Tasca, my research supervisor. The data used for the three studies were originally collected as part of two original studies completed at the Regional Centre for the Treatment of Eating Disorders (RCTED) at The Ottawa Hospital. Various staff at the RCTED worked to recruit participants, interview participants using the Adult Attachment Interview (AAI), and transcribe the interviews. Clinicians at the RCTED provided the group psychotherapy to participants in the treatment study. Certified researchers and clinicians were hired to code the AAIs. The process of recruitment through to coding the AAIs took several years and would not have been possible without the help of staff and clinicians at the RCTED. A doctoral student aided in coding the AAIs for reliability purposes. A second doctoral student also aided in coding the AAIs for reflective functioning and for reliability purposes.

I completed the training to become a certified reliable AAI and reflective functioning coder in 2013. The training to become a reliable AAI coder took over 18 months and the training to become a reliable reflective functioning coder took about one year. I was responsible for completing the literature review, formulating the hypotheses, coding the AAIs for reliability purposes, coding the majority of the AAIs for reflective functioning, completing the data analyses, and writing the discussion and conclusion. I am also responsible for submitting the studies as manuscripts for publication. For all three manuscripts, I am the first author and Dr. Tasca is the second author. Renee Grenon is a doctoral student who aided in coding the AAIs and reflective functioning and she is the third author. Megan Faye is also a doctoral student who aided in coding reflective functioning for reliability purposes and she is included as a co-author on the manuscripts that include reflective functioning (i.e., manuscripts two and three). Drs.

Kerri Ritchie, Hany Bissada, and Louise Balfour were co-investigators for the original studies from which the data for the current study were obtained and as such, they are also included as co-authors on the manuscripts.

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General Introduction

Introduction Overview

Binge-eating disorder (BED) is a common mental illness that is co-morbid with being overweight and with having symptoms of depression (Kessler et al., 2013). I used attachment theory as a framework to understand better the psychopathology and maintenance of BED and the group treatment mechanisms that may be related to patient outcomes. Increased understanding of the factors underlying and maintaining BED will contribute to refining psychological treatment with the aim of improving outcomes.

Attachment states of mind can be assessed using the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1985) which categorizes individuals based on current states of mind associated with early memories of attachment figures. Individuals may be classified as having a secure or insecure (i.e., preoccupied or dismissing) attachment state of mind. In addition to secure versus insecure, they may also be classified as having an unresolved/disorganized attachment state of mind with regards to loss or abuse. Insecure and unresolved/disorganized attachment states of mind are strongly associated with psychopathology (Bakermans-Kranenburg & van IJzendoorn, 2009). The AAI may also be used to rate individuals on attachment dimensional scales including Coherence of Mind and Reflective Functioning. The Coherence of Mind scale provides a measure of the degree to which an individual's attachment narratives is consistent, relevant, and concise; as well as, the degree to which they express beliefs that are consistent with reality. The Reflective Functioning scale measures the degree to which individuals thoughtfully reflect on one's own and others' behaviors in terms of states of mind concepts. Higher ratings on these dimensional scales indicate a capacity to think more coherently and reflectively, increased ability to regulate affect, and engage in better interpersonal

functioning. Consequentially, higher ratings are strongly associated with less psychopathology (Katznelson, 2014).

Individuals with BED experience greater psychopathology compared to individuals who do not have a mental illness (Fabricatore & Wadden, 2003; Kessler et al., 2013). There is also evidence that individuals with other eating disorders (e.g., anorexia nervosa [AN] and bulimia nervosa [BN]) have a high rate of insecure and unresolved/disorganized attachment states of mind and score lower than those without eating disorders on attachment dimensional scales (Kuipers & Bekker, 2012). As such, individuals with BED may also have a higher rate of insecure and/or unresolved/disorganized attachment state of mind (Barone & Guiducci, 2009) and may score lower than individuals who do not experience psychopathology on AAI dimensional scales (i.e., the Coherence of Mind and Reflective Functioning scales). As noted, BED is commonly co-morbid with overweight status. Research has begun to examine whether attachment is associated with body weight; however, results are mixed and the research is marked by methodological problems (e.g., Cooper & Warren, 2011; Gray, 2010; Marsh, 2005).

This dissertation consists of three studies that examine the role of attachment states of mind and attachment dimensional scales to understand BED and co-morbid overweight status and to examine mechanisms related to group treatment response. The first study uses attachment theory (i.e., attachment states of mind classifications) to understand better the psychopathology of BED and co-morbid overweight status. The goal of the second study is to examine whether coherence of mind and reflective functioning add to our understanding of the psychopathology of BED and obesity. The goal of the third study is to use coherence of mind and reflective functioning to understand better group treatment response for those with BED.

In this introduction, I will begin with a review of BED and health related complications (i.e., obesity and depression), then I will review attachment theory and reflective functioning and their role in or how they relate to eating disorders, with a focus on BED. I will then review the literature on the relationship among attachment, binge eating, and weight. Lastly, I will review the literature on attachment and psychotherapy. I will discuss the role that attachment states of mind and attachment dimensions might play in change over the course of group therapy and how they might serve as predictors for treatment outcomes in individuals with BED.

Binge-Eating Disorder and Health Related Complications

Binge-eating disorder is the most common eating disorder among Canadian women. Gauvin and colleagues (2009) reported a point-prevalence of 3.8% of a random sample of 1,501 Canadian women that met diagnostic criteria for BED. Lifetime prevalence rates for BED are high at 1.9% (2.6% for females and 1.1% for males; Kessler et al., 2013). Symptoms of BED are characterized by binge eating without compensatory behaviours (e.g., vomiting, laxative use, etc.). Binge eating is defined as an episode of eating a larger amount of food than an average person in the same amount of time and circumstances (i.e., over eating), and concurrently experiencing a sense of lack of control during the over eating episode. In BED, binge eating is marked by distress and must occur on average at least 2 days a week for six months (according to the Diagnostic and Statistical Manual of Mental Disorders, version four [DSM-IV-TR] which was used in the current study; American Psychiatric Association, 2000). See Appendix A for the DSM-IV-TR BED diagnostic criteria.

Binge-eating disorder is commonly co-morbid with being overweight or obese and with symptoms of depression. The majority of women with a lifetime history of BED have a body mass index (BMI; $\text{BMI} = \text{kg/m}^2$) of 25 or greater, making them overweight or obese (Kessler et

al., 2013; World Health Organization, 2014). With regards to depression, 42.2% of respondents with a lifetime history of BED had a lifetime history of major depressive disorder/dysthymia (Kessler et al., 2013). Overall BED is a common eating disorder that is comorbid with physical and mental health conditions thus resulting in a high level of burden for those with the disorder. Partly for this reason, treatment research on BED has proliferated in the past two decades.

Interpersonal Model of Binge-Eating Disorder

Interpersonal therapy is an evidence-based treatment for BED (Yager et al., 2012). The interpersonal model of binge eating posits that interpersonal problems and interpersonal deficits result in negative affect, which in turn, triggers binge eating as a way to temporarily cope with negative mood (Steiger, Gauvin, Jabalpurwala, Seguin, & Stotland, 1999; Wilfley, Frank, Welch, Spurrell, & Rounsaville, 1998). Research provides empirical support for the interpersonal model of BED (Ansell, Grilo, & White, 2012; Ivanova et al., 2015; Lo Coco et al., 2016).

Long-term decreases in interpersonal difficulties and adaptive affect regulation (particularly for negative affect) for women with BED are important to relieve symptoms of BED (Ansell et al., 2012; Ivanova et al., 2015). Interpersonal difficulties and affect regulation are key concepts related to attachment theory, in particular attachment insecurity (Ainsworth, 1969; Bowlby, 1969, 1973, 1980; Mikulincer & Shaver, 2007). Group Psychodynamic Interpersonal Psychotherapy (GPIP; Tasca, Mikail, & Hewitt, 2005) for BED integrates interpersonal (Kiesler, 1996; Strupp & Binder, 1984), attachment (Bowlby, 1980), and psychodynamic theory (Gabbard, 2000; Malan, 1979) within a group therapy model (Yalom & Leszcz, 2005). The GPIP treatment model emphasizes the impact that attachment functioning has on interpersonal interactions, affect regulation, and binge eating. Group Psychodynamic Interpersonal Psychotherapy is the group treatment used in this dissertation.

Group Psychodynamic Interpersonal Psychotherapy for Treating Binge-Eating Disorder

The GPIP model describes BED symptoms as a means of coping in response to negative affect that is precipitated by interpersonal conflict and unmet attachment needs. The *intrapersonal* dynamic is that unmet attachment needs lead to anxiety and/or negative affect (particularly low mood), which then lead to maladaptive defense mechanisms to cope. This intrapersonal dynamic manifests itself *interpersonally* in terms of relationships with the self, with others, and in the case of therapy, with the therapist or therapy group. The goal of GPIP is to identify and modify Cyclical Maladaptive Interpersonal Patterns (CMIP; Strupp & Binder, 1984), or one's maladaptive pattern of interacting that develops as a result of unmet attachment needs. Therapists identify CMIP's during the early stage of therapy, and they encourage more adaptive interactions and defense mechanisms during the middle stage of therapy. Participants are encouraged to generalize these new adaptive interactions outside of the group. The final stage of therapy focuses on internalizing shifts in participants' CMIP and consolidating changes (Tasca et al., 2005). Changes in CMIP and defenses result in one's self-concept becoming more positive and in using more adaptive coping strategies, which in turn result in less interpersonal distress. Consequently, individuals may decrease the frequency with which they use binge eating as a means of coping. There is empirical support for the effectiveness of GPIP for treating BED (Tasca, Ritchie, et al., 2006; Tasca, Ritchie, Demidenko, et al., 2013).

Attachment Theory

Attachment theory is a fundamental basis of GPIP for BED. Adult attachment systems develop from repeated interaction patterns between children and their primary caregivers, which lead to the development of internal working models that include views of the self and of others (Ainsworth, 1969; Bowlby, 1969, 1973, 1980). If the infant's attachment figure responds to

signals for proximity in a reliable and predictable safe way, the infant will develop an internal working model of the self as acceptable and worthwhile and of others as predictable and safe (Bowlby, 1973, 1980; Bretherton & Munholland, 2016). Overtime, this develops into a secure attachment system. If the attachment figure is inconsistent or unresponsive when the infant signals proximity and contact, then the infant will develop a view of self as unacceptable and unworthy and will view others as unpredictable and unsafe (Bowlby, 1973, 1980). In this case, the infant will engage in secondary attachment strategies as a way to try to most effectively interact with an unpredictable or unresponsive attachment figure (e.g., hyperactivating or deactivating their attachment system by overly maintaining contact or overly avoiding contact; Bowlby, 1973, 1980). Overtime, the infant will develop an insecure attachment system characterized by preoccupied or dismissing internal working models. Internal working models therefore, guide one's behaviour, cognitions, and feelings. The individual's attachment style, or attachment states of mind, in adulthood are a reflection of the individual's most accessible internal working models (Mikulincer & Shaver, 2007).

Attachment States of Mind

One way of assessing attachment states of mind in adulthood is by using the AAI. The AAI assesses adult states of mind with respect to attachment by focusing on current adult mental representations of early working models of child-parent relationships. The AAI is a semi-structured interview in which attachment related narratives are evaluated in order to assess attachment states of mind. Attachment state of mind classifications include secure and insecure. Insecure is further broken down into preoccupied and dismissing attachment states of mind. Classifications also include unresolved/disorganized with regards to loss or abuse.

Individuals with a secure attachment state of mind provide succinct, clear, and complete responses when describing childhood attachment memories on the AAI (Main, Goldwyn, & Hesse, 2002). These individuals tend to be confident that others will be there for them in times of need. They are able to self-soothe and feel worthy, which allows them to more easily empathize and care for others during times of distress. They maintain a positive view of the self and positive expectations about others' availability in times of distress. They are able to express and share emotions, and they use adaptive ways of regulating their emotions to cope (Mikulincer & Shaver, 2007; Mikulincer, Shaver, & Pereg, 2003; Shaver & Mikulincer, 2002). Adaptive emotion regulation and coping strategies allow these individuals to engage in supportive, healthy interpersonal interactions.

Individuals with a preoccupied attachment state of mind generally provide truthful but non-collaborative (i.e., not succinct, relevant, or entirely clear) responses when discussing attachment memories. Their AAIs are marked by anger and/or excessive passivity (Main et al., 2002). These individuals tend to use hyperactivating strategies (e.g., exaggerate threats, exaggerate their inability to cope) to gain proximity to attachment figures (e.g., romantic partners). They may blame themselves when others are not responsive to their needs. As such, they experience a negative view of self and a positive view of others. Their use of hyperactivating strategies interferes with their ability to understand the mental states and needs of others, thereby interfering with their ability to genuinely express concern and caring for others.

Individuals with a dismissing attachment state of mind generally provide succinct, relevant, and clear descriptions of attachment memories but descriptions appear untruthful (e.g., few to no examples for what they say). These AAIs contain clear idealization of an attachment

figure (e.g., positive descriptor without convincing evidence) or are derogatory of an attachment figure, and lack anecdotal evidence (Main et al., 2002). Idealization and derogation of an attachment figure indicates the inability to provide a balanced account of child-caregiver (i.e., attachment figure) attachment memories. These individuals tend to use deactivating strategies (e.g., deny their needs, avoid emotional states, avoid expressing emotions) to maintain emotional distance from attachment figures (Mikulincer & Shaver, 2007). They maintain a positive view of self and a negative view of others. Although they may provide positive descriptions of their attachment figures (as is the case when an individual idealizes an attachment figure), the individual is unable to substantiate those descriptors and as such, idealization in this case indicates a superficiality with regards to the relationship. Deactivating strategies interfere with the ability to appreciate mental states in others, which reduces these individual's ability to empathize and understand others' motives. Overall, hyperactivating and deactivating strategies negatively affect interpersonal interactions by decreasing the satisfaction and stability of relationships (Mikulincer & Shaver, 2007). Interviews that do not fit within the secure, preoccupied, or dismissing categories are classified as "cannot classify".

An unresolved/disorganized attachment state of mind classification can be assigned in addition to a secure or insecure attachment state of mind classification. An unresolved/disorganized attachment state of mind is caused by unresolved loss of attachment figures or by abuse or maltreatment. For individuals with an unresolved/disorganized attachment state of mind, affect fluctuates from deactivating to hyperactivation leading to inconsistent coping with distress. In terms of interpersonal style, individuals with this state of mind both approach and avoid attachment figures both wanting closeness but fearing connection. Indicators of unresolved/disorganized states of mind include statements that imply confusion between the

dead person and the self (e.g., “I died when my mother was 8 years old”), disruption in the flow of the narrative (e.g., losing track of their narrative during a response), and disorientation with respect to time (e.g., reporting that a person died at two differing times), for example. In addition to attachment state of mind classifications, the AAI dimensional scales include data that may be used to further understand attachment functioning. Two scales of interest for the current dissertation include the Coherence of Mind and the Reflective Functioning scales.

Coherence of Mind

The Coherence of Mind dimensional scale from the AAI is considered the “overall score providing the most accurate and final indication of the speaker’s ‘state of mind’ with respect of the attachment” (Main et al., 2002, p.62). Coherence of Mind is based on: (a) the coherence of the transcript, (b) an assessment for beliefs that are irrational that impact upon attachment, and (c) fear of loss or other indicators of unresolved/disorganized loss or trauma.

Coherence of transcript refers to the internal coherence of the discourse of the interviewee. This includes the degree to which the speaker is: (a) truthful (i.e., having evidence for what one says), (b) succinct yet provides enough information, (c) relevant (e.g., the person responds to the question that was posed), and (d) clear and orderly in their descriptions. Coherent narratives are a hallmark for secure attachment states of mind. As described, interviews that are generally truthful but non-collaborative (i.e., not succinct, relevant, or entirely clear) are typical of individuals who are assigned a preoccupied attachment state of mind, and interviews that are moderately collaborative (i.e., succinct, relevant, clear) but appear untruthful (i.e., do not provide evidence for what they say) are typical of individuals who are assigned a dismissing attachment state of mind (Main et al., 2002). Coherence of Mind also represents the degree to which the speaker uses statements that are consistent with usual ideas of reality (i.e., greater consistency

with reality indicates a more coherent narrative) and the degree to which the speaker demonstrates unresolved/disorganized mental states with regards to experiences of loss or abuse (i.e., less indication of unresolved/disorganized mental states indicates a more coherent narrative; Main et al., 2002).

The Coherence of Mind dimensional scale provides a scale from which to assess secure versus insecure attachment states of mind. Its unique value rests in its indication of both coherence of transcripts and unresolved/disorganized loss. As such, the Coherence of Mind dimensional scale provides a comprehensive picture of a person's full state of mind with respect to attachment experiences.

Reflective Functioning

Similar to Coherence of Mind, Reflective Functioning is an attachment dimensional scale that is coded using the AAI (Fonagy, Target, Steele, & Steele, 1998). Reflective functioning is defined as “the mental process by which an individual implicitly and explicitly interprets the actions of himself and others as meaningful on the basis of intentional mental states such as personal desires, needs, feelings, beliefs, and reasons” (Bateman & Fonagy, 2004, p.21). It is an empirically grounded framework for assessing a person's capacity to mentalize (i.e., “the capacity to perceive and understand oneself and others in terms of mental states” [Fonagy et al., 1998, p.7]). The construct comes from a combination of psychoanalytic concepts and attachment theory (Fonagy et al., 1998; Katznelson, 2014).

During the AAI, a person demonstrates reflective functioning when they: (a) demonstrate an awareness of the nature of mental states (e.g., that others' mental states are not entirely knowable), (b) make an effort to understand mental states underlying behaviour (e.g., taking into account one's own mental state in interpreting others' behaviour), (c) recognize the

developmental aspects of mental states (e.g., taking an intergenerational perspective or making links across generations), and/or (d) identify mental states in relation to the person with whom they are speaking (e.g., emotional attunement with the interviewer; Fonagy et al., 1998).

Reflective functioning is important because it enhances interpersonal communication and the ability to understanding others' actions (Fonagy et al., 1998). Moreover, greater reflective functioning is related to having a secure attachment state of mind, and plays a protective role in fostering a secure attachment state of mind associated with adaptive affect regulation, and secure interpersonal environments (Fonagy et al., 1995; Fonagy et al., 1998; Mikulincer & Shaver, 2007). Reflective functioning also allows one to distinguish between appearance and reality (Fonagy et al., 1998) which is important when considering the wellbeing of people who have endured abuse. Reflective functioning may protect the individual from negative views of the self that could result from traumatic experiences (e.g., the ability to separate one's view of self from one's negative view of the perpetrator of trauma; Fonagy et al., 1998).

Attachment and Eating Disorders

High rates of insecure attachment states of mind (Bakermans-Kranenburg & van IJzendoorn, 2009), low coherence of mind (Fonagy et al., 1996; Levy et al., 2006), and low reflective functioning (for a review see Katznelson, 2014) are common in clinical samples. However only recently has research begun to use attachment theory to understand eating disorders (for reviews see Katznelson, 2014; Kuipers & Bekker, 2012; Tasca & Balfour, 2014).

Although the etiology of eating disorders is largely unknown, a prevalent theory is that eating disorders result from a combination of genetic, biological, cognitive, and psychosocial factors (Connan, Campbell, Katzman, Lightman, & Treasure, 2003). Specifically, Connan and colleagues' (2003) model posits that genetic factors interact with early life experiences (i.e.,

childhood attachment experiences) which affects the development of the hypothalamic-pituitary-adrenal (HPA) axis. Due to this interaction, the HPA axis is more likely to become dysregulated in response to stress. A dysregulated HPA axis response includes both physiological vulnerabilities (e.g., changes in appetite) and psychological vulnerabilities (e.g., ability to cope adaptively) to develop an eating disorder. This model fits with the interpersonal model of binge eating in which sensitivities to interpersonal stressors precede negative affect, which then leads to episodes of binge eating as a maladaptive means of coping (Wilfley et al., 1998). Taken together, the interaction of early attachment experiences with biological vulnerabilities may be implicated in the etiology and maintenance of BED.

The literature indicates that 67% to 100% of individuals with eating disorders may be classified as having an insecure attachment state of mind (Kuipers & Bekker, 2012; Kuipers, van Loenhout, van der Ark, & Bekker, 2016; Tasca & Balfour, 2014). In their review, Kuipers and Bekker (2012) reported that individuals with an eating disorder were 1.7 to 2.1 times more likely to have an insecure attachment state of mind compared to non-clinical controls. Individuals with eating disorders also have higher prevalence rates of unresolved/disorganized mental states with respect to trauma or loss compared to non-clinical controls (Barone & Guiducci, 2009; Kuipers et al., 2016; Ward, Ramsay, & Treasure, 2000). This is likely due to the high number of individuals with eating disorders who have suffered adverse events in childhood (e.g., sexual abuse, violence within the home; Tasca, Ritchie, Zachariades, et al., 2013; Ward et al., 2000).

To date, only one published study with participants with BED used the AAI (Barone & Guiducci, 2009). This study included 10 participants diagnosed with BED, and reported data for eight of those 10 participants (Barone & Guiducci, 2009). Of the eight participants, seven were classified as dismissing, one was classified as “cannot classify”, and three received a

superimposed classification of unresolved/disorganized attachment state of mind with regards to loss or abuse. In addition, one unpublished dissertation examined attachment measured using the AAI with a treatment-seeking sample diagnosed with BED (Spurrell, 1996). However, the AAI was scored using the Revised Adult Attachment Q-Set (Kobak, 1994) which classifies individuals in terms of attachment state of mind differently than the Adult Attachment Scoring and Classification System Manual (Main et al., 2002) and so can not be directly compared. Regardless, the authors reported a high rate of insecure attachment state of mind. Other unpublished dissertations using self-report measures of attachment and with small sample sizes of individuals with BED, reported that obese individuals with and without BED had high rates of childhood abuse and high rates of insecure attachment (Domingo, 2003; Harrington, 2008).

Studies also reported low Coherence of Mind among individuals with eating disorders (Fonagy et al., 1996; Ward et al., 2001). Barone and Guiducci (2009), the only researchers who reported Coherence of Mind data for individuals with BED, found that their sample scored lower on Coherence of Mind compared to their non-clinical control sample; however, the authors did not report means of the Coherence of Mind data. Studies also found low Reflective Functioning for individuals with AN and mixed evidence for those with BN (Müller, Kaufhold, Overbeck, & Grabhorn, 2006; Pedersen, Lunn, Katznelson, & Poulsen, 2012; Ward et al., 2001). Research that included non-clinical controls (and small sample sizes ranging from 14 to 34 participants) reported that individuals with eating disorders demonstrated significantly lower Reflective Functioning (Fonagy et al., 1996; Kuipers et al., 2016; Rothschild-Yakar, Levy-Shiff, Fridman-Balaban, Gur, & Stein, 2010). One study with individuals with BN (and a larger sample size with 70 individuals with BN) did not report significant differences between their clinical sample and non-clinical controls (Pedersen et al., 2012). The authors suggested that their clinical sample

might represent a better functioning outpatient group resulting in higher Reflective Functioning compared to previous research. To date, no studies have reported Reflective Functioning data for individuals with BED.

Overall, research on adult attachment using the AAI in eating disorder samples is in its infancy. The body of literature available suggests that individuals with eating disorders are significantly more likely than non-clinical samples to have an insecure attachment state of mind classification and to demonstrate low Coherence of Mind compared to non-clinical controls. The evidence is mixed regarding Reflective Functioning data (i.e., low or similar to non-clinical norms). This suggests that adults with eating disorders are less consistent, relevant, and concise in their narratives of childhood attachment memories compared to non-clinical samples. They may also demonstrate a high rate of unresolved/disorganized state of mind with regards to loss and abuse that contributes to low Coherence of Mind. Adults with eating disorders may also have a harder time understanding their own and others mental states and considering mental states in understanding behaviour. As discussed, attachment states of mind and attachment dimensions in adulthood may be important for understanding the etiology and maintenance of eating disorders, including BED. However, there are very few studies that examined the role of attachment states of mind and attachment dimensions in BED. Furthering this line of research may have important implications for understanding better the factors that underlie and maintain BED and that affect treatment outcomes.

As indicated, only one very small pilot study has been published that used the AAI with a sample of participants with BED (Barone & Guiducci, 2009), and no study has provided Reflective Functioning data for individuals with BED. As such, it is unclear whether those with BED demonstrate levels of attachment states of mind or reflective functioning that may differ

from those of non-clinical controls. Even within the research of other eating disorders like AN or BN, few studies used non-clinical control groups, and no studies with participants with BED were longitudinal. Studies with participants with BED that use the AAI to assess attachment states of mind and attachment dimensions may provide additional insight into factors that impact affect regulation in individuals with BED. Such research may be particularly important for treatment implications.

Attachment, Binge Eating, and Weight

As discussed, individuals with BED experience a high rate of co-morbid obesity. Hence, it may be important to also understand the relationship among attachment, binge eating and weight. There is some evidence that symptoms of depression and level of BMI is moderated by self-report attachment style (Marsh, 2005). For those with secure attachment, greater symptoms of depression were associated with a higher BMI, and for those with insecure attachment, less symptoms of depression were associated with higher BMI. Others using community samples including students reported a relationship between higher BMI and insecure attachment measured using self-report measures (Cooper & Warren, 2011; Wilkinson, Rowe, Bishop, & Brunstrom, 2010). Moreover, two unpublished dissertations with small sample sizes reported that obese bariatric patients with and without BED had similar rates of self-report insecure attachment (Domingo, 2003; Harrington, 2008). As such, there is preliminary evidence that higher weight is associated with insecure attachment.

Those with eating disorders also experience a high rate of loss and abuse (Tasca, Ritchie, Zachariades, et al., 2013; Ward et al., 2000) and may experience a high rate of unresolved/disorganized mental states with regards to those experiences (Barone & Guiducci, 2009). There is also evidence that adults who experienced abuse or trauma in childhood or

adulthood are more likely to be overweight compared to those who have not experienced abuse (Kubzansky et al., 2014; Williamson, Thompson, Anda, Dietz, & Felitti, 2002). An unpublished dissertation reported that obese individuals with and without BED had similar rates of trauma (Domingo, 2003). As such, it is possible that unresolved/disorganized attachment states of mind with respect to loss and abuse might be related to higher body weight.

Experiences of loss or abuse and/or unreliable and unresponsive caregiving, characteristic of caregiver-child relationships that fosters an insecure attachment state of mind, may impact a person's physiological system, their eating behaviour, and their subsequent weight (Connan et al., 2003; Morris, Beilharz, Maniam, Reichelt, & Westbrook, 2015). Stress experienced in adulthood and/or related to early life experiences leads to the hyperactivation of the HPA axis (Adam & Epel, 2007; Morris et al., 2015). Eating food that is hedonically pleasant (e.g., high in sugar) is thought to dampen HPA axis activity through the activation of dopamine. Activating dopamine reduces cortisol levels and subsequently relieves feelings of stress and anxiety that are consistent with a hyperactivated HPA axis. In the case of overweight women with and without BED, it is possible that stress related to unreliable and unresponsive caregiving in childhood (characteristic of having an insecure attachment state of mind) as well as stress related to having an unresolved/disorganized state of mind with regards to loss and abuse, results in the hyperactivation of the HPA axis leading to over eating and being overweight or obese. As such, insecure and unresolved/disorganized attachment states of mind in overweight women with and without BED may underlie and maintain binge eating, over eating, and overweight status. Since coherence of mind is related to insecure and unresolved/disorganized attachment states of mind and the ability to understand mental states is likely impacted by attachment state of mind, it is possible that understanding further coherence of mind and reflective functioning may provide

valuable information for further understanding what underlies BED and co-morbid overweight status.

Negative Affect and Interpersonal Difficulties in Binge-Eating Disorder

As discussed, those with BED also tend to have concurrent symptoms of depression (or negative affect). Symptoms of depression (or low mood which is a proxy for negative affect) are worse in women with BED who are overweight compared to those who are overweight and do not have BED (Azarbad & Gonder-Frederick, 2010; Fandino et al., 2010; Grilo et al., 2008; Herbozo, Schaefer, & Thompson, 2015; Ramacciotti et al., 2008; Vinai et al., 2015; Wilfley, Wilson, & Agras, 2003). Similarly, symptoms of depression are worse for women who are overweight and do not have BED compared to non-clinical normal weight women (Azarbad & Gonder-Frederick, 2010; Carpenter, Hasin, Allison, & Faith, 2000; Fabricatore & Wadden, 2003; Magallares & Pais-Ribeiro, 2013). As such, depression may be a variable that differentiates individuals in terms of BED diagnosis and weight.

Symptoms of depression may account for some of the difficulties women with BED experience with negative affect and interpersonal functioning. For example, the nature of depression affects one's view of self, others, and the world. Symptoms of depression often include negative affect and spending less time with one's social circles. Individuals with depression turn inward, have a difficult time taking others perspectives, and maintaining balanced views (Horowitz, 2004). Moreover, depression is strongly associated with having an insecure attachment state of mind (Bakermans-Kranenburg & van IJzendoorn, 2009), indicating that those who are depressed use either hyperactivating or deactivating strategies to cope with negative affect, and have difficulties with interpersonal relationships. Ivanova and colleagues (2015) demonstrated that negative affect (i.e. low mood) mediated the relationship

between interpersonal problems and BED symptoms in an eating disorders sample. Their findings further support the interpersonal model of binge eating. As such, it may be important to take into account low mood and interpersonal problems when considering the impact of other factors that may impact negative affect and interpersonal functioning in individuals with BED.

Attachment and Psychotherapy in Eating Disorders

According to the Interpersonal (Wilfley et al., 1998) and GPIIP (Tasca et al., 2005) models of BED, interpersonal functioning and affect regulation are key components in developing and maintaining symptoms of BED. Adaptive interpersonal functioning and emotion regulation are also associated with a secure attachment state of mind (Bowlby, 1969; Mikulincer & Shaver, 2007). As such, change in attachment states of mind from insecure to secure may be one way that GPIIP, and other attachment based psychotherapies, effect change in binge eating for women with BED.

Change in attachment dimensions may be factors that affect or explain change in GPIIP for BED. When a person demonstrates more Coherence of Mind and Reflective Functioning, the individual is better able to take multiple perspectives, identify their own and others mental states, understand the impact of mental states and behaviour, and think about attachment-related situations in a balanced way, all of which are important for regulating one's affect and having satisfying interpersonal interaction and relationships (Fonagy et al., 1998; Main et al., 2002). As such, compared to those with less Coherence of Mind and Reflective Functioning, individuals with greater abilities in these attachment functions may be able to engage better in therapeutic interventions. That is, their capacity for regulating emotions, attending to content and emotions, and considering the interaction of thoughts, feelings, intentions, and behaviour will be greater. Moreover, those with higher pre-treatment Coherence of Mind and Reflective Functioning may

be better able to make use of therapy and as a result, have better treatment outcomes. In addition, it may be important that psychotherapy facilitate healthy changes in these attachment dimensions so that over-time, patients can gain more benefit.

There is limited research that has assessed attachment and psychotherapy process and outcome in eating disorder samples. Some evidence indicates that individuals with different attachment styles may engage in psychotherapy differently and benefit more from one type of therapy over others (Daniel, 2011; Tasca, Balfour, Ritchie, & Bissada, 2007; Tasca, Ritchie, et al., 2006; Tasca, Taylor, Bissada, Ritchie, & Balfour, 2004). For example, one study that used the AAI found that those with BN who had a preoccupied state of mind talked more and had longer speaking turns than those with a dismissing state of mind during psychotherapy (Daniel, 2011). There is also some research that has examined the possible mechanisms by which greater attachment insecurity impacts eating disorder symptoms (e.g., self-esteem; Dakanalis et al., 2014; Keating, Tasca, & Hill, 2013; Tasca, Kowal, et al., 2006; Tasca et al., 2009). In terms of attachment as a predictor of treatment outcomes, one unpublished dissertation that used the Revised Adult Attachment Q-Set (Kobak, 1994) applied to the AAI, reported that individuals with a secure attachment state of mind improved significantly following Interpersonal Psychotherapy or Cognitive Behavioural Therapy, providing evidence that attachment states of mind may serve as a predictor for change in psychotherapy (Spurrell, 1996). Additional research is needed to examine attachment states of mind and attachment dimensions as predictors of treatment outcomes for individuals with BED.

There is also some research that examined changes in self-reported attachment following psychotherapy in eating disorder samples (Maxwell, Tasca, Ritchie, Balfour, & Bissada, 2014). In a group therapy study of participants with BED, reductions in self-reported attachment anxiety

and avoidance at 12 months post-treatment were significantly related to decreases in interpersonal problems up to 12 months post-treatment (Maxwell et al., 2014). To date, no research has examined changes in attachment states of mind using the AAI among those with BED. However, there is some evidence in the treatment of borderline personality disorder that increases in secure attachment states of mind and increases in Coherence of Mind are possible following individual therapy (Levy et al., 2006).

With regards to reflective functioning, there is emerging evidence that reflective functioning measured with the full AAI improves following dynamically oriented therapy (Levy et al., 2006; Müller et al., 2006), whereas other studies that used alternative methods of assessing reflective functioning did not find significant changes (e.g., assessment of reflective functioning specific to panic disorder symptoms [Rudden, Milrod, Target, Ackerman, & Graf, 2006] and assessing reflective functioning using interviews other than the AAI [Vermote et al., 2010]).

With regards to treatment response, there is some evidence that higher pre-treatment reflective functioning may be related to earlier engagement in and response to psychotherapy (Gullestad, Johansen, Hoglend, Karterud, & Wilberg, 2013; Taubner, Kessler, Buchheim, Kachele, & Staun, 2011). As such, changes in reflective functioning and other attachment dimensions like coherence of mind, might mediate changes in outcomes. Taken together, there is preliminary research that reflective functioning impacts how people engage in psychotherapy, that reflective functioning may change following psychotherapy, and that reflective functioning and other attachment dimensions like coherence of mind might mediate changes in treatment outcomes.

Group Psychodynamic Interpersonal Psychotherapy and Attachment Functioning

As discussed, GPIP is thought to lead to changes in CMIPs. The GPIP model contends that over the course of therapy, patients develop more adaptive ways of regulating affect and

functioning interpersonally, thus they are able to begin to regulate their emotions and reach for support in adaptive ways. As such, over-time, they are likely able to trust in themselves and that others will be there for them, which is characteristic of secure attachment (Mikulincer & Shaver, 2007). The interventions in GPIP may also facilitate both coherence of mind and reflective functioning. For example, the focus on the here and now allows the therapist and group members to help clients focus on their mental states as they are experienced during the group (Tasca et al., 2005). The therapist and group members support and help clients form coherent narratives of what is occurring for them when their attachment system is activated (e.g., discussing a loss, abuse, a romantic partner, medical emergency etc.). Patients process and are supported to describe their experiences with a focus on how those experiences impact them in the here and now and how they might be related to binge eating symptoms. These therapeutic interactions may also contribute to improved reflective functioning (e.g., by linking mental states to behaviour). Moreover, group therapeutic factors (Yalom & Leszcz, 2005) like interpersonal learning, whereby patients share their own and hear about others mental states (i.e., emotions, thoughts, and perceptions), and receive and provide feedback on their mental states and behaviour from group members, may facilitate reflective functioning. As such, GPIP may promote change in attachment states of mind, coherence of mind, and reflective functioning.

The Current Dissertation

The current dissertation aims to build on the literature on attachment and eating disorders in a number of ways through three different studies (see Appendix B for a break down of the measures used for the three samples in the studies). The first study is both cross sectional and longitudinal, and builds on the literature on BED and the categorical assessment of attachment states of mind with the AAI. The first goal of the first study is to use attachment theory to

understand better the psychopathology of BED and co-morbid overweight status. I do this by a cross sectional comparison of the categorical assessment of attachment states of mind among three age and weight matched samples, including: (a) overweight women with BED (subsequently referred to as women with BED), (b) overweight women without BED, and (c) normal weight women without BED. The second goal of the first study is to use attachment theory to understand better the treatment response of women with BED who receive GPIP. I do this by examining longitudinal change in the categorical assessment of attachment states of mind pre- to six months post-GPIP in women with BED.

The second study is cross sectional and builds on the literature on BED and attachment dimensions measured with the AAI. The goal of the second study is to examine whether coherence of mind and reflective functioning add to our understanding of the psychopathology related to BED and obesity. To do so, I examine whether Coherence of Mind and Reflective Functioning scores differentiate three matched groups: women with BED, overweight women without BED, and normal weight women without BED. These comparisons are made while controlling for depressive symptoms and interpersonal problems (consistent with the Interpersonal and GPIP models of BED; Tasca et al., 2005; Wilfley et al., 1998) to isolate the unique contributions of coherence of mind and reflective functioning in understanding BED.

The third is a longitudinal study that builds on the literature on BED and psychotherapy by examining coherence of mind and reflective functioning measured with the AAI. The goal of the third study is to use coherence of mind and reflective functioning to understand better group treatment response for those with BED. I do this by examining change in Coherence of Mind and Reflective Functioning scores pre- to six months post-group treatment with GPIP. Further, I examine if change in Reflective Functioning and Coherence of Mind mediate change in binge

eating (findings are reported in Appendix C), and whether these attachment dimensions at pre-treatment predict changes in BED symptoms of depression and binge eating at 12 months post-treatment.

Study One

Change in Attachment States of Mind of Women with Binge-Eating Disorder*

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Abstract

Insecure and unresolved/disorganized attachment states of mind may impact affect regulation and interpersonal functioning that contribute to binge eating in women with binge-eating disorder (BED). Group psychological treatment may facilitate changes from insecure to secure and from unresolved/disorganize to non-unresolved/disorganized attachment states of mind. The current study used attachment theory to understand better the psychopathology of BED and co-morbid overweight status, and to understand better the treatment response of patients with BED who receive group psychotherapy. Women with BED attended Group Psychodynamic Interpersonal Psychotherapy (GPIP) and completed the Adult Attachment Interview (AAI) pre- and six months post-treatment. Matched samples of overweight women without BED and normal weight women without BED completed the AAI at one-time point. Women with BED had significantly higher rates of preoccupied and unresolved/disorganized attachment states of mind compared to normal weight women without BED, and had similar rates of insecure and unresolved/disorganized attachment states of mind compared to overweight women without BED. Of the women with BED who had an insecure and/or unresolved/disorganized attachment state of mind at pre-treatment, about 60% demonstrated clinically relevant changes to secure and to non-unresolved/disorganized states of mind at six months post-GPIP. Results indicated that some women with BED may benefit from interventions that help them regulate hyperactivated affect and create coherent narratives. Both women with BED and overweight women without BED, may benefit from treatments that help them develop more adaptive affect regulation strategies related to unresolved/disorganized attachment states of mind.

Change in Attachment States of Mind of Women with Binge-Eating Disorder

Attachment states of mind measured by the Adult Attachment Interview (AAI; Main, Goldwyn, & Hesse, 2002) provide a way of examining attachment functioning related to affect regulation and interpersonal behaviour in adulthood. Insecure attachment states of mind are associated with having an eating disorder, particularly anorexia (AN) and bulimia nervosa (BN; for a review see Tasca and Balfour, 2014). Those with eating disorders also have higher rates of unresolved/disorganized attachment state of mind compared to those without eating disorders (Barone & Guiducci, 2009; Kuipers, van Loenhout, van der Ark, & Bekker, 2016; Ward, Ramsay, & Treasure, 2000). Interpersonal problems and affect dysregulation, which are characteristic of insecure and unresolved/disorganized attachment, may maintain symptoms of eating disorders, including binge eating (Ivanova et al., 2015; Wilfley, Frank, Welch, Spurrell, & Rounsaville, 1998). Binge-eating disorder (BED) is a common eating disorder that is highly co-morbid with physical health conditions including overweight status/obesity and obesity-related diseases (Kessler et al., 2013).

Some researchers suggest that there may be a relation among attachment states of mind, binge eating, and weight (e.g., Domingo, 2003; Marsh, 2005). However, there is little research on the attachment states of mind of those with BED, and even less research on the relationships among attachment states of mind, binge eating, and weight. The goal of the current study is to use attachment theory to further the understanding of the nature of BED and co-morbid overweight status. We do this by examining differences in the attachment states of mind of overweight women with BED and overweight and normal weight women without BED. We also examine changes in the attachment states of mind of women with BED from pre- to six months post-group psychotherapy.

Binge-Eating Disorder

Binge eating is defined as eating an unusually large amount of food within a two-hour period and experiencing a sense of loss of control while doing so. Estimates of the lifetime prevalence of BED in the population range from 2.6% to 3.8% (Gauvin, Steiger, & Brodeur, 2009; Kessler et al., 2013). Binge-eating disorder is commonly co-morbid with obesity, with population studies reporting that as many as 31% to 41% of individuals with BED are obese (Kessler et al., 2013), and treatment studies reporting that as many as 90% of individuals seeking treatment for BED are obese (Tasca et al., 2006). Those with BED often experience concurrent symptoms of depression (Kessler et al., 2013; Tasca et al., 2006) and interpersonal problems, including chronic unfulfilling social relationships (Grilo, Shiffman, & Carter-Campbell, 1994; Wilfley et al., 1993).

The interpersonal model of binge eating posits that interpersonal problems result in negative affect, which triggers binge eating as a way of coping (Wilfley et al., 1998; Wilfley et al., 2002). Recently, Ivanova and colleagues (2015) and Lo Coco and colleagues (2016) found that negative affect mediated the relationship between interpersonal problems and BED symptoms, thus providing empirical support for the interpersonal model in a clinical sample. Interpersonal therapies are well-suited for patients diagnosed with BED because these treatments focus on developing and sustaining satisfying relationships and using adaptive strategies for coping with social and interpersonal problems and negative affect (Wilfley et al., 1998). Since interpersonal functioning and affect regulation are key concepts related to BED, attachment theory (Bowlby, 1969), which provides a comprehensive framework for both affect regulation and interpersonal functioning, may be useful for understanding BED symptoms and treatment response.

Attachment States of Mind

The AAI (Main et al., 2002) is one of the most widely used and validated methods for assessing adult attachment states of mind. The AAI uses current adult mental representations of early working models of parent-child relationships to classify individuals as having a secure or insecure (i.e., preoccupied or dismissing) attachment state of mind by examining narratives when describing attachment related memories. Adults who are classified as having a secure attachment state of mind provide coherent narratives of childhood attachment memories in that their descriptions are consistent, relevant, and concise (Main et al., 2002). These individuals are able to self-soothe, trust that others will support them, express and share their feelings, and use adaptive ways of regulating their emotions (Mikulincer & Shaver, 2007).

Adults who are classified as having a preoccupied attachment state of mind provide less coherent narratives of attachment memories that are marked by anger or excessive passivity (Main et al., 2002). These individuals have a difficult time with self-soothing, view the self as flawed or unacceptable, and use hyper-activating strategies (e.g., over-emphasizing negative affect) when experiencing and expressing their emotions (Mikulincer & Shaver, 2007). Adults who are classified as having a dismissing attachment state of mind also provide less coherent narratives of attachment memories compared to those with a secure attachment state of mind. Attachment memories of those with a dismissing attachment state of mind are characterized by idealizing caregivers, or being derogatory of attachment relationships, and/or demonstrating a considerable lack of memory when discussing attachment related experiences (Main et al., 2002). These individuals view the self as acceptable, but do not trust that others will be available or willing to help them in times of need. They use deactivating strategies with regard to affect (e.g., avoid emotional states that trigger their attachment system; Mikulincer & Shaver, 2007).

Alternatively, some adults may be classified as cannot classify if they demonstrate characteristics of more than one attachment state of mind and/or do not fit within a secure, preoccupied, or dismissing attachment state of mind classification.

In addition to being classified as having a secure or insecure attachment state of mind, an individual may be classified as having an unresolved/disorganized attachment state of mind if they continue to be affected by loss or abuse (Main et al., 2002). When discussing a loss or abuse during the AAI, these individuals may: (a) demonstrate a lapse in reasoning, (b) demonstrate a lapse in the monitoring of their discourse, (c) describe extreme behavioural responses related to the loss or abuse, and/or (d) provide disoriented responses (Main et al., 2002). Those with unresolved/disorganized attachment states of mind fluctuate in using both hyperactivating and deactivating strategies related to affect, and their narrative lacks coherence when discussing loss or abuse. Interpersonally, these individuals tend to both approach and avoid attachment figures both wanting closeness but fearing connection.

Attachment States of Mind and Eating Disorders

Individuals with eating disorders are overwhelmingly classified as having an insecure attachment state of mind (i.e., 67% to 100%) and are 1.7 to 2.1 times more likely to have an insecure attachment state of mind compared to non-clinical controls (for reviews see Kuipers & Bekker, 2012; Kuipers et al., 2016). A study by Barone & Guiducci (2009), which is the only published study of the AAI that specifically included participants with BED and AAI classifications, reported data for eight participants with BED. Seven of their eight participants were classified as having a dismissing attachment state of mind and one was categorized as cannot classify. These results provide preliminary evidence that individuals with BED may have a high rate of insecure attachment state of mind. As noted, having an insecure attachment state of

mind is associated with interpersonal problems and affect dysregulation, key concepts in the interpersonal model of BED (Ivanova et al., 2015; Wilfley et al., 1998). As such, an insecure attachment state of mind may underlie and maintain BED symptoms and related psychopathology.

Research also indicates that there may be a high rate of unresolved/disorganized attachment state of mind in individuals with eating disorders (Tasca, Ritchie, Zachariades, et al., 2013; Ward et al., 2000). Barone and Guiducci (2009) reported that 37.5% of their sample with BED (i.e., three out of eight participants) were classified as unresolved/disorganized with respect to loss and abuse. As indicated, an unresolved/disorganized attachment state of mind is associated with fluctuations in hyperactivating and deactivating of emotions. As such, for many with BED, binge eating may be a way of coping with difficulty regulating affect related to past experiences of loss and/or abuse. For that reason, an unresolved/disorganized attachment state of mind may contribute to the maintenance of binge eating for some. Research with larger samples of individuals with BED is needed to provide reliable estimates of secure versus insecure attachment states of mind and to explore further the role of having an unresolved/disorganized attachment state of mind in the psychopathology associated with BED.

Attachment States of Mind, Binge Eating, and Weight

Due to the high rate of co-morbid overweight status or obesity in those with BED (Kessler et al., 2013), it may be important to understand the relationship among attachment states of mind, binge eating, and weight. To date, there is limited research that has examined the relationships among attachment, binge eating, and weight and no research that has specifically examined the relationships among these variables using the AAI. Studies provide preliminary evidence of associations among self-reported attachment, binge eating, and weight, suggesting

that self-reported insecure attachment is associated with higher weight (Cooper & Warren, 2011; Domingo, 2003; Harrington, 2008; Hintsanen, Jokela, Pulkki-Råback, Viikari, & Keltikangas-Järvinen, 2010; Marsh, 2005; Wilkinson, Rowe, Bishop, & Brunstrom, 2010). However, evidence of the relationship between weight and type of insecure attachment is mixed. This may be due to assessing attachment functioning by a variety of different measures, including scales with limited psychometric evidence to support their validity (Cooper & Warren, 2011; Hintsanen et al., 2010; Wilkinson et al., 2010), and due to studies with small sample sizes with BED (e.g., $n = 11$ in Domingo, 2003). Although there are notable limitations in the existing research, the studies to date suggest a possible association between higher weight and insecure attachment.

There is also some evidence suggesting that compared to those who have not experienced trauma, those who did experience trauma in childhood or adulthood are at a greater risk for being overweight or obese as adults (Kubzansky et al., 2014; Williamson, Thompson, Anda, Dietz, & Felitti, 2002). One unpublished dissertation reported that obese individuals with and without BED had similar rates of trauma, however, the sample size of individuals with BED was small ($n = 11$; Domingo, 2003). One potential mechanism that links childhood adversity to adult obesity is dysregulation of the hypothalamic-pituitary-adrenal (HPA) axis (for a review see Morris, Beilharz, Maniam, Reichelt, & Westbrook, 2015). According to this model, stress from early life experiences and adulthood can lead to a hyperactivated HPA axis. The HPA axis can be dampened by increases in dopamine caused by eating hedonically pleasant food (e.g., high in sugar and carbohydrates; Adam & Epel, 2007; Morris et al., 2015). Hence, overeating or binge eating in part may be a response to physiological vulnerability caused to some extent by childhood adversity, which in turn is related to insecure or disorganized attachment states of mind in adulthood.

Group Psychotherapy and Change in Attachment States of Mind

Attachment states of mind are relatively stable from childhood to adulthood (Pinquart, Feussner, & Ahnert, 2013; Shorey & Snyder, 2006; Waters, Weinfeld, & Hamilton, 2000). A recent meta-analysis reported a moderate level of stability over time in attachment categories (Pinquart et al., 2013). Change in attachment classification has been examined among those with eating disorders, however, that body of research is limited and has primarily used self-report measures (Tasca & Balfour, 2014). Understanding changes in attachment states of mind in those with BED may be important because attachment insecurity is related to psychopathology in general and may be related to binge eating symptoms (Bakermans-Kranenburg & van IJzendoorn, 2009; Ivanova et al., 2015). However, there is no research on change in attachment states of mind pre- to post-psychotherapy for those with BED. A study that used a self-report measure of attachment dimensions reported that attachment anxiety (i.e., preoccupied) and attachment avoidance (i.e., dismissing) significantly decreased from pre- to 12 months post-treatment in women with BED (Maxwell, Tasca, Ritchie, Balfour, & Bissada, 2014). A recent study found that dimensional rating of attachment insecurity on the AAI did not change following 21 sessions of Cognitive Behavioural Therapy or two years of Psychoanalytic Psychotherapy for patients with BN (Daniel, Poulsen, & Lunn, 2016). However, in a sample of patients with borderline personality disorder who received 12 months of Transference Focused Therapy, Levy and colleagues (2006) reported a significant increase in the number of patients classified with secure attachment states of mind on the AAI but not a significant decline in unresolved/disorganized attachment state of mind at post-treatment. The results of these studies are difficult to compare since they each assessed change in attachment differently. However, the

study by Levy et al., (2006) provides evidence that attachment states of mind, assessed using the standard coding system for the AAI (Main et al., 2002) can change following psychotherapy.

The participants in the current study were diagnosed with BED and received Group Psychodynamic Interpersonal Psychotherapy (GPIP; Tasca, Mikail, & Hewitt, 2005). This treatment is based on psychodynamic (Gabbard, 2000; Malan, 1979) and interpersonal (Kiesler, 1996; Strupp & Binder, 1984) theories to understand symptoms and interpersonal processes within a group therapy framework (Yalom & Leszcz, 2005). The GPIP model is informed by the interpersonal model of BED (Wilfley et al., 1998) and describes BED symptoms as a mean of coping with difficult affect precipitated by unmet attachment needs and interpersonal conflict (Ivanova et al., 2015; Tasca et al., 2005). As described by the GPIP model, the *intrapersonal* dynamic of BED is characterized by unmet attachment needs in the individual that lead to anxiety and/or negative affect, which then lead to using maladaptive defenses to cope with affect. This intrapersonal dynamic manifests itself *interpersonally* in terms of relationships with the self, with others, and in the case of therapy, with the therapist or therapy group. As such, the goal of GPIP is to identify and modify Cyclical Maladaptive Interpersonal Patterns (CMIP; Strupp & Binder, 1984) that develop as a result of unmet attachment needs. Therapists identify CMIPs during the early stage of therapy, and they encourage more adaptive group interactions and healthier defense mechanisms during the middle stage of the group treatment. The final stage of therapy focuses on internalizing shifts in participants' CMIPs and consolidating these changes (Tasca et al., 2005). Over the course of GPIP, patients develop adaptive ways of regulating affect and seeking interpersonal support. Hence, GPIP may facilitate change in attachment states of mind. Research has shown that GPIP is effective in reducing BED symptoms (i.e., binge eating

frequency and symptoms of depression; Tasca et al., 2006; Tasca, Ritchie, Demidenko, et al., 2013).

The Current Study

In this study we compare attachment states of mind measured with the AAI among three matched samples: (a) overweight women with BED (subsequently referred to as women with BED), (b) age and weight matched overweight women without BED, and (c) age matched normal weight women without BED. We also examine change in attachment states of mind pre- to six months post-treatment. We hypothesize that compared to overweight and normal weight women without BED, women with BED will have a significantly higher rate of: (1) insecure attachment state of mind, and (2) unresolved/disorganized attachment state of mind. Due to the novel nature of this research, we will conduct exploratory analyses to examine differences in the proportion of insecure versus secure and unresolved/disorganized versus non-unresolved/disorganized attachment states of mind between overweight women and normal weight women without BED. We will also conduct exploratory analyses to examine differences in the proportion of preoccupied and dismissing attachment states of mind among the three matched samples of women. We also hypothesize that there will be: (3) a significant increase of secure attachment state of mind and concurrent decrease in insecure state of mind from pre- to six months post-GPIP for women with BED, and (4) a significant decrease in unresolved/disorganized attachment state of mind from pre- to six months post-GPIP for women with BED.

Method

Participants

Of the 202 participants in this study, 102 were diagnosed with BED according to the DSM-IV-TR (American Psychiatric Association, 2000) criteria and they started GPIP for BED. Six month AAI follow-up data was available for 63 of the 102 participants in the treatment sample. All participants with BED had a body mass index (BMI; kg/m^2) of 27 or higher classifying them as overweight or obese according to the World Health Organization (2014). Non-clinical comparison participants who did not meet criteria for BED included: 1) 50 age- and weight-matched overweight or obese women, and 2) 50 age-matched normal weight women. Table 1 presents demographic data for the three samples.

Materials

The Adult Attachment Interview (Main, Goldwyn, & Hesse, 2002). The AAI is a semi-structured interview. Each AAI transcript is assigned a 5-way classification (i.e., secure, preoccupied, dismissing, cannot classify, or unresolved/disorganized), a 4-way classification (i.e., secure, preoccupied, dismissing, or cannot classify), a 3-way classification (i.e., secure, preoccupied, or dismissing), and a 2-way classification (i.e., secure or insecure). The reliability and validity of the AAI is well documented (e.g., Bakermans-Kranenburg & van IJzendoorn, 1993). The six AAI coders for the current study attended AAI Training Institutes provided by certified AAI trainers, and successfully completed the reliability testing. Inter-rater reliability was examined on a random subsample of transcripts (i.e., 25% or 66 of the 265 transcripts) that included transcripts from all six coders. Coders had good inter-rater reliability for the 5-way, 4-way, 3-way, and 2-way classifications, with 91% to 92% agreement, Cohen's $\kappa = .82$ to $.86$.

Patient Edition of the Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Research Version (SCID-I/P; First, Spitzer, Gibbon, & Williams, 2002). The SCID-I/P is a semi-structured interview used in making DSM-IV-TR Axis-I diagnoses. It

includes a module for diagnosing BED. The SCIP-I/P has good validity (Basco et al., 2000; Shear et al., 2000) and strong inter-rater reliability, Cohen's $\kappa > .70$ (First et al., 2002; Tasca, Ritchie, Demidenko, et al., 2013).

Group Psychodynamic Interpersonal Psychotherapy (Tasca et al., 2005). The treatment, GPIIP, is a time-limited therapy that provides 16 weekly 90 minute groups. Each group was led by one therapist, and included eight to 10 participants in each of the 12 groups. Prior to the group, participants attended a pre-group preparation session to socialize them to the group treatment and to assess their CMIP. As noted, GPIIP combines principles from psychodynamic, interpersonal, and group psychotherapy theory. The therapy describes BED symptoms as a means of maladaptive coping in response to negative affect precipitated by interpersonal conflict and unmet attachment needs. Participants may experience decreases in symptoms as their CMIPs shift over the course of therapy.

Procedure

Participants with BED were recruited as part of a treatment study through a tertiary treatment centre for eating disorders, or they were self-referred through advertisements in the community for a group treatment study for BED. The original treatment study publication details the recruitment procedures (Tasca, Ritchie, Demidenko, et al., 2013). Participant exclusion criteria included: not speaking English, having schizophrenia, a psychotic disorder, or a bipolar disorder diagnosis, drug or alcohol dependence, pregnancy, or currently or planning to participate in a weight loss program in the following year. Participants met with a Ph.D. clinical psychologist to verify a diagnosis of BED with the SCID-I/P (First et al., 2002). Participants completed a demographic questionnaire pre-treatment and the AAI pre- and six months post-treatment. The AAIs were administered and audio recorded by either a Ph.D. clinical

psychologist or a Ph.D. psychology student trained in administering and coding the AAI. Each audio recording was transcribed and then coded by trained coders according to the AAI manual (Main et al., 2002). Participants' weight and height were measured prior to beginning treatment. Prior to beginning GPIP, a Ph.D. psychologist completed a pre-group preparation session with each participant during which he discussed and formulated the participants' CMIP. Participants' CMIP were shared with the group therapists before the first session of GPIP. The 16 group therapy sessions were video recorded which were used in part to assess therapist adherence to the treatment manual. Six therapists including three Ph.D. clinical psychologists, two psychiatrists, and one master's level advanced practice nurse each provided two GPIP groups. Each therapist had at least three years of experience providing group psychotherapy, completed a two-day workshop on GPIP, and attended weekly supervision sessions on GPIP. A previous publication that used the same sample as in the current study used the Psychodynamic Therapy Adherence Scale of the Tape Rating Instrument for Psychotherapy of Eating Disorders (Olmsted, Isaacs, Bemis, & Garner, 1988) to assess therapist adherence to the GPIP manual (Tasca, Ritchie, Demidenko, et al., 2013). The authors reported good therapist adherence to the GPIP treatment manual (Tasca, Ritchie, Demidenko, et al., 2013).

Participants in the two comparison samples without BED were self-referred through advertising for a women's wellness study. The first sample included 50 women who were age and weight matched to the sample with BED, and the second sample included 50 women who were age matched to the sample with BED and who had a normal weight (i.e., BMI = 18.5 to 24.99; World Health Organization, 2014). Participants were screened for the study over the telephone by a research coordinator for age and weight. The research co-ordinator also assessed potential participants for exclusion criteria which included the presence of binge eating based on

the DSM-IV-TR (American Psychiatric Association, 2000) criteria for BED and the other exclusion criteria used for the BED sample. A Ph.D. clinical psychologist met with participants to re-assess for exclusion criteria. The SCID-I/P (First et al., 2002) was used to assess Axis-I diagnoses. Comparison sample participants completed a demographic questionnaire and the AAI at one-time point using the same procedure as with the BED treatment sample.

For all participants, the SCID-I/P and the AAI were administered independently by either Ph.D. clinical psychologists or doctoral-level psychology students. For those with BED, the group therapists did not administer any of the assessments. The AAI raters were not aware of the treatment hypotheses. All participants were provided no compensation to participate in the study other than parking vouchers. All participants provided informed consent to participate in the research, as well as for their data to be used for research purposes. The institution's research ethics board approved the study.

Data Analyses

Chi-square analyses were used to test the cross-sectional hypotheses on differences in the proportion of attachment states of mind among the three samples. The sequential method (Jennions & Moller, 2003; Nakagawa, 2004) was used to correct the *p*-value for possible inflation due to Type I error for *a priori* multiple comparisons. McNemar tests were used to test the longitudinal hypotheses about change in the proportion of attachment states of mind pre- to six months post-GPIP for the BED sample.

Results

Data Screening

No data were missing for the cross-sectional analyses comparing the women with BED ($n = 102$), and the overweight women ($n = 50$) and normal weight women ($n = 50$) without BED.

Of the 102 participants with BED who provided pre-treatment data, 63 provided data at six months post-treatment indicating that 38% of the longitudinal data were missing. All participants who dropped out of treatment ($n = 18$) did not provide six-month follow-up data, and 21 participants who completed treatment also did not provide six-month follow-up data. As such, our longitudinal results represent the treatment completers and conclusions for these analyses are based on completers only. Participants who dropped-out versus those who remained in treatment did not differ significantly on a 2-way classification of attachment state of mind at pre-treatment or on the presence of unresolved/disorganized classification at pre-treatment, $p = .301$ and $p = .664$, respectively.

Cross Sectional Comparison of Attachment States of Mind

The 5-way, 4-way, 3-way, and 2-way classifications of attachment states of mind across the three samples are presented in Table 2. Regarding hypothesis one, the 2-way classification was used to examine differences between the three samples in terms of secure versus insecure attachment states of mind. There were no significant differences in the proportion of secure and insecure attachment states of mind among the three samples in the overall test, $\chi^2(2, N = 202) = 4.79, p = .091, \phi^2 = .02$. Given the *a priori* hypothesis, we successively compared women with BED to both overweight women without BED and normal weight women without BED. The proportion of insecure attachment state of mind of the women with BED was not significantly different than either the overweight women, $\chi^2(1, N = 152) = .31, p = .572, \phi^2 = .00$, or the normal weight women without BED, $\chi^2(1, N = 152) = 3.35, p = .067, \phi^2 = .02$, though the latter test approached statistical significance. As an exploratory analysis, we compared overweight women without BED to normal weight women without BED. The overweight women had a

significantly lower rate of secure attachment state of mind compared to the normal weight women, $\chi^2 (1, N = 100) = 4.34, p = .037, \phi^2 = .04$.

For exploratory purposes, we took a closer look at the distribution of specific insecure attachment states of mind (i.e., preoccupied and dismissing) across the three samples using the frequencies from the 3-way classification (see Table 2). There were no significant differences across the three samples in the overall test, $\chi^2 (2, N = 78) = 5.53, p = .060, \phi^2 = .07$, though the finding approached statistical significance. We then successively paired and compared the samples. Proportions of preoccupied and dismissing attachment states of mind were not significantly different between women with BED and overweight women without BED, $\chi^2 (1, N = 65) = .47, p = .492, \phi^2 = .01$. The proportions were significantly different when comparing women with BED to normal weight women, $\chi^2 (1, N = 55) = 5.53, p = .019, \phi^2 = .10$, such that the women with BED had a significantly higher proportion of preoccupied state of mind with a medium effect size. Proportions were not significantly different when comparing overweight women and normal weight women without BED, $\chi^2 (1, N = 35) = 2.95, p = .086, \phi^2 = .08$.

Regarding hypothesis two, we examined differences in unresolved/disorganized attachment state of mind among the three samples from the 5-way classification (i.e., frequency of those with an unresolved/disorganized attachment state of mind compared to those who did not have an unresolved/disorganized attachment state of mind). There were no significant differences in the proportions of unresolved/disorganized attachment state of mind among the three samples in the overall test, $\chi^2 (2, N = 202) = 5.34, p = .069, \phi^2 = .03$, though again the findings approached statistical significance. Given the *a priori* hypothesis, we proceeded to successively pair and compare the women with BED to both the overweight women and the normal weight women without BED. The proportions of unresolved/disorganized attachment

state of mind were not significantly different between women with BED and overweight women, $\chi^2(1, N = 152) = 1.81, p = .671, \phi^2 = .01$. Women with BED had a significantly higher proportion of unresolved/disorganized attachment state of mind compared to normal weight women without BED even after correcting for possible Type I inflation (i.e., $p < .025$), $\chi^2(1, N = 152) = 5.31, p = .021, \phi^2 = .03$. For exploratory purposes, we examined differences between overweight and normal weight women without BED, but results were not statistically significant, $\chi^2(1, N = 100) = 2.95, p = .086, \phi^2 = .03$.

Change in Attachment States of Mind from Pre- to Six Months Post-Group Psychotherapy

To test hypothesis three, change in attachment state of mind categories measured by the AAI were examined for the 63 women with BED who completed GPIP and the AAI at six months post-treatment. The 5-way, 4-way, 3-way, and 2-way distribution of attachment state of mind classifications at pre- and six months post-treatment are presented in Table 3. The 2-way classification was used to examine change in secure versus insecure attachment states of mind from pre- to six months post-GPIP. As shown in Table 4, there was no statistically significant change in the proportion of secure versus insecure attachment state of mind from pre- to six months post-treatment, McNemar's $p = .078, \phi^2 = .05$. Although these changes in proportions only approached statistical significance, we proceed to describe the percentage of changes to illustrate the potential clinical meaningfulness of the findings. Of the 23 participants who were categorized as insecure at pre-treatment, 65% (i.e., 12 of the 23) changed and were classified as secure at six months post-treatment. To further examine these proportions, we looked at the specific types of insecure attachment from the 3-way classification. Of those with a preoccupied attachment state of mind at pre-treatment, 66.67% (i.e., 8 out of 12) were classified as having a secure attachment state of mind at six months post-treatment. Also, 54.54% (i.e., 6 out of 11) of

those classified as having a dismissing attachment state of mind at pre-treatment changed to a secure attachment state of mind at six months post-treatment. These changes were not examined using non-parametric tests due to the small sample sizes within some cells, which would have impacted power.

To test hypothesis four, the proportion of those with an unresolved/disorganized attachment state of mind classification compared to the proportion of those without an unresolved/disorganized attachment state of mind classification from pre- to six months post-treatment were evaluated (Table 3). There was no significant change in the proportion of unresolved/disorganized attachment state of mind from pre- to six months post-treatment, McNemar's $p = .238$, $\phi^2 = .09$, however the change in proportions indicated a medium effect size (see Table 4). Of the 20 participants who were classified as unresolved/disorganized at pre-treatment, 60% (i.e., 12 of the 20) no longer received this classification at six months post-treatment.

Discussion

The current study used attachment theory to understand better the psychopathology of BED and overweight status/obesity. We also used attachment theory to conceptualize the treatment response of patients with BED who received GPIP in terms of change in attachment state of mind. This is one of the largest and first studies to: a) examine differences in attachment state of mind among age and weight matched samples of women with BED compared to overweight women and normal weight women without BED, and b) examine change in attachment states of mind pre- to six months post-group psychotherapy for women with BED. A strength of the current study is that participants were matched on age and weight, thus

controlling for these variables. The process of matching is rare in studies that compare samples and may explain some differences found between this and previous research, as discussed below.

Cross Sectional Comparison of Secure Versus Insecure Attachment States of Mind

Our results partially supported the first hypothesis. Initially, the overall difference in proportion of insecure versus secure attachment state of mind among women with BED and overweight and normal weight women without BED only approached statistical significance. However, when the samples were successively paired and compared on specific attachment insecurities for exploratory purposes, those with BED had a higher proportion of preoccupied attachment state of mind compared to normal weight women. This provides preliminary evidence that need for approval and up-regulation of emotions that are characteristic of preoccupied attachment state of mind may differentiate those with BED from normal weight controls, and therefore may play a role in defining symptoms of BED. Those with BED may be ambivalent about their high need for connection with others since they may have previously experienced rejection in attachment relationships. These individuals may also express their needs in a way that includes exaggerated negative affect, which may have served to elicit a response from an inconsistent attachment figure in the past. As indicated, in the interpersonal model and the GPIP model, unmet attachment needs and negative affect may lead to binge eating (Tasca et al., 2005; Wilfley et al., 1998). However, due to the exploratory nature of this analysis in the current study, the extent to which a preoccupied attachment state of mind may play a role in defining symptoms of BED should be explored further and replicated in future studies.

Our sample of women with BED had a higher proportion of secure attachment state of mind (45% in a 5-way classification) than reported in other studies of samples with eating disorders (Kuipers & Bekker, 2012), including a study of individuals with BED (Barone &

Guiducci, 2009). Barone and Guiducci (2009) reported that seven of their eight participants with BED were classified as dismissing and one was classified as cannot classify. However, Barone and Guiducci's (2009) sample of participants with BED was small and so may not have been truly representative of the population. Moreover, the difference in rate of secure attachment state of mind may be in part due to the older age of participants with BED in the current study ($M = 44.32$, $SD = 11.79$) compared to the sample in Barone and Guiducci's study ($M = 28.40$, $SD = 10.82$). A psychometric study of the AAI reported that non-clinical participants with a secure attachment state of mind were older in age (Bakermans-Kranenburg & van IJzendoorn, 1993). The authors stated that as individual age and have more life experiences, they may be better able to distance themselves from their infant and childhood caregivers and evaluate more objectively their attachment histories. Our results demonstrate that matching participants in comparison groups on weight and age as well as having a larger sample size may be important to tease out the role of attachment in BED and obesity.

Follow-up exploratory analyses indicated that overweight women without BED had a significantly lower rate of secure attachment state of mind compared to the normal weight women without BED. Moreover, overweight women with and without BED did not significantly differ in terms of rates of secure versus insecure attachment states of mind. These results, taken as a whole provide additional support for an association between insecure attachment and higher weight (Cooper & Warren, 2011; Hintsanen et al., 2010; Wilkinson et al., 2010). The findings suggest that overweight women without BED may use similar ways of regulating their affect and experience similar types of interpersonal problems as women with BED. Lo Coco et al., (2016) reported that negative affect plays a complex role in the interpersonal functioning and weight of obese women without BED that is not yet fully understood. As suggested by Lo Coco and

colleagues (2016), negative affect may lead to and be a consequence of interpersonal problems, and both of these issues may result in overeating and obesity. Our findings suggest that similar to women with BED, overweight women without BED use both hyperactivating and deactivating affect regulation strategies. The affect regulation strategies characteristic of those with insecure attachment states of mind may be associated with dysregulation of the HPA axis, which may be maladaptively regulated by increased dopamine related to overeating or binge eating (Adam & Epel, 2007; Morris et al., 2015). As such, problems with affect associated with having an insecure attachment state of mind may maintain overeating. These findings suggest that overweight women without BED may benefit from similar interventions as those with BED aimed at affect regulation as part of treatment that they may seek for weight loss, other mental disorders, or interpersonal difficulties. However, these results should be interpreted within the context of the exploratory nature of the analysis comparing overweight and normal weight women without BED.

Cross Sectional Comparison of Unresolved/Disorganized Attachment State of Mind

The results partially supported our hypothesis that women with BED will have a higher rate of unresolved/disorganized attachment state of mind compared to the comparison samples. When we successively paired and compared the samples, we found that women with BED were significantly more likely to have an unresolved/disorganized attachment state of mind compared to normal weight women without BED. We also found that overweight women with and without BED did not significantly differ in rates of unresolved/disorganized attachment state of mind. The rate of unresolved/disorganized attachment state of mind among women with BED in the current study was similar to those reported in previous research (Barone & Guiducci, 2009).

In terms of understanding the maintenance of binge eating in BED, these findings appear

to fit within the interpersonal model (Wilfley et al., 1998) and the GPIIP model of BED (Tasca et al., 2005). Unresolved loss or abuse can have a disorganizing impact on individuals such that they may exhibit lapses in reasoning or disorientation when discussing the trauma. Such individuals may experience a heightened level of distress related to the experience of disorganization, and may fluctuate in their use of hyperactivating and deactivating strategies to regulate affect. These processes likely interfere with their ability to express attachment needs and have these needs met in relationships (Mikulincer & Shaver, 2007). According to the GPIIP model for BED, as interpersonal problems increase, negative affect increases, and binge eating may be used as a way to cope with distressing emotions (Tasca et al., 2005). The unresolved/disorganized attachment state of mind related to loss and/or abuse likely underlies and exacerbates this cycle for some.

As noted, overweight women without BED experienced similar levels of unresolved/disorganized attachment states of mind related to loss or abuse as women with BED. As such, they likely experience the same difficulties in maintaining a coherent narrative related to the loss or abuse, fluctuating affect regulation, and interpersonal difficulties as those with BED. These results suggest that the negative affect experienced by some overweight women who do not binge eat might be due to unresolved loss and/or abuse. It may be that dysregulated affect due to unresolved/disorganized mental states due to loss and/or abuse contribute to the ongoing dysregulation of the HPA axis which in turn may lead to over eating (Adam & Epel, 2007; Morris et al., 2015). As proposed by Allen and Miga (2010), the AAI assesses one's broader emotion regulation capacity. Difficulties with emotion regulation in those with unresolved trauma or abuse may have a difficult time regulating their emotions, similarly to those with a preoccupied attachment state of mind (Allen & Miga, 2010).

Change in Attachment States of Mind from Pre- to Six Months Post-Group Psychotherapy

Hypothesis three, that insecure attachment states of mind will improve from pre- to six months post-treatment, was not supported, though again the results approached statistical significance. Nevertheless, of the 23 participants who were classified as having an insecure attachment state of mind at pre-treatment, 65% (i.e., 15 out of 23 participants) changed to a secure attachment state of mind at six months post-treatment. As noted by Daniel and colleagues (2016), the majority of studies that have reported significant changes of insecure to secure attachment states of mind did so with samples that were primarily insecure at pre-treatment. It may be that in samples with more patients with secure attachment states of mind, like in the current study and in the Daniel and colleagues (2016) study, one is less likely to see statistically significant changes from insecure to secure categories of attachment. It may also be the case that 16 sessions of GPIP was not long enough and so participants did not receive a large enough dose of the treatment to cause the degree of change necessary to go from an insecure to a secure attachment state of mind classification.

When we looked more closely at change in the proportion of specific attachment insecurities, we found eight of 12 participants (66%) with a preoccupied attachment state of mind at pre-treatment were categorized as secure at six months post-treatment. Further, six of 11 participants (54%) with a dismissing attachment state of mind at pre-treatment were categorized as secure at six months post-treatment. We speculate that GPIP may have been equally effective in facilitating changes for both individuals with preoccupied and dismissing attachment states of mind. This likely means that GPIP therapists were able to use group therapeutic factors like interpersonal learning, the group as a social microcosm, and corrective emotional experiences (Yalom & Leszcz, 2005) to facilitate change in participants who presented with varying

difficulties in affect regulation and interpersonal functioning. Therapists likely facilitated corrective emotional experiences whereby group members with a preoccupied attachment state of mind were given the opportunity to regulate, organize, and express their emotional experiences in the group. On the other hand, those with a dismissing attachment state of mind were given the opportunity and support to identify, deepen, and expand their emotional experiences in the group.

Regarding hypothesis four, pre- to six months post-treatment change in the proportion of unresolved/disorganized attachment state of mind was not statistically significant. Nevertheless, changes in unresolved/disorganized attachment state of mind for some of the participants are potentially clinically relevant as evidenced by the medium effect size. Out of the 20 participants who were classified as unresolved/disorganized at pre-treatment, 60% (i.e., 12 out of 20) were no longer given this classification at six months post-treatment. These individuals were able to process and organize their experiences of loss or abuse in a more coherent way following treatment. They were also able to discuss their experiences without becoming so overwhelmed by emotion or by their memories that they became disorganized or disoriented. As they were better able to cope with their memories of past loss or abuse, they were likely better equipped to regulate their emotions. It is likely that the focus in GPIP on building strong group cohesion during the early phase of treatment facilitated an engaged and safe atmosphere in which participants were willing to discuss experiences of loss and/or abuse. With a larger sample size and greater power, it is likely that change in unresolved/disorganized attachment state of mind pre- to six months post-treatment would have been statistically significant. The extent to which GPIP facilitated changes in unresolved/disorganized attachment state of mind should be examined further and replicated in future studies with larger sample sizes.

Treatment Implications

The results of the current study have a number of treatment implications. However, the following implications should be interpreted within the context that several analyses in the current study were exploratory and as such, the implications are speculative until the findings are replicated. As indicated, a number of our clinical sample with BED started treatment with a secure attachment state of mind (45% in the 5-way classification). For these individuals, it is possible that binge eating was primarily a response to dietary restraint rather than to negative affect and psychopathology (Stice et al., 2001). If a clinical assessment of attachment states of mind indicates attachment security in someone with BED, then therapists might consider integrating aspects of cognitive behavioural therapy for eating disorders that target dietary restraint, and cognitions related to weight and shape. This might include, for example, daily food monitoring to encourage normal eating and identifying triggers for binge eating (Fairburn, 2008). However, for patients with BED who have an insecure attachment state of mind, understanding the way in which they regulate affect and attempt to have their needs met could be used to inform effective interventions. For example, therapists of women with BED with a preoccupied attachment state of mind may need to be aware of a tendency for such patients to be overly accommodating and nurturing in the group and then to become frustrated as their needs are not met. The group therapist could help these patients to make the association between their high need for approval, hyperactivation of emotions, and BED symptoms (Tasca, Ritchie, & Balfour, 2011). On the other hand, for individuals with a dismissing attachment states of mind, GPIP therapists may need to help these patients attend to and access their emotions in the here and now and provide them help to reflect on their own and others mental states and behaviours (Tasca et al., 2011).

A substantial portion of our sample with BED was classified as having an unresolved/disorganized attachment state of mind with regards to loss and/or abuse at pre-treatment (31% in the 5-way classification). Adapting GPIP to explicitly address the high rate of unresolved/disorganized attachment state of mind due to loss and/or abuse might further help patients with BED process their past experiences of loss and/or abuse, and recognize the impact of those experiences on current affect regulation, interpersonal functioning, and binge eating. Clinicians could focus on any ongoing impact of loss and/or abuse when evaluating patients' CMIP, and target the impact of loss and/or abuse on affect regulation during treatment by encouraging reflective functioning. For example, therapists might slow patients down when they discuss past experience of loss and abuse, help them monitor their emotional experiences, and keep them focused, present, and grounded within the group.

Lastly, we found that overweight women without BED also had high rates of unresolved/disorganized attachment states of mind related to loss and/or abuse (28% in the 5-way classification). As such, unresolved/disorganized mental states related to loss and/or abuse may be a factor that maintains obesity for some. Therefore, weight loss treatment or psychological treatment for other presenting problems should assess whether overweight women without BED are experiencing unresolved/disorganized attachment states of mind related to loss or abuse. If so, therapy targeting the loss and/or abuse may help these individuals decrease overeating as a way to cope with negative affect (Lo Coco et al., 2016) and may help those seeking weight loss treatment maintain weight loss (Harrington, 2008).

Limitations and Future Directions

There are several limitations to this study. First, the sample size limited power of the analyses to detect significant differences, especially for analyses that included sub-groups of

participants. Due to the great amount of resources required to do research using the AAI, it was not possible for the current study to include a larger sample size. Future studies might aim to include larger sample sizes. Second, the sample for the current study included only women and was rather homogenous in terms of cultural diversity. Moreover, the women with BED differed significantly from the comparison groups in terms of education level and income. The demographic variables for women with BED in the current study are similar to those in a large sample of treatment-seeking individuals with BED in a previous study (Tasca et al., 2006) and appear to be representative of this population. Moreover, participants with BED in the current study were willing to participate in a research study at a tertiary treatment centre as well as group psychotherapy that was video recorded. As such, individuals who are unwilling to do so may be different in terms of demographic characteristics as well as attachment state of mind. Future research should include a BED sample with more cultural diversity, a community sample (i.e., not a treatment seeking sample), and include men. Third, the current study provided those with BED with GPIP only. As such, results cannot be generalized to patients with BED who receive other treatments. However, other types of psychotherapy such as Emotionally Focused Therapy (Elliot, Watson, Goldman, & Greenberg, 2004) are also in part, based on attachment theory and may also facilitate changes in attachment state of mind. Future studies should aim to replicate findings using both GPIP and other individual or group psychotherapies. In the same vein, future studies might also examine whether different approaches of treatment are effective for patients with BED with differing attachment states of mind. Fourth, longitudinal findings in this study represented changes for treatment completers only. One could argue that future studies should aim to examine change in attachment for non-treatment completers as well as treatment completers, where possible. However, as Levy and colleagues (2006) have argued, studies such

as this one that examine the mechanisms of change in an attachment-based treatment like GPIP, require that participants get a sufficient dose of the treatment. Since the study was not a test of the efficacy of the intervention, a completer analysis was appropriate to guard against threats to validity from insufficient doses of treatment (Levy et al., 2006). Fifth, assessing change in attachment functioning using categorical classification requires that individuals show large qualitative shifts in states of mind. Such categorical assessments might obscure subtle or gradual, yet important, changes in attachment functioning. Since attachment state of mind categories are relatively stable, change may require treatment of a longer duration or intensity for change in classifications to occur. Regardless, clinically relevant changes in attachment categorization were noted in a large minority of patients in this study.

Conclusion

The current study used attachment states of mind to understand better the psychopathology and maintenance of BED and co-morbid overweight status. Results provide preliminary evidence that a preoccupied attachment state of mind may differentiate those with BED from normal weight individuals, and so for some, it may be an underlying factor for BED. Results also indicate that the negative affect experienced by some overweight women who do not binge eat might be due to unresolved loss and/or abuse. Over half of participants with BED and insecure or unresolved/disorganized attachment states of mind at pre-treatment changed to a secure or non-unresolved/disorganized attachment state of mind at six months post-treatment. As such, GPIP appeared to help these individuals to process and organize their attachment memories, and that may have led to improved affect regulation and interpersonal functioning. Taken together, the current study provides preliminary evidence that psychological theories and

treatment for BED, and weight loss of those who are overweight, may benefit from considering the impact of insecure and unresolved/disorganized attachment states of mind.

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Table 1

Demographic Data for Participants

	BED <i>n</i> = 102	OW <i>n</i> = 50	NW <i>n</i> = 50
BMI	<i>M</i> = 38.35 <i>SD</i> = 7.18	<i>M</i> = 37.05 <i>SD</i> = 6.34	<i>M</i> = 23.12 <i>SD</i> = 1.97
Current or partial remission Axis I diagnosis	64% <i>n</i> = 65	8% <i>n</i> = 4	6% <i>n</i> = 3
Past Axis I diagnosis	25% <i>n</i> = 25	34% <i>n</i> = 17	30% <i>n</i> = 15
Age	<i>M</i> = 44.32 <i>SD</i> = 11.79	<i>M</i> = 47.09 <i>SD</i> = 12.50	<i>M</i> = 43.89 <i>SD</i> = 12.06
White	89% <i>n</i> = 91	86% <i>n</i> = 43	84% <i>n</i> = 42
Single	28% <i>n</i> = 28	10% <i>n</i> = 5	22% <i>n</i> = 11
Married/Cohabiting	48% <i>n</i> = 49	70% <i>n</i> = 35	64% <i>n</i> = 32
Separated/Divorced	21% <i>n</i> = 21	12% <i>n</i> = 6	10% <i>n</i> = 5
Employed full-time	69% <i>n</i> = 70	58% <i>n</i> = 29	64% <i>n</i> = 32
Employed part-time	15% <i>n</i> = 15	20% <i>n</i> = 10	26% <i>n</i> = 13
Attended college or university	78% <i>n</i> = 80	90% <i>n</i> = 45	94% <i>n</i> = 47
Median family income	60,000 to 69,000	80,000 +	80,000 +

Notes: BED = binge-eating disorder; OW = overweight women without BED; NW = normal weight women without BED; *M* = mean; *SD* = standard deviation; Total *N* = 202.

Table 2

Distribution of Attachment States of Mind for Overweight Women with BED, Overweight Women without BED, and Normal Weight Women without BED

Classification	5-way Classification			4-way Classification			3-way Classification			2-way Classification		
	BED	OW	NW	BED	OW	NW	BED	OW	NW	BED	OW	NW
Secure	45% <i>n</i> = 46	46% <i>n</i> = 23	66% <i>n</i> = 33	45% <i>n</i> = 46	46% <i>n</i> = 23	66% <i>n</i> = 33	59% <i>n</i> = 60	54% <i>n</i> = 27	74% <i>n</i> = 37	59% <i>n</i> = 60	54% <i>n</i> = 27	74% <i>n</i> = 37
Insecure	19% <i>n</i> = 19	22% <i>n</i> = 11	20% <i>n</i> = 10	24% <i>n</i> = 24	24% <i>n</i> = 15	20% <i>n</i> = 20	41% <i>n</i> = 42	46% <i>n</i> = 23	26% <i>n</i> = 13	41% <i>n</i> = 42	46% <i>n</i> = 23	26% <i>n</i> = 13
<i>Preoccupied</i>	6% <i>n</i> = 6	6% <i>n</i> = 3	4% <i>n</i> = 2	9% <i>n</i> = 9	8% <i>n</i> = 4	4% <i>n</i> = 2	22% <i>n</i> = 22	20% <i>n</i> = 10	4% <i>n</i> = 2			
<i>Dismissing</i>	13% <i>n</i> = 13	16% <i>n</i> = 8	16% <i>n</i> = 8	15% <i>n</i> = 15	18% <i>n</i> = 9	16% <i>n</i> = 8	20% <i>n</i> = 20	26% <i>n</i> = 13	22% <i>n</i> = 11			
U/D	31% <i>n</i> = 32	28% <i>n</i> = 14	14% <i>n</i> = 7	31% <i>n</i> = 32	28% <i>n</i> = 14	14% <i>n</i> = 7						
CC	5% <i>n</i> = 5	4% <i>n</i> = 2	0% <i>n</i> = 0									
Total	100 % <i>n</i> = 102	100% <i>n</i> = 50	100% <i>n</i> = 50	100% <i>n</i> = 102	100% <i>n</i> = 50	100% <i>n</i> = 50	100% <i>n</i> = 102	100% <i>n</i> = 50	100% <i>n</i> = 50	100% <i>n</i> = 102	100% <i>n</i> = 50	100% <i>n</i> = 50

Notes: Classification = Attachment states of mind; U/D = unresolved/disorganized; CC = cannot classify; BED = binge-eating disorder; OW = overweight women without BED; NW = normal weight women without BED; Total *N* = 202.

Table 3

Pre- and Six Months Post-Treatment Attachment State of Mind Classifications for Women with BED

Classification	5-way Classification		4-way Classification		3-way Classification		2-way Classification	
	pre	six months	pre	six months	pre	six months	pre	six months
Secure	51% <i>n</i> = 32	62% <i>n</i> = 39	51% <i>n</i> = 32	62% <i>n</i> = 39	63% <i>n</i> = 40	78% <i>n</i> = 49	63% <i>n</i> = 40	78% <i>n</i> = 49
Insecure	14% <i>n</i> = 9	14% <i>n</i> = 9	17% <i>n</i> = 11	14% <i>n</i> = 9	37% <i>n</i> = 23	22% <i>n</i> = 14	37% <i>n</i> = 23	22% <i>n</i> = 14
<i>Preoccupied</i>	6% <i>n</i> = 4	6% <i>n</i> = 4	8% <i>n</i> = 5	6% <i>n</i> = 4	19% <i>n</i> = 12	13% <i>n</i> = 8		
<i>Dismissing</i>	8% <i>n</i> = 5	8% <i>n</i> = 5	10% <i>n</i> = 6	8% <i>n</i> = 5	18% <i>n</i> = 11	10% <i>n</i> = 6		
U/D	32% <i>n</i> = 20	22% <i>n</i> = 14	32% <i>n</i> = 20	24% <i>n</i> = 15				
CC	3% <i>n</i> = 2	2% <i>n</i> = 1						
Total	100% <i>n</i> = 63	100% <i>n</i> = 63	100% <i>n</i> = 63	100% <i>n</i> = 63	100% <i>n</i> = 63	100% <i>n</i> = 63	100% <i>n</i> = 63	100% <i>n</i> = 63

Notes: Participants included are those diagnosed with BED who completed the Adult Attachment Interview at six months post-treatment; Classification = Attachment states of mind; U/D = unresolved/disorganized; CC = cannot classify; Pre = pre-treatment; six months = six months post-treatment; Total *N* = 202.

Table 4

Change in Attachment States of Mind Pre- and Six Months Post-Treatment

		Six Months Post-Treatment	
		Secure	Insecure
Pre-Treatment	Secure	54.0% <i>n</i> = 34	9.5% <i>n</i> = 6
	Insecure	23.8% <i>n</i> = 15	12.7% <i>n</i> = 8
		U/D	Not U/D
Pre-Treatment	U/D	12.7% <i>n</i> = 8	19.1% <i>n</i> = 12
	Not U/D	9.5% <i>n</i> = 6	58.7% <i>n</i> = 37

Notes: Secure = secure attachment state of mind; Insecure = insecure attachment states of mind; McNemar's test for pre- to six months post-treatment insecure and secure attachment: $p = .078$, $\phi^2 = .05$. U/D = Unresolved/Disorganized attachment state of mind; McNemar's test for pre- to six months post-treatment for unresolved disorganized attachment: $p = .238$, $\phi^2 = .09$. Total $N = 63$.

Study Two

The Role of Coherence of Mind and Reflective Functioning in Understanding Binge-Eating Disorder and Co-Morbid Overweight*

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Abstract

Coherence of mind and reflective functioning may impact negative affect and interpersonal functioning over and above the effects of symptoms of depression and interpersonal problems that contribute to symptoms of binge-eating disorder (BED) and overweight/obesity. Matched samples of overweight women with BED and overweight and normal weight women without BED completed the Adult Attachment Interview, a measure of depressive symptoms, and a measure of interpersonal problems. Greater symptoms of depression distinguished women with BED from the matched comparison samples. Greater interpersonal problems differentiated women with BED from overweight women without BED. Coherence of Mind scale scores did not differentiate the samples. However, lower Reflective Functioning scale scores did distinguish both women with BED and overweight women without BED from normal weight women. Lower reflective functioning may lead to binge eating independent of depressive symptoms and interpersonal problems.

The Role of Coherence of Mind and Reflective Functioning in Understanding Binge-Eating Disorder and Co-Morbid Overweight

Binge-eating disorder (BED) is the most common eating disorder (Kessler et al., 2013). Data from the World Health Surveys indicate that the lifetime prevalence for BED is high at 1.9% (2.6 % for females and 1.1% for males; Kessler et al., 2013). Binge-eating disorder involves recurrent episodes of binge eating characterized by a lack of control while eating a large amount of food in a discrete period of time (American Psychiatric Association, 2000). As many as 31.2% to 41.8% of individuals with BED in the population are obese (Hudson, Hiripi, Pope, & Kessler, 2007; Kessler et al., 2013), and as many as 90% of individuals with BED in treatment seeking samples are obese (Tasca et al., 2006). Exploring psychological factors may help to understand further the nature of binge eating and obesity. Psychological factors such as negative affect and interpersonal sensitivities are key to understanding BED (Ivanova et al., 2015).

Negative Affect and Interpersonal Difficulties in BED

The Interpersonal (Wilfley, Frank, Welch, Spurrell, & Rounsaville, 1998) and Group Psychodynamic Interpersonal Psychotherapy (GPIP; Tasca, Mikail, & Hewitt, 2005) models of BED conceptualize binge eating as a maladaptive coping mechanism for negative affect that results from interpersonal difficulties. In a re-conceptualization of Malan's (1979) triangle of conflict, the GPIP model posits that unmet attachment needs in current and past relationships may lead one to experience negative affect or anxiety (Tasca et al., 2005). These negative affective experiences may lead to maladaptive defenses and concomitant means of coping, such as binge eating for those with BED. Research of those with eating disorders demonstrates that early experiences of abuse, neglect, or low parental caring may lead to attachment insecurity (Grenon et al., 2016; Tasca, Ritchie, Zachariades, et al., 2013), and that maladaptive coping

mediates the relationship between attachment insecurity and eating disorder symptoms (Tasca et al., 2009). Further, in a recent study of those with BED, Hill and colleagues (2015) demonstrated that improvements in overall defensive functioning (i.e., from maladaptive to adaptive) were associated with decreases in binge eating following GPIIP.

Low mood, which is a proxy for negative affect, occurs at a high rate among those with BED. Over 42% of individuals with a lifetime history of BED also have a lifetime history of major depressive disorder/dysthymia (Kessler et al., 2013). That percentage increases up to 63% in treatment-seeking samples (Tasca et al., 2006). Symptoms of depression are greater in those with BED who are overweight compared to those without BED who are overweight (Azarbad & Gonder-Frederick, 2010; Fandino et al., 2010; Grilo et al., 2008; Herbozo, Schaefer, & Thompson, 2015; Ramacciotti et al., 2008; Vinai et al., 2015; Wilfley, Wilson, & Agras, 2003). Similarly, symptoms of depression are greater for women who are overweight without BED compared to non-clinical normal weight women (Azarbad & Gonder-Frederick, 2010; Carpenter, Hasin, Allison, & Faith, 2000; Fabricatore & Wadden, 2003; Magallares & Pais-Ribeiro, 2013).

Depressive symptoms in those with BED may account for some of the difficulties these individuals experience with negative affect and interpersonal functioning. For example, depressive symptoms (or low mood and sadness) may affect one's view of self, others, and the world. Symptoms of depression often include spending less time with one's social circles and attachment relationships. Individuals with depression turn inward and have a difficult time taking others' perspectives and maintaining balanced views (Horowitz, 2004). Moreover, depression is strongly associated with an insecure attachment state of mind (Bakermans-Kranenburg & van IJzendoorn, 2009), suggesting that those who are depressed use either hyperactivating or deactivating strategies to cope with negative affect.

In a recent test of the interpersonal model of binge eating in a clinical sample, Ivanova and colleagues (2015) found that negative affect (i.e., low mood) mediated the relationship between interpersonal problems and BED symptoms. Including low mood and interpersonal difficulties when examining the role of coherence of mind and reflective functioning in understanding BED will provide a more comprehensive understanding of the factors that underlie and maintain BED and obesity.

Coherence of Mind and Reflective Functioning

One way of measuring attachment in adulthood is with the Adult Attachment Interview (AAI; Main, Goldwyn, & Hesse, 2002). The AAI assesses unconscious attachment states of mind related to one's interpersonal relationships and affect regulation. Two scales that are used to rate AAI transcripts and that are of interest for the current study include Coherence of Mind and Reflective Functioning. The Coherence of Mind scale assesses the degree to which an individual is consistent, relevant, and concise in their descriptions of childhood attachment memories, as well as the degree to which beliefs that are expressed during the interview are based in reality. This scale is considered the best indicator of the interviewee's state of mind with respect to attachment (Main et al., 2002). Individuals with a secure attachment state of mind demonstrate higher coherence of mind on the AAI. They provide consistent, relevant, and concise descriptions of attachment memories (Main et al., 2002). Individuals with an insecure attachment state of mind demonstrate lower coherence of mind on the AAI. Their narrative may be marked by excessive passivity or anger, or by idealization, derogation, and/or lack of memory (Main et al., 2002). Moreover, individuals who demonstrate a lapse in reasoning, a lapse in the monitoring of their discourse, describe extreme behavioural responses, and/or provide

disoriented responses when discussing loss or abuse also demonstrate lower coherence of mind (Main et al., 2002).

Low coherence of mind is related to insecure attachment states of mind (i.e., an insecure attachment classification) which is an indicator of poor affect regulation and interpersonal functioning, both of which are key aspects of BED (Ivanova et al., 2015; Wilfley et al., 1998). Therefore, understanding coherence of mind in individuals with BED and co-morbid overweight may allow clinicians to understand better the developmental and psychological underpinnings of the disorder. Only three studies report Coherence of Mind scale findings in individuals with eating disorders (Barone & Guiducci, 2009; Fonagy et al., 1996; Ward et al., 2001). Fonagy and colleagues (1996) reported that a mixed psychiatric sample, including patients with eating disorders, had significantly lower Coherence of Mind scores compared to a non-clinical sample. Ward and colleagues (2001) also reported low Coherence of Mind scale scores for individuals with anorexia nervosa (AN), but the study did not have a comparison sample. In the only study that included a sample with BED ($n = 10$), Barone and Guiducci (2009) reported that those with BED scored lower on Coherence of Mind compared to a non-clinical control sample; however, the authors did not report the Coherence of Mind data. Additional research with larger sample sizes and matched comparison groups is needed to understand the role that coherence of mind might play in the development and maintenance of BED.

Reflective functioning can be assessed using the Reflective Functioning Scale (RFS; Fonagy, Target, Steele, & Steele, 1998) which is applied to AAI transcripts. The RFS assesses the mental function that allows a person to organize their own and understand others' behaviours using mental state constructs such as personal desires, needs, feelings, beliefs, and reasons (Bateman & Fonagy, 2004; Fonagy et al., 1998). Those who demonstrate greater reflective

functioning are better able to reflect on their own and others' mental states in understanding behaviour, whereas those with lower reflective functioning have a harder time doing so. Greater reflective functioning is associated with improved communication, mentalizing, and empathy (Fonagy et al., 1998), which are important aspects of interpersonal functioning. Reflective functioning is also related to having a secure attachment state of mind.

Low reflective functioning is associated with poorer interpersonal communication and interactions (Fonagy et al., 1998), which is a key focus in the interpersonal model of BED and in some BED treatment models (Tasca et al., 2005; Wilfley et al., 1998). As such, understanding reflective functioning among women with and without BED may have important implications for conceptualizing BED and its treatment. However, to date, there is limited research available on reflective functioning in those with AN or those with bulimia nervosa (BN), and there is no research in those with BED. Studies with small sample sizes of individual with AN and BN (i.e., 14 to 34 participants) demonstrated low reflective functioning compared to non-clinical controls (Fonagy et al., 1996; Rothschild-Yakar, Levy-Shiff, Fridman-Balaban, Gur, & Stein, 2010). Other studies with small sample sizes (i.e., 16 to 20 participants) and without comparison groups also reported limited reflective functioning in participants with eating disorders (Müller, Kaufhold, Overbeck, & Grabhorn, 2006; Ward et al., 2001). One study with a larger sample of individuals with BN ($n = 70$) did not report significant differences with non-clinical controls ($n = 20$; Pedersen, Lunn, Katznelson, & Poulsen, 2012). The authors suggested that their clinical sample might have represented a better functioning outpatient group resulting in higher reflective functioning ratings compared to previous research. When the authors examined their sample of participants with BN more closely, they found that the clinical group showed a bi-modal distribution of reflective functioning scores. The authors posited that those with BN could be

separated into two groups: those who defended against reflecting on mental states (leading to low reflective functioning) versus those who put considerable effort into understanding others' behaviours (leading to higher reflective functioning). Taken together, the limited research on those with eating disorders indicates that: those with AN may demonstrate low reflective functioning; and that those with BN may demonstrate either low or high reflective functioning. How these findings extend to those with BED, is unclear.

As discussed, individuals with BED have a high rate of co-morbid overweight/obesity. As such, it may be important also to understand the relationship among attachment, binge eating, and body weight. In an unpublished dissertation, Marsh (2005) reported that the association between symptoms of depression and level of body mass index (BMI) was moderated by attachment style measured by self-report for individuals seeking treatment for obesity. That is, greater symptoms of depression were associated with a higher BMI in securely attached individuals, and fewer symptoms of depression were associated with higher BMI in insecurely attached individuals. Others reported a relationship between higher BMI and greater insecure attachment measured by self-report (Cooper & Warren, 2011; Hintsanen, Jokela, Pulkki-Råback, Viikari, & Keltikangas-Järvinen, 2010; Wilkinson, Rowe, Bishop, & Brunstrom, 2010). Albeit limited, there is some preliminary evidence that higher weight is associated with insecure attachment. However, there is no research that has examined the relationship among Coherence of Mind and Reflective Functioning with binge eating and body weight. Such research may help to understand how attachment and some of its related functions (i.e., negative affect and interpersonal style) may impact binge eating and weight for individuals with BED.

The goal of the current study is to examine whether coherence of mind and reflective functioning add to our understanding of the psychopathology related to BED and obesity. To do

so, we examine whether coherence of mind and reflective functioning differentiate overweight women with BED (subsequently referred to as women with BED) from comparison groups without BED. We do so while also controlling for symptoms of depression and interpersonal problems in the analyses to be consistent with the Interpersonal and GPIP models of BED (Tasca et al., 2005; Wilfley et al., 1998), and to isolate the unique contributions of coherence of mind and reflective functioning in understanding BED. Our comparison groups include age and weight matched overweight women without BED and age matched normal weight women without BED. Clinically, those with BED binge eat whereas those who are overweight or normal weight without BED do not binge eat. First, based on the Interpersonal and GPIP models of BED, we examine whether level of depressive symptoms or interpersonal problems predict group membership among our three samples (i.e., women with BED, overweight women without BED, and normal weight without BED). We hypothesize that greater symptoms of depression and interpersonal problems will differentiate those with BED from those who are overweight or normal weight without BED. For exploratory purposes, we examine whether there are differences between overweight and normal weight women without BED. Second, we examine whether Coherence of Mind scores and Reflective Functioning scores predict group membership while controlling for symptoms of depression and interpersonal problems. We hypothesize that lower Coherence of Mind scores and lower Reflective Functioning scores will differentiate those with BED from those who are overweight or normal weight without BED. For exploratory purposes, we will examine whether Coherence of Mind and Reflective Functioning scores differentiate those who are overweight without BED from those who are normal weight without BED.

Method

Participants

Participants included 102 treatment-seeking overweight women who met DSM-IV-TR (American Psychiatric Association, 2000) criteria for BED. In addition, the study included 50 age- and weight-matched women, and 50 normal weight age-matched women who did not meet BED diagnostic criteria. Table 1 presents demographic data for the three groups.

Materials

Coherence of Mind Scale. Coherence of Mind is a dimensional scale of the AAI (Main et al., 2002). The Coherence of Mind scale reflects both the degree to which speakers are coherent in their narrative (i.e., consistent, relevant, and concise in the description of childhood attachment memories), and the speaker's general belief system in relation to reality. The scale is coded using a 9-point scale ranging from 1 (striking absence of coherence of mind) to 9 (strong coherence of mind). A score of 5 on Coherence of Mind is considered the cut-off for categorizing secure versus insecure attachment states of mind (Main et al., 2002).

The six AAI coders for the current study successfully completed reliability testing through Drs. Mary Main and Erik Hesse at the University of California in Berkeley after completing an AAI Training Institute provided by certified AAI trainers. Inter-rater agreement among the six coders for the current study was high with an intraclass correlation coefficient (ICC) ranging from .89 to .94 among raters, with a mean ICC of .91 overall for the 33% (66 of the 202) transcripts that were coded for reliability purposes.

Reflective Functioning Scale (RFS). Reflective Functioning was rated on the AAI using the Reflective Functioning Manual version 5 (Fonagy et al., 1998). All raters attended a 3-day workshop provided by Dr. Howard Steele, a co-author of the RFS, and successfully completed Dr. Steele's reliability training. Ratings ranging from -1 (negative reflective functioning) to +9

(exceptional reflective functioning; Fonagy et al., 1998) were assigned to the transcript as a whole. A Reflective Functioning rating of 5 is the most common rating in ordinary high functioning samples (Fonagy et al., 1998).

There is strong psychometric evidence for the RFS including good inter-rater reliability (e.g., Taubner et al., 2013). Inter-rater reliability between two coders for the current study was high, ICC = .89, on a random sample of transcripts (i.e., 25% or 51 of the 202 transcripts coded for reliability purposes).

Patient Edition of the Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Research Version (SCID-I/P). The SCID-I/P (First, Spitzer, Gibbon, & Williams, 2002) is a widely used semi-structured interview that aids in making DSM-IV-TR Axis-I diagnoses and that includes a module for diagnosing BED. Studies that have examined the validity of various versions of the SCID report superior validity of the SCID over standard interview at intake (Basco et al., 2000; Shear et al., 2000). Inter-rater reliability for the current study was high, Cohen's $\kappa > .70$ (Tasca, Ritchie, Demidenko, et al., 2013).

Inventory of Interpersonal Problems (IIP; Horowitz, Rosenberg, Baer, Ureno, & Villaseñor, 1988). The IIP is a 64-item self report measure that assesses distress from interpersonal sources. Participants respond using a 4-point Likert scale (0 to 3) on which higher scores represent greater interpersonal problems. The mean item total score was used in the current study. Means of .97 ($SD = .48$) and 1.48 ($SD = .56$) are reported for normative and clinical samples in the literature (Hansen & Lambert, 1996). There is evidence of the reliability and validity for the IIP (Hansen & Lambert, 1996; Horowitz et al., 1988). The Cronbach's alpha for the current study was .96, indicating high internal consistency reliability.

Beck Depression Inventory-II. The Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996) is a 21-item self-report measure of depression-related symptoms and attitudes. Participants respond using a 4-point Likert scale (0 to 3) on which higher scores represent greater depressive symptoms. The total mean score was 12.56 ($SD = 9.93$) for a normative sample and 22.45 ($SD = 12.75$) for a clinical sample (Beck et al., 1996). Mean cut-off scores for severity of symptoms of depression are ≥ 29 severe, 20 – 28 moderate to severe, 14 – 19 mild, and ≤ 13 minimal (Beck et al., 1996). There is strong evidence of good internal consistency, concurrent validity, construct validity, and evidence that the BDI-II is able to differentiate between psychiatric and non-psychiatric patients (Beck et al., 1996). Cronbach's alpha for the current study was .95, indicating high internal consistency reliability.

Procedure

The sample of women with BED ($n = 102$) were part of a treatment study conducted at a regional center for the treatment of eating disorders in a general hospital of a medium sized urban center. The participants were recruited from the treatment center, from family physicians, or they were self-referred through advertisements in the community for a group treatment study for BED. These participants did not meet exclusion criteria during a telephone screening for the treatment study, accepted an in-person interview with a Ph.D. clinical psychologist, and met criteria for BED according to the DSM-IV-TR (American Psychiatric Association, 2000). Exclusion criteria included not speaking English, having a psychotic or bipolar disorder, drug or alcohol dependence, pregnancy, diagnosis of another eating disorder, or currently or planning to participate in a weight loss program in the following year. The SCID-I/P (First et al., 2002) was used to diagnose BED and other Axis I diagnoses. All individuals who began treatment had a BMI of 27 or higher making them either overweight or obese (World Health Organization,

2014). Participants with BED completed a demographic questionnaire, the AAI, the BDI-II, and the IIP at pre-treatment.

The two samples of women without BED were self-referred through advertising in the community for a women's wellness study at the hospital. Participants were screened for the study over the telephone by a research coordinator who used a semi-structured interview to assess for the absence of binge eating based on the DSM-IV-TR (American Psychiatric Association, 2000) criteria for BED, other exclusion criteria, and for age and weight. Exclusion criteria included a previous or current eating disorder diagnosis as well as the other exclusions used for the BED sample. A Ph.D. clinical psychologist met with participants who qualified for the study following the phone screening to re-assess for exclusion criteria. The SCID-I/P (First et al., 2002) was used to assess Axis I diagnoses. Two samples of women without BED were recruited. The first included 50 women who were age and weight matched to the sample with BED. The second sample included 50 women who were age matched to the sample with BED and who had a normal weight (i.e., BMI = 18.5 to 24.99; World Health Organization, 2014). Participants completed a demographic questionnaire, the AAI, the BDI-II, and the IIP.

A Ph.D. clinical psychologist or Ph.D. psychology student trained in providing and coding the AAI, conducted the AAIs with participants. The AAIs were audio recorded, transcribed, and coded according to the Adult Attachment Scoring and Classification System Manual (Main et al., 2002). The AAI and RFS coders were blind to group status (i.e., women with BED, overweight and normal weight women without BED). All participants provided informed consent to participate in the research, as well as for their data to be used for secondary research purposes. The treatment study, women's wellness study and the current study were approved by the local research ethics board.

Data Analyses

To assess the hypotheses, we used a multinomial logistic regression. Group membership (i.e., women with BED, overweight women without BED, and normal weight women without BED) was the dependent variable. Predictors included BDI-II, IIP, Coherence of Mind, and Reflective Functioning scores.

Results

Data Screening

There were no missing data for coherence of mind or reflective functioning variables. For three participants, missing data at the item level for the IIP were imputed using individual participant means where there was less than 25% of missing data. Participants who had more than 25% of item level data missing were excluded from analyses that used the variables with missing data. As a result, eight participants were excluded from analyses (i.e., eight participants were missing IIP scores and five of those participants were also missing BDI-II scores). The percent of missing data for the BDI-II and IIP variables were 2.5% and 4.0% respectively. Little's MCAR test was not significant, $\chi^2(8) = 2.88, p = .942$, indicating that the data were missing completely at random. No out of range values, univariate outliers, or multivariate outliers were identified. Coherence of Mind, Reflective Functioning, and IIP scores were normally distributed. The BDI-II variable was positively skewed, so analyses were run with and without a square root transformation and results were the same. For ease of interpretation, the non-transformed results are presented. There were no problems with multicollinearity or singularity. The assumption of linearity of the logit was met. The Goodness-of-Fit statistics indicated that our data were underdispersed (Pearson $\chi^2(368) = 281.17, p = 1.00, \phi$ Pearson = .76; deviance $\chi^2(368) = 205.15, p = 1.00, \phi$ deviance = .56), which may have led to Type II error

(i.e., overly conservative test of significance). We ran the model with and without bootstrapping to examine differences in results with and without robust standard errors using 1000 bootstrap samples; the results were the same when run either way, and so the non-bootstrapped results are reported.

Predicting Group Membership

Overall, the model explained a significant amount of variability, $p < .001$ (see Table 4). The Goodness-of-Fit statistics indicated that our data were a good fit in that the predicted values did not differ significantly from the observed values (Pearson $\chi^2(376) = 297.38, p = .999$; deviance $\chi^2(376) = 213.04, p = 1.000$). With all variables included in the model, 89.11% (i.e., 90 out of 101) of women with BED, 53.19% (i.e., 25 out of 47) of overweight women without BED, and 68.89% (i.e. 31 out of 45) of normal weight women without BED were correctly classified in terms of group membership. The means and standard deviations of the predictor variables are reported in Table 2, the correlations between predictor variables are presented in Table 3, and the multinomial logistic regression results are presented in Table 4. The means and 95% Confidence Intervals of each predictor variable are presented in Figure 1.

To test hypothesis one, we evaluated if depressive symptoms and interpersonal problems differentiated those with BED from the other two groups. The likelihood ratio test indicated that the BDI-II scores predicted group membership while controlling for IIP, Coherence of Mind, and Reflective Functioning scores, $\chi^2(2) = 86.53, p < .001$. Higher BDI-II scores significantly differentiated those with BED from women who were overweight without BED, $p < .001$ (see Table 4 for logistic regression results). For every one-unit increase in BDI-II scores, the odds of having BED relative to being overweight without BED increased by 1.23. Higher BDI-II scores also significantly differentiated those with BED from normal weight women without BED, $p <$

.001. For every one-unit increase in BDI-II scores, the odds of having BED relative to being normal weight increased by 1.54.

The likelihood ratio test indicated that the IIP scores predicted group membership while controlling for BDI-II, Coherence of Mind, and Reflective Functioning scores, $\chi^2(2) = 6.51, p = .039$. Higher IIP scores significantly differentiated those with BED from women who were overweight without BED, $p = .027$. For every one-unit increase in IIP scores, the odds of having BED relative to being overweight without BED increased by 3.33. The IIP scores did not differentiate those with BED from normal weight women without BED, $p = .910$.

We also examined whether BDI-II and IIP scores differentiated overweight and normal weight women without BED. Higher BDI-II scores significantly differentiated overweight women without BED from those who were normal weight without BED, $p = .004$. For every one-unit increase in BDI-II scores, the odds of being overweight without BED relative to being normal weight without BED increased by 1.25. The IIP scores did not differentiate the two groups, $p = .077$.

To test hypothesis two, we evaluated if Coherence of Mind and Reflective Functioning scores distinguished those with BED from the other two groups. The likelihood ratio tests indicated that overall, Coherence of Mind scores did not predict group membership when controlling for BDI-II, IIP, and Reflective Functioning scores, $\chi^2(2) = .06, p = .973$. Coherence of Mind scores did not differentiate women with BED from overweight women, $p = .859$, or from normal weight women without BED, $p = .986$.

The likelihood ratio tests indicated that overall, Reflective Functioning scores did predict group membership when controlling for the BDI-II, IIP, and Coherence of Mind scores, $\chi^2(2) = 22.26, p < .001$. Reflective Functioning scores did not distinguish those with BED from

overweight women without BED, $p = .751$. However, higher Reflective Functioning scores did differentiate women with BED from normal weight women without BED, $p = .001$. For every one-point increase in Reflective Functioning scores, the odds of being normal weight relative to having BED increased by 2.43. Higher Reflective Functioning scores also distinguished participants who were overweight without BED from those who were normal weight without BED, $p < .001$. For every one-point increase in Reflective Functioning scores, the odds of being normal weight relative to being overweight increased by 2.27.

Discussion

The aim of the current study was to examine whether coherence of mind and reflective functioning add to our understanding of the psychopathology of BED. We did so while considering and controlling for symptoms of depression and interpersonal problems, which represent two elements of the Interpersonal (Wilfley et al., 1998) and GPIP conceptualizations of BED (Tasca et al., 2005).

Predicting Group Membership from Levels of Depression and Interpersonal Problems

Results supported hypothesis one in that greater symptoms of depression predicted having BED relative to being overweight or normal weight without BED. In addition, greater symptoms of depression differentiated being overweight without BED relative to being normal weight without BED. These results are consistent with findings in the literature that women with BED report greater symptoms of depression compared to overweight women without BED, and that overweight women without BED report greater symptoms of depression compared to normal weight women without BED (e.g., Fabricatore & Wadden, 2003; Fandino et al., 2010). Results partially supported hypothesis one in that greater interpersonal problems predicted having BED

relative to being overweight without BED, but did not differentiate those with BED from those with normal weight.

The negative affect associated with depression is intimately related to difficulties in social functioning, and interpersonal problems and may lead to binge eating (Wilfley et al., 1998). Our results confirm that interpersonal difficulty is an important variable to differentiate those who have BED from those who are overweight but without BED. Although the interpersonal model of binge eating has been extended to obese samples without BED (Lo Coco et al., 2016), the current study did not find that interpersonal problems differentiated those who were overweight versus those who were normal weight. As such, further research should examine the extent to which the interpersonal model of binge eating applies to non-clinical samples. It is likely that negative affect plays a key role in binge eating in those with BED as well as overeating in those who are obese, but it remains unclear whether interpersonal difficulties contribute to negative affect in those without BED.

Predicting Group Membership from Coherence of Mind and Reflective Functioning

Results partially supported hypothesis two regarding predicting group membership based on coherence of mind and reflective functioning. While controlling for symptoms of depression, interpersonal problems, and Reflective Functioning scores, Coherence of Mind scores did not predict group membership among those with and without BED. The mean Coherence of Mind scores for the women with BED and overweight women without BED were lower than that of the normal weight women without BED, but this difference did not significantly predict group membership. Previous research with individuals with AN and BN suggests that these groups appear to have lower mean Coherence of Mind scores compared to the participants with BED in the current study (Fonagy et al., 1996; Ward et al., 2001). It may be that women with BED differ

from those with AN and BN by being more coherent in their narrative when discussing early attachment memories and experiences of loss or abuse. By contrast, Barone and Guiducci (2009) reported that their subsample of individuals with BED had lower scale scores on Coherence of Mind than their non-clinical control sample. However, the authors did not provide the mean Coherence of Mind scores for their BED sample, and so we are unable to indirectly compare the means. It is noteworthy that Barone and Guiducci's (2009) participants were considerably younger ($M = 28.40$, $SD = 10.82$) than the participants in the current study ($M = 44.32$, $SD = 11.79$). Previous research with a non-clinical sample indicates that as individuals age, they are more likely to have a secure attachment state of mind (likely due to having more life experiences and perhaps the ability to distance themselves somewhat from the parental home and evaluate more objectively their attachment history), which implies higher Coherence of Mind scores (Bakermans-Kranenburg & van IJzendoorn, 1993). As such, the differences between Barone and Guiducci's (2009) study and the current study may in part be due to differences in age between the BED samples. Also, Barone and Guiducci's (2009) study did not match their BED and non-clinical sample by weight, nor did they control for symptoms of depression or interpersonal problems. Lastly, Barone and Guiducci's (2009) sample size was small (i.e., they reported data for eight participants with BED), and so their sample may not have been representative of the population of individuals with BED. Additional research with large samples is required to replicate the current findings and to gain a clearer understanding of the relationship among coherence of mind, binge eating, and weight.

While controlling for symptoms of depression, interpersonal problems, and Coherence of Mind scores, the Reflective Functioning scores significantly predicted group membership thus providing partial support for hypothesis two. Although Reflective Functioning did not

differentiate women with BED from overweight women without BED, it did differentiate normal weight women from both the BED and overweight groups. Those with BED and overweight women had significantly lower scores compared to normal weight women (see Table 2).

The mean Reflective Functioning score for women with BED and overweight women without BED indicates that both groups demonstrated a level of reflective functioning similar to those with AN and lower than those with BN as reported in previous research (Fonagy et al., 1996; Müller et al., 2006; Pedersen et al., 2012; Rothschild-Yakar et al., 2010; Ward et al., 2001). This indicates that women with BED and overweight women without BED demonstrated less consideration of mental states. When reflective functioning was demanded by AAI questions, these individuals frequently evaded using mental state language by responding with descriptions that were overly global and generalized. At other times, they demonstrated some evidence of consideration of mental states but they did so at a very rudimentary level. This included, for example, general descriptions that appeared to be reflective in nature but that were not specific to their own personal experiences. The mean Reflective Functioning score for normal weight women without BED was within the normal range similar to other previously reported non-clinical samples (see Table 2; Fonagy et al., 1996; Fonagy et al., 1998; Pedersen et al., 2012). These participants demonstrated a mix of considering mental states at a more rudimentary level, genuine reflection, and instances of marked reflection. Overall, normal weight women without BED were able to consider their own and others' mental states and the impact of mental states on behaviour.

Difficulty understanding one's own feelings and others' feelings, behaviours, mental states, and intentions likely contributes to problems with interpersonal communication (Fonagy et al., 1998). This may lead to more negative affect and interpersonal problems for women with

BED. As such, low reflective functioning may be a key variable that underlies BED, and the effects of reflective functioning appear to be independent of the impact of depressive symptoms or interpersonal problems. With only limited reflective functioning, individuals may be unable to understand or manage interpersonal interactions and contexts that may cause anxiety or negative affect. As such the negative affect may be experienced as unpredictable thus limiting their ability to adaptively cope, which may lead to binge eating.

Treatment for BED may be improved by helping patients develop reflective functioning skills so that their relationships and emotions become more understandable and predictable leading to more adaptive means of coping. Interventions might include explicitly helping the individual to identify their own and others' mental states through individual or group therapy interventions. In particular, patients could focus on interpersonal contexts that precipitate negative affect which may lead to the urge to binge or overeat.

In the current study, overweight women without BED also demonstrated difficulty understanding one's own feelings and others' feelings, behaviours, mental states, and intentions independent of depressive symptoms and interpersonal problems. Some recent conceptualizations of obesity have focused on early experiences of trauma and attachment insecurity among those with obesity (Maunder, Hunter, & Le, 2017). For obese individuals with trauma histories and attachment insecurity, emotional eating may be an external regulator of affect when internal means are not developed or are unavailable during times of stress. One could speculate that this emphasis on externalizing means of regulating emotions runs counter to attempts to understand ones' behaviors from a mental state perspective. Hence, it may be that the experience of trauma and subsequent attachment insecurity may reduce ones' ability to reflect and self regulate using internal resources that could lead to over-eating as a means of managing

stress and difficult emotions. This is the first study to demonstrate a specific association between reflective functioning and obesity. More research is required in this area to understand further the potential role of reflective functioning in the development of obesity and its treatment.

Limitations and Future Directions

The results of the current study should be interpreted within the context of the following limitations. First, this study included only women. Although the majority of those with BED are women (Kessler et al., 2013), future research might include men to investigate whether coherence of mind and reflective functioning predict group membership differently for men. Second, the sample included participants who sought treatment and/or who volunteered for research at a general hospital. As such, the participants may not represent individuals within the community, and so future research might include a broader sampling of participants in the community. Third, the women with BED differed significantly from the other groups in terms of lower income and educational level. These demographic variables are similar to what was observed in a large sample of individuals with BED in a previous study (Tasca et al., 2006) and appear to be representative of this population. Fourth, 30% to 34% of the non-clinical samples had a past Axis I diagnosis. Information on treatment history was not available. As such, we are not able to account for the impact of past treatment on outcome variables for the current study. Future studies should include this information for non-clinical control samples.

Conclusion

The current study examined whether coherence of mind and reflective functioning add to our understanding of the psychopathology of BED and overweight. This was the first study to examine the role of coherence of mind and reflective functioning in those who are overweight. Normal weight women demonstrated greater reflective functioning compared to both overweight

women with and without BED. As such, normal weight women showed a greater ability to consider their own emotions and the thoughts, emotions, and intentions of others in understanding behaviour. Poorer reflective functioning by overweight women with and without BED may lead to binge eating or overeating independent of depressive symptoms and interpersonal problems. If replicated, these findings may suggest that a focus on improving reflective functioning in the treatment of BED and of overweight women without BED may help to improve symptom outcomes.

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Table 1

Demographic Data for the Three Groups

	BED	OW	NW
BMI	$M = 38.35$ $SD = 7.18$	$M = 37.05$ $SD = 6.34$	$M = 23.12$ $SD = 1.97$
Age	$M = 44.32$ $SD = 11.79$	$M = 47.09$ $SD = 12.50$	$M = 43.89$ $SD = 12.06$
Current or partial remission co-morbid anxiety disorder	28% $n = 29$	4% $n = 2$	2% $n = 1$
Current or partial remission co-morbid mood disorder	59% $n = 60$	6% $n = 3$	4% $n = 2$
Past Axis I diagnosis	25% $n = 25$	34% $n = 17$	30% $n = 15$
White	89% $n = 91$	86% $n = 43$	84% $n = 42$
Married/Cohabiting	48% $n = 49$	70% $n = 35$	64% $n = 32$
Separated/Divorced	21% $n = 21$	12% $n = 6$	10% $n = 5$
Single	27% $n = 28$	10% $n = 5$	22% $n = 11$
Employed full-time	69% $n = 70$	58% $n = 29$	64% $n = 32$
Employed part-time	15% $n = 15$	20% $n = 10$	26% $n = 13$
Attended college or university	78% $n = 80$	90% $n = 45$	94% $n = 47$
Median family income	60,000 to 69,000	80,000 +	80,000 +

Notes: Some participants have both past and present Axis I diagnoses; BED = binge-eating disorder; OW = overweight women without BED; NW = normal weight women without BED; M

= mean; SD = standard deviation; $n = 102$ for women with BED; $n = 50$ for overweight women without BED; $n = 50$ for normal weight women without BED.

Table 2

Means and Standard Deviation for Symptoms of Depression, Interpersonal Problems, Coherence of Mind and Reflective Functioning scores for the Three Groups

	BED			OW			NW		
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
Depressive Symptoms	102	20.93	11.38	48	4.92	4.77	47	2.51	2.93
Interpersonal Problems	101	1.47	.54	47	.82	.46	46	.84	.41
Coherence of Mind	102	4.63	2.21	50	4.42	2.12	50	5.26	1.86
Reflective Functioning	102	2.95	1.07	50	2.72	1.13	50	4.12	1.52

Notes: BED = binge-eating disorder; OW = overweight women without BED; NW = normal weight women without BED; *M* = mean; *SD* = standard deviation; Depressive symptoms = BDI-II scores.

Table 3

Correlations between Predictor Variables

	Symptoms of Depression	Interpersonal Problems	Coherence of Mind
Interpersonal Problems	.62*		
Coherence of Mind	-.08	.07	
Reflective Functioning	-.13	-.07	.34*

Notes. Symptoms of depression = BDI-II scores; Interpersonal Problems = IIP scores; Values represent Pearson correlations; 202 participants provided coherence of mind and reflective functioning data, 197 participants provided BDI-II data, and 194 participants provided IIP data; * $p < .001$.

Table 4

Multinomial Logistic Regression Results

	<i>B</i> (SE)	<i>OR</i>	<i>95% CI for OR</i>	
OW versus. BED				
Intercept	2.71 (.92)**			
Symptoms of Depression	-.21 (.05)***	.81	.74,	.89
Interpersonal Problems	-1.21 (.55)*	.30	.10,	.87
Coherence of Mind	-.02 (.13)	.98	.77,	1.25
Reflective Functioning	.08 (.24)	1.08	.68,	1.72
NW versus BED				
Intercept	-.37 (1.14)			
Symptoms of Depression	-.43 (.08)***	.65	.55,	.77
Interpersonal Problems	-.08 (.69)	.93	.24,	3.58
Coherence of Mind	.00 (.15)	1.00	.75,	1.34
Reflective Functioning	.89 (.27)**	2.43	1.45,	4.09
OW versus NW				
Intercept	3.09 (.98)**			
Symptoms of Depression	.22 (.08)**	1.25	1.07,	1.45
Interpersonal Problems	-1.13 (.64)	.32	.09,	1.13
Coherence of Mind	-.03 (.12)	.98	.77,	1.25
Reflective Functioning	-.81 (.21)***	.44	.29,	.67

Notes: BED = binge-eating disorder; OW = overweight women without BED; NW = normal weight women without BED; $n = 101$ for sample of overweight women with BED; $n = 47$ for sample of overweight women without BED; $n = 45$ for normal weight women without BED; Total sample $N = 193$. Symptoms of depression = BDI-II scores; Interpersonal Problems = IIP

scores; CI = confidence interval; OR = odds ratio; $R^2 = .61$ (Cox & Snell), $.70$ (Nagelkerke); Model $\chi^2(8) = 181.59, p < .001$; * $p < .05$, ** $p < .01$, *** $p < .001$.

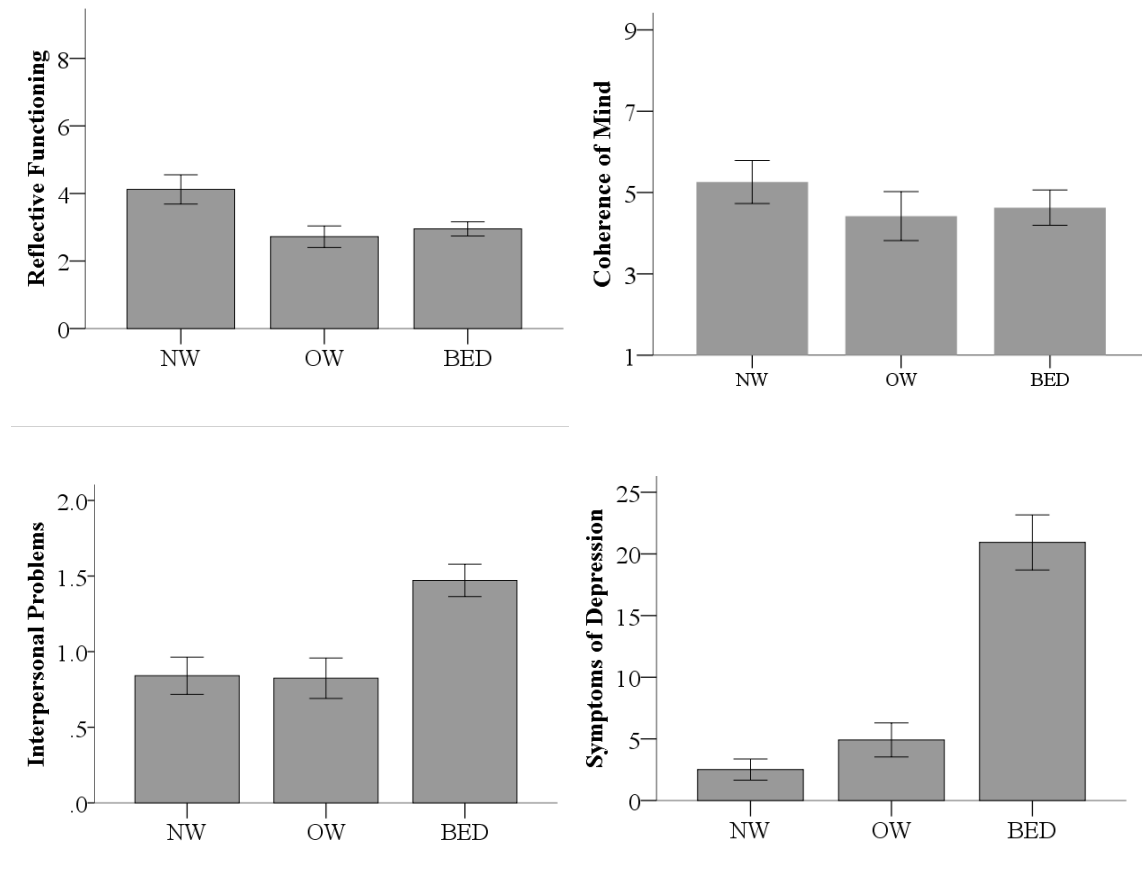


Figure 1. Means and 95% confidence intervals for Reflective Functioning, Coherence of Mind, Beck Depression Inventory-II, and Inventory of Interpersonal Problems scores for the three groups. Higher scores indicate greater reflective functioning, coherence of mind, symptoms of depression, and interpersonal problems. BED = binge-eating disorder, OW = overweight without BED, and NW = normal weight without BED.

Study Three

**Change in Attachment Dimensions in Women with Binge-Eating Disorder following
Group Psychodynamic Interpersonal Psychotherapy***

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Abstract

Objective: To examine the role of attachment dimensions, including coherence of mind and reflective functioning, in developing and maintaining binge-eating disorder (BED) and in determining group psychotherapy outcomes for women with BED. We hypothesize that higher pre-treatment attachment dimension scores will predict better treatment outcomes for women with BED and will increase at follow-up. **Method:** Women with BED attended 16 sessions of group therapy and completed the Adult Attachment Interview (AAI) at pre-treatment. Participants completed outcome measures (i.e., binge eating frequency and symptoms of depression) at pre-, post-, six months, and 12 months post-treatment. Treatment completers completed the AAI at six months post-treatment. **Results:** Treatment outcomes improved significantly from pre- to 12 months post-treatment. Greater Reflective Functioning scores at pre-treatment were related to greater decreases in binge eating across the four time points, whereas Coherence of Mind scores were not. For treatment completers, there were significant increases in Reflective Functioning at six months post-treatment, and about a third of treatment completers experienced clinically significant increases in both attachment dimensions at six months post-treatment. **Conclusions:** Greater reflective functioning at the outset is important for improvements in binge eating in the longer term and group psychotherapy can facilitate change in reflective functioning.

Change in Attachment Dimensions in Women with Binge-Eating Disorder following Group Psychodynamic Interpersonal Psychotherapy

Attachment functioning, particularly attachment insecurity, may be a risk factor for developing an eating disorder, may contribute to symptom maintenance, and may be important for understanding treatment processes and outcomes (Tasca & Balfour, 2014). Attachment dimensional concepts like coherence of mind (i.e., the quality of a person's attachment state of mind; Main, Goldwyn, & Hesse, 2002) and reflective functioning (i.e., the ability to understand one's own and others' behaviour in terms of mental states; Fonagy, Target, Steele, & Steele, 1998) may be key attachment variables related to treatment outcomes for eating disorders. The current paper examines the role of coherence of mind and reflective functioning in group psychotherapy for women with binge-eating disorder (BED).

Binge-Eating Disorder

Binge-eating disorder is the most common eating disorder (Gauvin, Steiger, & Brodeur, 2009; Kessler et al., 2013). The disorder occurs with similar frequencies in industrialized countries and among Whites, Asians, Latinos, and African Americans in the United States (American Psychiatric Association, 2013; Lee-Winn, Mendelson, & Mojtabai, 2014). The lifetime prevalence for BED ranges from .2 to 2.4 in European Countries, 4.7 in Brazil, .9 in Columbia, and 2.6 in the United States (Kessler et al., 2013). In Canada, the point prevalence of BED was 3.8% (Gauvin et al., 2009). Men and women have more comparable rates of BED compared to the gender ratio for other eating disorders (American Psychiatric Association, 2013; Kessler et al., 2013). Binge eating is defined as eating more than the average person in a two hour period and feeling out of control while doing so (American Psychiatric Association, 2013). The interpersonal model of BED posits that interpersonal problems lead to negative affect or

affect dysregulation that in turn leads to binge eating (Wilfley, Frank, Welch, Spurrell, & Rounsaville, 1998). Ivanova and colleagues (2015) found that negative affect mediated the relationship between interpersonal problems and BED symptoms, thus providing empirical support for the interpersonal model of BED.

Based in part on the interpersonal model of binge eating, Tasca et al., (2005) developed Group Psychodynamic Interpersonal Psychotherapy (GPIP). Group Psychodynamic Interpersonal Psychotherapy is an attachment-informed treatment for BED that integrates interpersonal (Kiesler, 1996; Strupp & Binder, 1984) and psychodynamic (Gabbard, 2000; Malan, 1979) approaches to symptoms and interpersonal processes within a group therapy model (Yalom & Leszcz, 2005). The GPIP model describes BED symptoms as a means of coping in response to negative affect that is precipitated by interpersonal conflict and unmet attachment needs (Ivanova et al., 2015; Tasca et al., 2005). Studies report that GPIP is effective in reducing symptoms of depression and the number of days women binge ate for women with BED (Tasca et al., 2006; Tasca et al., 2013).

Attachment Theory and Attachment Dimensions

As indicated, attachment theory may be an important concept for understanding BED (Tasca & Balfour, 2014) and attachment theory informs GPIP for BED (Tasca et al., 2005). According to attachment theory, interactions with caregivers lead infants to develop internal working models that guide behaviours, affective responses, and the ability to understand one's self and others (Bowlby, 1969). One way to assess attachment and internal working models in adulthood is to use interview techniques like the Adult Attachment Interview (AAI; Main et al., 2002), which is the most widely accepted and validated adult attachment interview (Main et al., 2002). The AAI assesses unconscious attachment states of mind related to one's interpersonal

relationships and affect regulation by focusing on current adult mental representations of early working models of child-parent relationships.

The literature has typically reported AAI results in the form of attachment state of mind classifications, namely secure or insecure. Clinical samples, including samples with eating disorders, have a high rate of insecure attachment state of mind (for a review see Kuipers & Bekker, 2012). Those with a secure attachment state of mind are able to self soothe, express their emotions and needs, and reach to others for support (Mikulincer & Shaver, 2007; Mikulincer, Shaver, & Pereg, 2003). Their adaptive emotion regulation and coping strategies allow them to engage in supportive and healthy interpersonal relationships. Those with an insecure attachment state of mind may be classified as preoccupied (i.e., anxious attachment) or dismissing (i.e., avoidant attachment). Those with a preoccupied attachment state of mind tend to over-emphasize negative affect partly as a way to reach for support from others (Mikulincer & Shaver, 2007; Mikulincer et al., 2003). They experience a strong need for closeness and an intense fear of rejection by others. Those with a dismissing attachment state of mind tend to deny their needs. They avoid expressing emotions to others and prefer emotional distance in interpersonal relationships (Mikulincer & Shaver, 2007; Mikulincer et al., 2003).

The AAI also allows one to assess attachment dimensional concepts including coherence of mind and reflective functioning. Coherence of mind indicates the degree to which an individual is consistent, relevant, and concise in their descriptions of childhood attachment memories, as well as the degree to which beliefs that are expressed during the interview are based in reality (Main et al., 2002). The Coherence of Mind dimensional scale is considered the best predictor of a person's overall functioning related to attachment (Main et al., 2002). Individuals classified as having an insecure attachment state of mind demonstrate considerably

less coherence of mind in that their narrative is marked by anger, passivity, or idealization or derogation of attachment figures (Main et al., 2002). Reflective functioning is “the mental process by which an individual implicitly and explicitly interprets the actions of himself and others as meaningful on the basis of intentional mental states such as personal desires, needs, feelings, beliefs, and reasons” (Bateman & Fonagy, 2004, p.21). Individuals who demonstrate low reflective functioning have difficulty discerning mental states and the impact of one’s own and others’ mental states on behaviour; whereas, those with higher reflective functioning consider their own and others’ mental states and the interaction between mental states and behaviour (Fonagy et al., 1998). Higher coherence of mind and reflective functioning indicate a capacity to think more coherently and reflectively, increased ability to regulate affect, and better interpersonal functioning.

Attachment Dimensions in the Psychotherapy of Eating Disorders

According to the interpersonal and GPIP models of BED, interpersonal functioning and affect regulation are key components in developing or maintaining symptoms of BED. When a person demonstrates more coherence of mind and reflective functioning, the individual is better able to take multiple perspectives, identify their own and others’ mental states, understand the impact of mental states and behaviour, and think about attachment-related situations in a balanced way, all of which is important for regulating one’s affect and having satisfying interpersonal interactions and relationships (Fonagy et al., 1998; Main et al., 2002). As such, evaluating coherence of mind and reflective functioning in those with BED may be important for understanding further how these patients may present during psychotherapy and make use of therapeutic interventions (Gullestad, Johansen, Hoglend, Karterud, & Wilberg, 2013; Müller, Kaufhold, Overbeck, & Grabhorn, 2006; Taubner, Kessler, Buchheim, Kachele, & Staun, 2011).

Moreover, targeting coherence of mind and reflective functioning in psychotherapy may lead to improved treatment outcomes (Gullestad et al., 2013; Müller et al., 2006; Taubner et al., 2011).

There are few studies that examined coherence of mind in individuals with eating disorders. There is evidence that individuals diagnosed with anorexia nervosa (AN) or bulimia nervosa (BN) demonstrate low coherence of mind (Fonagy et al., 1996; Ward et al., 2001). Barone and Guiducci (2009) reported that a small sample with BED also demonstrated low coherence of mind. However, Maxwell and colleagues (Maxwell et al., 2016) reported that a larger sample with BED demonstrated coherence of mind that was not significantly different from non-clinical controls. No research has assessed change in coherence of mind in participants with an eating disorder. In a sample of patients with borderline personality disorder who received 12 months of Transference-Focused Therapy, Levy and colleagues (2006) reported a significant increase in Coherence of Mind dimensional scale scores pre to post-psychotherapy, providing preliminary evidence that coherence of mind can change following psychotherapy.

Studies report that individuals with eating disorders demonstrate lower reflective functioning (for a review see Katznelson, 2014) compared to non-clinical samples (Fonagy et al., 1996; Maxwell et al., 2016; Rothschild-Yakar, Levy-Shiff, Fridman-Balaban, Gur, & Stein, 2010), with the exception of one study that did not find statistically significant differences between a sample of individual with BN and non-clinical controls (Pedersen, Lunn, Katznelson, & Poulsen, 2012). Three studies examined reflective functioning as a predictor of psychological treatment outcomes (Gullestad et al., 2013; Müller et al., 2006; Taubner et al., 2011). For patients with AN or BN and a depressive disorder, higher reflective functioning at pre-treatment was significantly correlated with better outcomes following three months of in-patient therapy (Müller et al., 2006). Muller et al., (2006) speculated that this was likely due to the increased

ability of those demonstrating a higher level of reflective functioning to make use of the components of therapy. Studies with non-eating disorder clinical samples reported that higher reflective functioning at pre-treatment was associated with better outcomes after the first eight months of group and individual psychotherapy (Gullestad et al., 2013; Taubner et al., 2011). These results may indicate that those with higher reflective functioning are able to make quicker use of group therapy and establish a therapeutic alliance more easily (Gullestad et al., 2013; Taubner et al., 2011).

To date, only one study by Levy and colleagues (2006) examined reflective functioning as an outcome variable using the full AAI and Reflective Functioning Scale (RFS; Fonagy et al., 1998). The RFS is the most widely used and well validated assessment of reflective functioning (Bateman & Fonagy, 2012). In a study of individual therapy for participants with borderline personality disorder who received one year of Transference Focused Therapy, Levy and colleagues (2006) reported a shift from low simplistic reflections of others' mental states at pre-treatment to a higher mean level similar to what is commonly found in non-clinical samples at post-treatment. The authors postulated that the improvement in reflective functioning was likely due to the emphasis in the therapy on reducing symptoms through modifying representations of the self and others, which is a core concept of reflective functioning. Other studies that did not use the full AAI and RFS, provide mixed evidence of change in reflective functioning following psychological treatment (e.g., Karlsson & Kermott, 2006; Rudden, Milrod, Target, Ackerman, & Graf, 2006; Vermote et al., 2010).

The research so far suggests that the ability to reflect on one's own and others' mental states and behaviour may allow one to: empathize with others, effectively rely on others for soothing and caring, understand factors contributing to one's behaviours and motivations, and to

adaptively regulate one's emotions (Gullestad et al., 2013; Levy et al., 2006; Taubner et al., 2011). Greater ability to reflect on the various factors that maintain symptoms may make it more likely that patients accept psychotherapy, engage in a therapeutic relationship, and change maladaptive coping and defenses (Gullestad et al., 2013; Levy et al., 2006; Taubner et al., 2011). Thus, higher levels of reflective functioning pre-treatment may result in individuals gaining more from psychotherapy. Moreover, improvements in reflective functioning likely facilitates improved interpersonal functioning, the ability to better self-regulate, and to adaptively reach for support from others, all of which are key components to interpersonal group psychotherapy of BED.

In the current study we hypothesize that: 1) higher pre-treatment Coherence of Mind and Reflective Functioning dimensional scale scores will predict a greater decline in symptoms of depression and binge eating frequency across four measurement time points (i.e., pre-, post-, six months post-, and 12 months post-treatment), and 2) Coherence of Mind and Reflective Functioning dimensional scale scores will increase pre- to six months post-GPIP for those who completed treatment and the AAI at six months post-treatment.

Method

Participants

Participants included 102 women who met DSM-IV-TR (American Psychiatric Association, 2000) criteria for BED and who started 16 week GPIP. Based on findings from previous research (Tasca et al., 2006), participants were assigned to groups based on their level of attachment anxiety (Tasca et al., 2013). Participants provided pre-, post-, six months post-, and 12 months post-treatment data for outcomes of days binged in the past 28 days and symptoms of depression (see Table 1). Six month follow-up data on the AAI was available for

63 of the participants. The mean age for the total sample ($N = 102$) was 44.32 years ($SD = 11.79$). The majority of participants were White, 89.2% ($n = 91$). In terms of relationship status, 27.5% ($n = 28$) were single, 48.0 % ($n = 49$) were married or cohabitating, 20.6% ($n = 21$) were separated or divorced, 2.9% ($n = 3$) were widowed, and one participant did not provide her relationship status. In terms of employment status, 68.6% ($n = 70$) were employed full-time, 14.7% ($n = 15$) were employed part-time, 13.7% ($n = 14$) were unemployed, and three participants did not provide their employment status. The majority of participants, 78.43% ($n = 80$), attended college or university. The median family income was 60,000 to 69,000 in Canadian dollars.

Materials

Coherence of Mind Scale (Main et al., 2002). The Coherence of Mind scale is a dimensional scale of the AAI Classification and Coding System (Main et al., 2002). The AAI is a semi-structured interview. Ratings on the Coherence of Mind dimensional scale reflect both coherence of the narrative and the speakers' general belief system in relation to reality. Coherence of Mind is coded using a 9-point scale ranging from 1 (striking absence of coherence of mind) to 9 (strong coherence of mind). The scale is reliable when coded by trained coders (Fonagy et al., 1996; Levy et al., 2006).

The six AAI coders for the current study attended AAI Training Institutes provided by certified AAI trainers. The coders successfully completed the reliability testing. The reliability and validity of the AAI is well documented (Bakermans-Kranenburg & van IJzendoorn, 1993). Of note, the AAI has excellent test-retest reliability with spans of two months ($\kappa = .63$; Bakermans-Kranenburg & van IJzendoorn, 1993), three months ($\kappa = .70$; Sagi et al., 1994), and 12 months ($\kappa = .79$; Benoit & Parker, 1994). Although there is substantial reliability and validity

data for the AAI classifications, psychometric data is less commonly reported for the AAI dimensional scales like Coherence of Mind. This is likely due to the small number of studies that have focused on examining dimensional scales. Regardless, there is evidence that the Coherence of Mind scale is reliable when rated by trained coders (Fonagy et al., 1996; Levy et al., 2006). In this study, inter-rater agreement for Coherence of Mind was high overall, intraclass correlation coefficient (ICC) = .91, ranging from ICC = .89 to .97 among the six coders on a random sample (21%, $n = 34$) of transcripts. There is also evidence that Coherence of Mind scores can discriminate AAI classifications of secure versus insecure (Crowell et al., 2002) which is consistent with the AAI Scoring and Classification System (Main et al., 2002).

Reflective Functioning Scale (RFS; Fonagy et al., 1998). Reflective functioning was coded using the Reflective Functioning Manual - Version 5 (RFS; Fonagy et al., 1998) and was applied to the AAI transcripts. The three coders for the current study attended a three-day workshop provided by Dr. Howard Steele to learn to code reflective functioning using the RFS. Coders successfully completed the reliability testing for using the RFS which included achieving an ICC of .70 or greater with Dr. Steele on 15 transcripts. Scores on the RFS can range from -1 (negative reflective functioning) to +9 (exceptional reflective functioning; Fonagy et al., 1998). A RFS rating of 5 is the most common rating in normative samples (Fonagy et al., 1998).

The psychometric properties of the RFS are well documented, including good inter-rater reliability (e.g., Fonagy et al., 1996; Fonagy et al., 1998; Taubner et al., 2013). Reflective Functioning is independent of age, gender, personality, self-esteem, personality, and mood state of the individual before and after completing the AAI (Fonagy et al., 1996; Fonagy et al., 1998; Taubner et al., 2013). There is evidence of correlations between the RFS and other measures of mentalization (Bouchard et al., 2008) and of incremental validity of using the entire AAI to

assess Reflective Functioning (rather than only using AAI questions that demand Reflective Functioning; Taubner et al., 2013). For the current study, 24% ($n = 40$) of transcripts randomly selected from the total sample of transcripts ($N = 165$) were coded for reliability purposes. Inter-rater reliability between the three coders was high, $ICC = .90$.

Attachment Style Questionnaire (ASQ) Need for Approval Scale (Feeney, Noller, & Hanrahan, 1994). The ASQ is a widely used self-report measure of adult attachment. The measure is made up of 40 items using a 6-point Likert scale ranging from 1 (totally disagree) to 6 (totally agree). The items comprise five dimensions including two scales of attachment avoidance (Discomfort with Closeness and Relationships as Secondary), two scales of attachment anxiety (Need for Approval and Preoccupation with Relationships), and one scale of attachment security (Confidence in Self and Others). The Need for Approval scale includes seven items and measures participant's need for others confirmation and acceptance. In the original study from which this sample was taken, Need for Approval scale scores were used to place participants into high and low attachment anxiety treatment conditions pre-treatment (see Tasca et al., 2013 for details). In a factor analysis, the Need for Approval scale loaded highly on an attachment anxiety factor (.62; Brennan, Clark, & Shaver, 1998). The scale had satisfactory internal consistency with a mean inter-item correlation of .34 (Tasca et al., 2013).

Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996). The BDI-II is the most widely used self-report measure of depression-related symptoms and attitudes. Participants respond to 21 items using a 4-point Likert scale (0 to 3). Higher scores represent greater depressive symptoms. In the current study at pre-treatment, BDI-II items had good internal consistency with a Cronbach's alpha of .91. There is strong evidence of concurrent

validity and construct validity for the BDI-II, and evidence that the measure is able to differentiate between psychiatric and non-psychiatric patients (Beck et al., 1996).

The Eating Disorder Examination (EDE; Fairburn & Cooper, 1993). The EDE is a semi-structured interview that is commonly used in eating disorder research to assess overeating and extreme methods of weight control. The behavioural aspects of overeating from the EDE and a calendar recall method were used to assess the outcome variable days binged in the past 28 days. The EDE has strong inter-rater reliability and internal consistency of subscales (Fairburn & Cooper, 1993). The inter-rater reliability measured using ICCs in previous studies with BED samples, and the sample used for the current study, indicated high agreement between independent judges in assessing days binged, $ICC = .97$ to $.99$ (Tasca et al., 2006; Tasca et al., 2013.) The EDE has strong discriminant and concurrent validity and sensitivity to changes in binge eating symptoms (Fairburn & Cooper, 1993). A systematic review of the literature found that overall, there is good evidence of both reliability and validity of the EDE for assessing eating disorder symptoms (Berg, Peterson, Frazier, & Crow, 2012).

Procedure

Participants were recruited from the Regional Centre for the Treatment of Eating Disorders at The Ottawa Hospital or self-referred through advertisements for a group treatment study for BED. Recruitment details are reported in the original treatment study by Tasca et al., (2013). A total of 102 individuals who did not meet exclusion criteria, who met criteria for BED according to the DSM-IV-TR (American Psychiatric Association, 2000), and who accepted treatment were included in the current study. Exclusion criteria included anyone who had a comorbid disorder that might preclude them from engaging in, using, or attending to the group therapy sessions that were intended for treating BED (e.g., psychotic or bipolar disorders or

current drug or alcohol dependence). Exclusion criteria also included not speaking English, pregnancy, or currently or planning to participate in a weight loss program in the following year. Participants completed a demographic questionnaire and were weighed at pre-treatment. All participants had a body mass index equal to or greater than 27 indicating that they were overweight or obese (World Health Organization, 2014). Participants completed outcome measures (i.e., the BDI-II and EDE) pre-, post-, six months post-, and 12 months post-treatment. They completed the AAI pre- and six months post-treatment. A Ph.D. clinical psychologist or a Ph.D. psychology student trained in providing and coding the AAI conducted the AAIs, which were audio-recorded, transcribed, and then coded according to the Adult Attachment Scoring and Classification System Manual (Main et al., 2002). Prior to beginning GPIP, participants attended a pre-group preparation session. The group therapy sessions were video recorded. The video recordings were used in part to assess adherence to the treatment manual. Participants provided informed consent and the study was approved by the institution's research ethics board.

As part of the original study design (Tasca et al., 2013), participants were assigned to either a high ($n = 50$) or low ($n = 52$) attachment anxiety condition based on their scores on the Need for Approval scale of the ASQ. A score of 3.59 was chosen as the cut off point for the groups since in a previous study, it was the point of intersection between the GPIP and Group Cognitive Behaviour Therapy regression lines for the relationship between Need for Approval and post-treatment change in days binged (i.e., Need for Approval scale scores were significantly related to a decrease in days binged for women who received GPIP; Tasca et al., 2006). Participants with a score of 3.59 or greater were assigned to the high attachment anxiety condition and those who scored below 3.59 were assigned to the low attachment anxiety condition.

There were six therapists including three psychologists, two psychiatrists, and one advanced practice nurse. Each therapist had at least three years of experience in providing group psychotherapy, attended a two-day training workshop on GPIP, and attended weekly group supervision sessions. Therapists were blind to attachment anxiety condition and led two groups each.

Group Psychodynamic Interpersonal Psychotherapy is a time-limited evidence based treatment for BED that combines principles from interpersonal, psychodynamic, and group psychotherapy theory (Tasca et al., 2005). Participants attended one of 12 groups that each comprised 16 weekly 90-minute sessions with eight to ten participants and one therapist per group. The theoretical underpinning of GPIP is that unmet adult attachment needs result in negative affect, which in turn leads individuals to use defenses to maintain their self-concept and reduce anxiety. These defenses affect their interpersonal patterns and the quality of their relationships. Symptoms of depression and binge eating are viewed as maladaptive coping in response to negative affect and/or interpersonal conflict (Tasca et al., 2005). Cyclical Maladaptive Interpersonal Patterns (CMIP; Strupp & Binder, 1984; Tasca et al., 2005) are a framework from which to understand the participant's maladaptive interpersonal behaviour. The participant's CMIP informs the therapist of the participant's attachment needs, resultant affective states, defenses, maladaptive interactional patterns, expectations, and self-concept (Tasca et al., 2005). Throughout the group treatment, binge eating symptoms are discussed and understood within the context of each member's individual CMIP and as a maladaptive way of regulating negative affect (Tasca et al., 2005). The interactions within group are used to model and modify CMIPs. In a previous treatment study that used the same data as the current study, Tasca et al., (2013) reported good therapist adherence to the treatment manual rated by independent coders.

Data Analyses

Data screening including missing data analyses are outlined and reported in the Results section. We tested the first hypothesis, that pre-treatment attachment dimensions predict change in treatment outcomes (i.e., binge eating frequency and symptoms of depression) over four time points (pre-, post-, six months post-, and 12 months post-treatment) using hierarchically nested longitudinal models. The data were both hierarchically nested (i.e., participants within treatment groups) and longitudinal (i.e., repeatedly measured within participants), so a three-level hierarchically nested longitudinal model was used to assess the ICC (see Model 1 in the Appendix). The ICC is useful with grouped data to check if the data within groups are dependent (Tasca, Illing, & Ogrodniczuk, 2009). An ICC smaller than .05 is ignorable (i.e., does not increase Type I error) and an ICC larger than .05 indicates that the Type I error rate should be adjusted to correct for Type I error inflation (Kenny, Kashy, & Bolger, 1998; Tasca, Illing, & Ogrodniczuk, 2009). The equation to calculate the ICC was $\rho = \tau_{00j} / (\tau_{00j} + \tau_{0ij} + \sigma^2)$. That is, the ICC or ρ is a function of between group variance, τ_{00j} , divided by total variance (i.e., τ_{00j} plus between individual variance, τ_{0ij} , plus within person variance, σ^2). Dependence in the data was assessed across four time points (i.e., pre-, post-, six months post-, and 12 months post-treatment) for binge eating frequency and symptoms of depression. The ICC for binge eating frequency was ignorable, $\rho = .0003$. The ICC for symptoms of depression was greater than .05, $\rho = .08$, so the Type I error rate for the two level analyses involving depression scores was adjusted to .008 as per the method described by Kenny and colleagues (1998). The analyses were run at both the individual (with two level models) and the group level (with three level models), and results were the same regardless of which models were run. Since the hypothesis addressed the phenomenon at the individual rather than the group level, and the results were the

same when run at both the individual and group levels, we chose to analyse the data with two-level models. Thus, results of the two-level hierarchically nested longitudinal multilevel models are reported using an adjusted Type I error rate ($p = .008$) for depression (see Model 2 in the Appendix). As was done by Tasca et al. (2013), time was log transformed (i.e., pre-treatment = .00, post-treatment = .03, six months post-treatment = .48, and 12 months post-treatment = .60) to model rapid change from pre to post-treatment, and less rapid change from post-treatment to 12 months follow-up. Since attachment anxiety condition was part of the design of the initial treatment study (Tasca et al., 2013), attachment anxiety condition was controlled in each statistical model.

To test the second hypothesis that Coherence of Mind and Reflective Functioning dimensional scale scores will increase from pre- to six months post-treatment, we used hierarchical linear models. Dependence was assessed across the two time points (pre-treatment and six months post-treatment) for Reflective Functioning and Coherence of Mind, $\rho = .0001$ and $\rho = .025$, respectively. Since hypotheses addressed the phenomena at the individual rather than the group level, and the ICC's indicated that dependence was ignorable, we chose to analyse the data with two-level models (repeated measurements nested within individuals) and report the individual level findings (see Model 3 in the Appendix). Regardless, the analyses were run at both the individual level (with two level models) and the group level (with three level models), and results were the same. Two-level hierarchically nested longitudinal multilevel models are reported. The level-2 slopes were fixed because the model only had two repeated measurement data points (see Model 3 in the Appendix).

In hierarchical linear modeling, the deviance statistic can be used as a measure of model fit (i.e., a measure of lack of fit between the data and the model) and provides information on the

improvement of model fit in each subsequent model (Kreft & De Leeuw, 1998). Smaller deviance statistics indicate a better fit of the model to the data (Tasca, Illing, Joyce, & Ogrodniczuk, 2009). The differences between deviances in two nested models have a chi-square distribution, $\Delta\chi^2$, with the degrees of freedom equal to the difference in the number of parameters tested between the two models (Kreft & De Leeuw, 1998; Tasca, Illing, Joyce, et al., 2009). In hierarchical linear modeling, Pseudo R^2 is used as an indicator of effect size by estimating the percentage of variance in the outcome accounted for by adding predictors to the model (Raudenbush & Bryk, 2002). Pseudo R^2 is calculated by subtracting the individual error term of the full model from the individual error term from the model without the predictor divided by the individual error term of the full model. Model fit and Pseudo R^2 statistics are reported for significant results for both hypotheses.

As a way to further describe changes in Reflective Functioning and Coherence of Mind dimensional scale scores pre- to six months post-treatment as part of hypothesis two, Reliable Change Indices (RCI; Jacobson & Truax, 1991; Speer, 1992) were used to assess clinically significant change. The RCI also provides a way of examining the relative likelihood of a participant's score moving from a dysfunctional (i.e., clinical) distribution to a functional (i.e., non-clinical) distribution (Jacobson & Truax, 1991). The RCI is calculated by subtracting the pre score from the post score and dividing by the standard error of the difference between the two scores. An RCI >1.96 has a probability of less than .05 that the difference occurred by chance. Reliable Change Indices may be susceptible to regression to the mean indicated by significant correlations between the pre-score and change scores (Speer, 1992). The pre- and change scores for both Reflective Functioning, $r = .287$, $p = .022$, and Coherence of Mind, $r = .680$, $p = .000$, were statistically significant. As such, the Edwards-Nunnally method which adjusts for

regression to the mean was used to classify participants (Speer, 1992). This method calculates an unbiased pre-treatment score based on the test-retest reliability of the measure and the participants' pre-treatment deviation score (pre-treatment minus the population mean multiplied by the test-retest reliability plus the population mean). A ± 2 standard errors confidence interval is then calculated around the unbiased pre-treatment score so that clinically significant change occurs outside this interval. If a score falls above this zone, the participant is classified as improved, if the score falls below this zone, the participant is classified as deteriorated, and if the score falls within this zone, the participant is classified as unchanged. Participants can be further classified as recovered if they improved and were within the normal population range (i.e., equal to or higher than the half way point between the functional and dysfunctional range).

Results

Data Screening

Univariate outliers (BDI-II post-treatment $n = 2$; BDI-II six months post-treatment $n = 1$, BDI-II 12 months post-treatment $n = 1$; EDE post-treatment $n = 5$; EDE six months post-treatment $n = 3$) were brought into range (Tabachnick & Fidell, 2007). The outcome variable of binge eating frequency at post-treatment and six months post-treatment were positively skewed. The square root transformation was applied and analyses were run separately with and without the transformation. Results were the same; as such, results are reported without the transformation for ease of interpretation. Analyses revealed no multivariate outliers or issues with multicollinearity or singularity.

A missing data analysis using Pattern Mixture Modeling for the outcome variables, BDI-II scores and binge eating frequency, over the four measurement points (pre-, post-, six months post-, and 12 months post-treatment) was reported in a previous study (Tasca et al., 2013).

Results indicated that data were missing at random (Tasca et al., 2013). Since analyses for the current study also included examining change in attachment dimensions from pre- to six months post-treatment, a missing data analysis was completed for these data. Data were missing at random but nevertheless represented treatment completers. Analyses also indicated that those whose AAI data were available at six months post-treatment ($n = 63$) had significantly lower BDI-II scores at pre-treatment compared to those whose AAI data were missing at six months post-treatment ($n = 39$), $F(1, 100) = 5.99, p = .016$, *Cohen's d* = .49. Therefore, pre-treatment BDI-II scores were included in all analyses in which AAI dimensions were dependent variables to control for BDI-II pre-scores. No other pre-treatment differences were noted between those with and without six month post-treatment AAI data.

Finally, we controlled for therapist effects by including dummy coded therapist contrasts in level two of the models. Controlling for therapist effects did not change any of the findings, and so we elected not to include these effects in the models.

Attachment Dimensions as Predictors of Treatment Outcomes.

To test hypothesis one, we assessed if pre-treatment Coherence of Mind or Reflective Functioning dimensional scale scores would predict symptom reduction over four time points (i.e., pre-, post-, six months post-, and 12 months post-treatment). See Table 1 for means and standard deviations. A previous publication using the same treatment outcome data, reported that both binge eating and BDI-II scores significantly improved from pre- to post- to six months, to 12 months post-treatment (Tasca et al., 2013). In this study, we found that pre-treatment Reflective Functioning dimensional scale scores were significantly associated with the slope in binge eating frequency across the four time points, $\beta_{12} = 4.29, SE = 1.51, t(98) = 2.84, p = .006$. That is, higher pre-treatment RFS scores predicted positive change in binge eating frequency up

to 12 months post-treatment. The model with Reflective Functioning as a predictor of binge eating slopes resulted in an improved model fit to the data, $\Delta\chi^2(1) = 8.35, p = .004$. Reflective Functioning scores accounted for 21.82% of the variability in binge eating slopes (or change in binge eating from pre- to 12 months post-treatment), indicating a large effect. Reflective Functioning pre-treatment dimensional scale scores did not predict change in symptoms of depression, $\beta_{12} = .97, SE = 1.77, t(98) = .55, p = .585$. Pre-treatment Coherence of Mind dimensional scale scores did not predict change in binge eating frequency, $\beta_{12} = -.01, SE = .77, t(98) = -.01, p = .990$, or symptoms of depression, $\beta_{12} = -.74, SE = .77, t(98) = -.97, p = .337$.

Change in Attachment Dimensions Pre- to Six Months Post-Treatment.

To test hypothesis two, we evaluated change in Coherence of Mind and Reflective Functioning dimensional scale scores from pre- to six months post-treatment for treatment completers. The means and standard deviations are reported in Table 2. The linear slope indicating change in Reflective Functioning from pre to six months post-treatment was significant, $\beta_{10} = .69, SE = .20, t(60) = 3.50, p < .001$. Compared to the base model, the linear model was a better fit to the data, $\Delta\chi^2(3) = 14.82, p = .002$. Adding the linear parameter resulted in a Pseudo $R^2 = .17$, indicating that 17% of the within person variance in Reflective Functioning was accounted for by the linear parameter, which is a medium effect. The linear slope indicating change for Coherence of Mind from pre- to six months post-treatment was not significant, $\beta_{10} = .003, SE = .45, t(60) = .01, p = .995$.

There was also an interaction between the linear parameter for Reflective Functioning and attachment anxiety condition, $\beta_{11} = -.56, SE = .27, t(60) = -2.07, p = .043$. Follow up analyses showed that participants with lower attachment anxiety assessed with the ASQ Need for Approval Scale experienced a significant increase in their Reflective Functioning from pre- to

six months post-treatment, $\beta_{10} = .77$, $SE = .18$, $t(27) = 4.33$, $p < .001$, whereas participants with high attachment anxiety did not, $\beta_{10} = .08$, $SE = .18$, $t(32) = 0.41$, $p = .69$ (see Table 2 for means and standard deviations). There was no interaction between the Coherence of Mind linear slope and attachment anxiety condition.

To assess the clinical meaningfulness of change in Coherence of Mind and Reflective Functioning dimensional scale scores, the Edwards-Nunnally method for the RCI was used. Of the 63 participants who completed the AAI at six months post-treatment, 39.68% ($n = 25$) reliably improved, 44.45% ($n = 28$) were unchanged, and 15.87% ($n = 10$) deteriorated on Reflective Functioning. On Coherence of Mind, 33.33% ($n = 21$) reliably improved, 50.79% ($n = 32$) were unchanged, and 15.87% ($n = 10$) deteriorated. The clinical cut-off suggesting significant clinical change from a dysfunctional to a normal population mean for Reflective Functioning was 4.00 and for Coherence of Mind was 5.19. The percentage of completers who reliably improved and who recovered (i.e., within the cut-off of the normal population) were 31.75% ($n = 20$) for Reflective Functioning and 23.81% ($n = 15$) for Coherence of Mind.

Discussion

The current study is the first to examine key attachment dimensions as predictors of BED treatment outcomes in women with BED who received group psychotherapy. It is also the first to examine change in attachment dimensions in women with BED who received group psychotherapy.

Attachment Dimensions as Predictors of Treatment Outcomes

Results partially supported our first hypothesis that attachment dimensions would predict treatment outcomes for depression and binge eating. Greater Reflective Functioning at pre-treatment was associated with a decline in binge eating frequency across four time points (i.e.,

pre-, post-, six months post-, and 12 months post-treatment). These results are consistent with other studies that reported that higher Reflective Functioning at pre-treatment was significantly correlated with better outcomes following short-term in-patient therapy for AN or BN (Müller et al., 2006) and following eight months of group and individual psychotherapy for personality disorders and depression (Gullestad et al., 2013; Taubner et al., 2011). Participants in the current study with higher Reflective Functioning dimensional scale scores at pre-treatment were likely better able to make quicker use of therapeutic interventions targeted at decreasing symptoms of binge eating. That is, they may have been better able than participants with lower Reflective Functioning dimensional scale scores to recognize the relationship between attachment needs, negative affect, maladaptive defenses and binge eating earlier in GPIP. It is also likely that participants with higher Reflective Functioning dimensional scale scores were able to use the group format to try out new adaptive ways of expressing their emotions and needs within the group and then generalize these changes outside the group in their interpersonal circles. As such, greater reflective functioning likely impacted how participants engaged in the therapeutic process and generalized what they learned. Therapists might benefit from identifying the extent with which patients demonstrate reflective functioning and include interventions aimed at increasing the frequency and sophistication with which patients do so in order to improve treatment outcomes. For example, for patients who demonstrate limited reflective functioning, therapists might use the group to model reflective functioning by asking other patients to describe mental states underlying their behaviour, by having other patients discuss the impact of behaviours that occur during the group on their thoughts about self and others, associated emotions, and subsequent binge eating. For patients who demonstrate greater reflective functioning, therapists might use group processes like interpersonal learning earlier in the group

to help these patients to develop more sophisticated reflective functioning more quickly (e.g., by integrating multiple perspectives of group members into how they understand mental states and behaviour).

Reflective Functioning dimensional scale scores did not predict changes in symptoms of depression across the four time points. This may be because of the focus in GPIP on linking affect regulation, interpersonal functioning, and binge eating rather than focusing on symptoms of depression specifically. As such, understanding symptoms of depression might not have been explicitly addressed, even though symptoms of depression improved following treatment.

Coherence of Mind dimensional scale scores at pre-treatment did not predict change in binge eating frequency and symptoms of depression across the four time points. This may be because coherence of mind is too broad of a concept from which to examine one's ability to use therapy and change in symptoms. Coherence of mind may be more of an indicator of overall difficulties in relationships and affect regulation rather than a predictor of change in symptoms. Also, as noted earlier, Coherence of Mind dimensional scale scores at pre-treatment in this sample of women with BED were higher than seen in other clinical samples and so the range of coherence of mind dimensional scale scores may have been restricted which may have attenuated correlations with other variables.

Change in Attachment Dimensions Pre- to Six Months Post-Treatment

Results partially supported our second hypothesis that attachment dimension scores would significantly increase from pre- to six months post-treatment for treatment completers. For the 63 participants who completed the AAI at six months post-treatment, we found that Reflective Functioning dimensional scale scores significantly increased whereas Coherence of Mind dimensional scale scores did not. Pre-treatment Reflective Functioning dimensional scale

scores ($M = 2.95$, $SD = 1.07$) indicated that women with BED demonstrated a mix of absent, concrete, or over generalized responses on the AAI. The statistically significant increase in Reflective Functioning dimensional scale scores in the current study by six months post-treatment ($M = 3.41$, $SD = 1.24$) indicates that participants shifted towards using mental state language more frequently. Moreover, the RCI indicated that just over 39% of participants reliably improved (i.e., placing them closer to the mean of a non-clinical population), and almost 32% of participants were categorized as recovered with respect to Reflective Functioning (i.e., placing them within the non-clinical population; Jacobson & Truax, 1991). The RCI results indicate that substantial clinical changes in reflective functioning can occur following time-limited interpersonal-dynamic group psychotherapy. This is important since greater reflective functioning is likely important for maintaining symptom improvement in individuals with BED. Continuing to identify one's own and others' mental states, understanding others' motives, intentions, and behaviour, and understanding the interaction between one's own and others' mental states and behaviours, contributes to better interpersonal communication and interactions (Fonagy et al., 1998). In the current study, improved interpersonal interactions may have led to less negative affect and in turn, fewer binge eating episodes, as described by interpersonal and GPIP models of BED (Ivanova et al., 2015; Tasca et al., 2005; Wilfley et al., 1998).

Although significantly higher than at pre-treatment, the mean six month post-treatment Reflective Functioning dimensional scale score in the current study indicated that on average participants continued to have difficulty demonstrating awareness of the nature of mental states, teasing out mental states underlying behaviour, recognizing developmental aspects of mental states, and considering the interviewer's mental state during the AAI (Fonagy et al., 1998). The mean six month post-treatment score in the current study was not as high as the mean post-

treatment score reported by Levy et al., (2006), who provided patients with borderline personality disorder with Transference Focused Therapy. The differences in post-scores between Levy et al., (2006) and the current study may be due to the frequency of treatment offered (i.e., once weekly for 90 minutes in the current study versus twice weekly for 45 minutes each by Levy et al., [2006]), the duration of therapy (i.e., 16 weeks in the current study versus 12 months in Levy et al., [2006]), and/or the modality of treatment (i.e., group treatment in the current study versus individual treatment in Levy et al., [2006]). Both Transference Focused Therapy and GPIP emphasize here and now interactions within the therapeutic milieu. A longer and more frequent course of group therapy may provide patients with a greater dose of interventions that facilitate reflective functioning, such as identifying mental states (i.e., emotions and thoughts) as they occur during the group, the impact of their behaviour that typically follows certain mental states, and the implications of that behaviour on interpersonal relationships including group interactions. Longer treatment may also provide participants with more time to practice checking out others' mental states and making links between mental states and behaviour in a safe group context. Longer duration and more frequent treatment may be particularly important for individuals with BED who, similar to those with borderline personality disorder, had very low scores on Reflective Functioning at pre-treatment.

As noted, the group modality of treatment may have also impacted change in reflective functioning. The group format which allows therapists to use group level interventions to facilitate the identification of and understanding of one's own and others' mental states and the interaction of mental states and behaviour, may have helped facilitate the quick increase in Reflective Functioning dimensional scale scores in the current study. This is particularly likely if the therapy groups had strong group cohesion (i.e., members felt a sense of belonging, valued,

accepted and supported by one another; Yalom & Leszcz, 2005). For example, interpersonal learning, whereby participants share aspects of their mental state including emotions, thoughts, and perceptions while receiving feedback from group members (Yalom & Leszcz, 2005) allows participants to receive immediate feedback and insight on their mental state from a number of people in a safe environment. Receiving feedback from numerous people may translate to faster training in participants in deciphering both the variability and consistency of how others perceive certain behaviours and statements. The concept of the group as a social microcosm (i.e., that individuals will begin to act in the group as they do within their social circles outside the group) might also contribute to the increase in reflective functioning. The concept of the group as a social microcosm allows the group to explore the client's maladaptive interpersonal behaviour and associated mental states in the here in now and when the client is emotionally engaged rather than discussing maladaptive interpersonal interactions that occur outside therapy at a more cognitive level (Yalom & Leszcz, 2005).

In a supplementary analysis we found that improvement in Reflective Functioning was moderated by level of attachment anxiety of the therapy group (i.e., low or high). Those with lower attachment anxiety in a group composed of participants with lower attachment anxiety at pre-treatment demonstrated a significant increase in Reflective Functioning at six months post-treatment, whereas those with higher attachment anxiety in a group composed of participants with higher attachment anxiety did not demonstrate the same change. Gullestad et al., (2013) posited that group therapy may be too demanding for individuals with low reflective functioning. For the current study, it may be that difficulty with hyperactivated affect and difficulty attending to the emotions and needs of other for those with higher attachment anxiety (Mikulincer & Shaver, 2007), prevented those with higher attachment anxiety from engaging in group

interventions in a way that would have facilitated reflective functioning. For example, in a group where participants had higher attachment anxiety, the therapist may have had to spend more time helping participants regulate their affect and less time deepening and expanding their awareness of their own and others' mental states, and how mental states and behaviour interact. As such, it may help patients and groups with higher attachment anxiety if therapists include interventions to help these patients with emotion regulation. In GPIIP, the clinician might even introduce emotion regulation "skills" during the pre-group session (e.g., deep breathing) so that patients can begin to practice the skills prior to beginning therapy. Patients with hyperactivated affect are also likely to provide an overwhelming amount of information, some of which would not be relevant or related to the content of discussion. As such, in the groups composed of participants with higher attachment anxiety, the therapist and group may have to spend time helping participants remain focused in addition to helping them regulate affect.

As indicated, coherence of mind did not improve for these women with BED who received GPIIP. The sample for the current study demonstrated a pre-treatment mean Coherence of Mind dimensional scale score ($M = 4.63$, $SD = 2.21$) slightly higher and with a wider range compared to what was previously reported for a mixed eating disorder sample ($M = 4.1$, $SD = 1.6$; Fonagy et al., 1996), and closer to the normative population mean of 5. It is possible that since participants' scores were near the range for average Coherence of Mind in the population, their average scores may not have had much room to grow after time limited group therapy. Further increases in coherence of mind would have represented more sophisticated coherence of mind than was reported even in the literature for non-clinical samples (Fonagy et al., 1996; Maxwell et al., 2016).

Although change in Coherence of Mind dimensional scale scores was not statistically significant, the RCI indicated important clinically relevant changes in Coherence of Mind for some. About a third of participants at six months post-treatment improved the coherence in their attachment narratives. This represents a considerable improvement in how they spoke about attachment related experiences indicating that they were more concise and provided more relevant and sufficient details. The GPIP model addresses interpersonal functioning as it occurs in the group, outside the group, and how it is related to binge eating. Group members are supported in developing more adaptive ways of identifying and expressing affect and needs which improves their interpersonal functioning (Tasca et al., 2005). This involves identifying CMIPs in current and past relationships, and understanding their roles in maintaining symptoms of binge eating. The integration of their relational experiences into a coherence model of self (i.e., CMIP) may have resulted in an increased narrative coherence for some. Nevertheless, in general, it may be that coherence of mind represents a more stable trait, and so it is possible that the majority of individuals (i.e., the two thirds who did not experience clinically significant change according to the RCI) may require therapy of a longer duration or specifically geared towards narrative change.

Limitations and Future Directions

The current study included a sample that was homogenous in terms of ethnicity. The sample also had a high level of education and a high average family income. Future studies should include a more heterogeneous sample to assess if the results can be generalized. The data for the current study were collected as part of a treatment study (Tasca et al., 2013) designed based on the results of Tasca et al., (2006) that demonstrated that attachment was associated with outcomes in women. As such, the sample for the current study included women only. Future

studies should include men to assess if the results generalize to men. The second hypothesis that examined change in attachment dimensions overtime did so for treatment completers only. The amount of missing data at six months post-treatment was sizeable. Those who did not provide data at six months post-treatment reported higher levels of depression at pre-treatment compared to those who did provide data at six months post-treatment. Although we controlled for level of depression, the results cannot be generalized to those who did not complete treatment. However, studies like the current one that examine the mechanisms of change rather than the efficacy of the intervention, require that participants get a sufficient dose of the treatment (Levy et al., 2006). Hence, it was appropriate to guard against threats to validity from insufficient doses of treatment (Levy et al., 2006). The current study examined attachment dimensions following GPIP only. Future studies might examine change in individuals with BED following other types of group psychotherapies (e.g., cognitive behavioural, emotionally focused) to examine whether results generalize across different types of interventions. This would also allow researchers to identify the types of interventions in group psychotherapy that might specifically target changes in attachment dimensions in individuals with BED. The current study grouped participants based on self-report scores of attachment anxiety. As such, the results of the current study may only generalize to patients who receive treatment in similarly organized psychotherapy groups. The current study and previous research suggested that higher pre-treatment Reflective Functioning may help facilitate quicker and stronger therapeutic alliance. Future research should specifically examine the relationship between reflective functioning and therapeutic alliance growth in clinical samples.

Conclusion

We described attachment dimensions as predictors of treatment outcomes across four time points (i.e., pre-, post-, six months post-, and 12 months post-treatment), and we reported change in attachment dimensions pre- to six months post-group psychotherapy in a sample of women with BED. The results indicated that reflective functioning may be a “skill” patients can learn from interpersonal interactions with a therapist and/or group, and that greater reflective functioning may allow patients to engage in therapy, use therapeutic interventions more effectively, and facilitate greater decreases in symptoms like binge-eating. Coherence of mind may be a more stable trait compared to reflective functioning that may be less easily learned through interpersonal interactions in a group therapy context. The RCI findings indicated that GPIP facilitated clinically significant change in both reflective functioning and coherence of mind for about a third of participants. It is likely that had the group treatment been longer in duration, participants would have continued to demonstrate increases in both reflective functioning and coherence of mind. Overall, the current study demonstrated that time-limited interpersonal dynamic group psychotherapy can facilitate positive changes in attachment functioning for those with BED, and that greater initial reflective functioning is important to achieve improvements in binge-eating.

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Table 1

Means and Standard Deviations of Outcome Variables

Variables	Pre-treatment			Post-treatment			Six-months follow-up			12 months follow-up		
	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>
Days Binged	15.25	5.72	102	6.66	6.90	86	6.35	8.20	69	4.78	5.54	55
BDI-II	20.93	11.38	102	12.55	9.71	81	10.41	8.18	63	13.22	9.77	44

Notes. Frequencies are different between those who provided days binged and BDI-II data due to the willingness to complete the BDI-II versus verbal report via phone on days binged at follow-ups; M = mean; SD = standard deviation; BDI-II = Beck Depression Inventory-II; Days binged = days binged in the past 28 days.

Table 2

Reflective Functioning and Coherence of Mind Means and Standard Deviations

Outcome Variable	Condition	Pre-Treatment			Six Months Post-Treatment		
		<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>
Reflective Functioning	Full Sample	102	2.95	1.07	63	3.41	1.24
	Low	52	2.81	.99	29	3.59	1.38
	High	50	3.10	1.13	34	3.26	1.11
Coherence of Mind	Full Sample	102	4.63	2.21	63	5.09	1.92
	Low	52	4.66	2.25	29	5.00	1.74
	High	50	4.59	2.19	34	5.16	2.07

Note. Condition = Attachment anxiety condition.

Appendix

Model 1: 3-Level Hierarchical Nested Model used to Calculate the Intraclass Correlation

Coefficient

$$\text{Level-1: Attachment Variable}_{ijk} = \pi_{0jk} + e_{ijk}$$

$$\text{Level-2: } \pi_{0jk} = \beta_{00k} + r_{0jk}$$

$$\text{Level-3: } \beta_{00k} = \gamma_{000} + u_{00k}$$

Note. Attachment Variable = Coherence of Mind or Reflective Functioning dimensional scale scores. The intraclass correlation coefficient, ICC or ρ , is a functioning of between group variance, τ_{00j} or u_{00k} from the model, divided by total variance (i.e., τ_{00j} plus between individual variance, τ_{0ij} or r_{0jk} from the model, plus within person variance, σ^2 or e_{ijk} from the model).

Model 2: 2-Level Hierarchically Nested Longitudinal Model to Assess Attachment

Dimensions as Predictors of Outcomes

Model without the Predictor

$$\text{Level-1: Outcome Variable}_{ti} = \pi_{0i} + \pi_{1i}(\text{Logtime}) + e_{ti}$$

$$\text{Level-2: } \pi_{0i} = \beta_{00} + \beta_{01}(\text{Condition}) + \beta_{02}(\text{Predictor}) + \beta_{03}(\text{BDI-II pre-score}) + r_{0i}$$

$$\pi_{1i} = \beta_{10} + \beta_{11}(\text{Condition}) + \beta_{12}(\text{BDI-II pre-score}) + r_{1i}$$

Model with the Predictor

$$\text{Level-1: Outcome Variable}_{ti} = \pi_{0i} + \pi_{1i}(\text{Logtime}) + e_{ti}$$

$$\text{Level-2: } \pi_{0i} = \beta_{00} + \beta_{01}(\text{Condition}) + \beta_{02}(\text{Predictor}) + \beta_{03}(\text{BDI-II pre-score}) + r_{0i}$$

$$\pi_{1i} = \beta_{10} + \beta_{11}(\text{Condition}) + \beta_{12}(\text{Predictor}) + \beta_{13}(\text{BDI-II pre-score}) + r_{1i}$$

Note. Outcome Variable = Binge eating frequency or depression scores; Condition = Attachment anxiety condition; Predictor = Coherence of Mind or Reflective Functioning pre-treatment dimensional scale scores; The logtime parameter models pre-, post-, six months

post-, and 12 months post-treatment scores as a log transformation of linear time; BDI-II = Beck Depression Inventory-II.

Model 3: 2-Level Hierarchical Nested Model with Fixed Slopes used to assess Change in Attachment Dimensions Pre- to Six Months Post-Treatment

Model without Time

Level-1: Attachment Variable_{ti} = $\pi_{0i} + e_{ti}$

Level-2: $\pi_{0i} = \beta_{00} + \beta_{01} (\text{Condition}) + \beta_{02} (\text{BDI-II pre-score}) + r_{0i}$

Model with Time

Level-1: Attachment Variable_{ti} = $\pi_{0i} + \pi_{1i} (\text{Time}) + e_{ti}$

Level-2: $\pi_{0i} = \beta_{00} + \beta_{01} (\text{Condition}) + \beta_{02} (\text{BDI-II pre-score}) + r_{0i}$

$$\pi_{1i} = \beta_{10} + \beta_{11} (\text{Condition}) + \beta_{12} (\text{BDI-II pre-score})$$

Note. Attachment variable = Coherence of Mind or Reflective Functioning dimensional scale scores; Time = pre- (0) and six months post-treatment (1); Condition = Attachment anxiety condition; BDI-II = Beck Depression Inventory-II.

General Discussion

Attachment theory has recently been applied as a framework with which to understand the etiology and maintenance of eating disorders (for reviews see Kuipers & Bekker, 2012; Tasca & Balfour, 2014). However, the research to date has mainly focused on understanding anorexia nervosa (AN) and bulimia nervosa (BN) from an attachment perspective. Moreover, the research has primarily used self-report measures of attachment that assess consciously available information about one's interpersonal relationships and affect regulation, rather than interview methods like the Adult Attachment Interview (AAI) that assesses unconscious states of mind related to attachment. As such, there is limited understanding of binge-eating disorder (BED) using attachment theory, and little research that has examined attachment states of mind in BED. The overall goals of the current dissertation were to examine how attachment states of mind classifications and attachment dimensions contribute to understanding BED and co-morbid overweight status, and to apply attachment theory to understanding the potential mechanisms of group psychotherapy for BED.

Brief Review of the Findings

The first study of this dissertation assessed attachment states of mind to understand better the psychopathology and maintenance of BED and co-morbid overweight status. First, I described and evaluated attachment state of mind classifications among overweight women with BED (subsequently referred to as women with BED) and compared them to: (a) age and weight matched women without BED, and (b) age matched normal weight women without BED. Women with BED had significantly higher rates of insecure (specifically preoccupied) and unresolved/disorganized attachment states of mind compared to normal weight women without BED. These findings suggested that hyperactivation of affect regulation strategies and a

frustrated preoccupation with relationships may underlie and maintain BED symptoms. Women with BED had similar rates of insecure and unresolved/disorganized attachment states of mind as overweight women without BED. Hence, affect dysregulation and/or an ongoing disorganized state of mind related to experiences of loss and abuse may be common to BED and obesity and may be implicated in the etiology and maintenance of both.

The second aspect of the first study was to use attachment theory to understand better the treatment response of women with BED who receive Group Psychodynamic Interpersonal Psychotherapy (GPIP). This was done by examining changes in categorical assessment of attachment states of mind pre- to six months post-GPIP in women with BED. Although results were not statistically significant, over half of those who started treatment with an insecure attachment state of mind had a secure attachment state of mind at six months post-treatment and over half of those who were classified as unresolved/disorganized with respect to loss or abuse at pre-treatment, were no longer given this classification at six months post-treatment. The findings indicate clinically meaningful change in attachment classification following group treatment. For some, GPIP helped to moderate dysfunctional relationship styles and to process and organize memories related to loss and abuse, which likely contributed to an improved ability to adaptively regulate affect.

The second study of this dissertation used attachment dimensions of coherence of mind and reflective functioning to add to our understanding of the psychopathology and maintenance of BED and co-morbid overweight status. In order to evaluate the role of these attachment dimensions I controlled for the effects of depressive symptoms and interpersonal problems to isolate the unique contributions of coherence of mind and reflective functioning in understanding BED. Higher Reflective Functioning scores differentiated normal weight women from both

women with BED and overweight women without BED, who did not differ from each other. Women with BED and overweight women without BED appear to have difficulty in understanding their own and others' mental states and behaviours. As such, limited mentalization may be a factor that maintains both BED and overweight status. Coherence of Mind scores did not differentiate the groups. It may be that coherence of mind is too broad a construct to differentiate women with BED from women without BED.

The third study of this dissertation used attachment dimensions of coherence of mind and reflective functioning to understand better group psychotherapy response for those with BED who received GPIP. The first aspect of the third study was to examine whether pre-treatment attachment dimensions predicted changes in BED symptoms of depression and binge eating. Greater Reflective Functioning scores at pre-treatment was associated with a decline in binge eating frequency at 12 months post-treatment. I speculated that participants with greater reflective functioning at pre-treatment were likely able to engage better in GPIP interventions and recognize the relationship among attachment needs, negative affect, and binge eating. Coherence of Mind scores at pre-treatment were not related to changes in treatment outcomes. Coherence of mind may not be a specific enough concept from which to examine one's ability to use therapy and predict changes in symptoms.

As noted in the general introduction, there is some evidence that attachment dimensions might mediate changes in treatment outcomes. As such, I examined whether changes in Reflective Functioning and Coherence of Mind scores mediated changes in binge eating and symptoms of depression. Results were not significant and were not included in the dissertation studies. See Appendix C for the model and results. As the results indicate, it appears that change

in binge eating varies based on the degree to which a person demonstrates reflective functioning at the outset rather than the amount of change in reflective functioning at post-treatment.

The second aspect of the third study was to examine change in attachment dimensions from pre- to six months post-treatment. Reflective Functioning scores significantly improved from pre- to six months post-treatment. Moreover, just over 39% of participants demonstrated clinically reliable improvement and almost 32% experienced clinically reliable recovery with respect to reflective functioning. These results were moderated by pre-treatment self-reported attachment anxiety. That is, those with lower self-reported attachment anxiety showed significant improvement in reflective functioning, whereas those with higher self-reported attachment anxiety did not show this improvement. A combination of interventions specific to GPIIP (e.g., the focus on Cyclical Maladaptive Interpersonal Patterns [CMIP] in the here and now) as well as the therapeutic factors related to the group modality (e.g., interpersonal learning and feedback, group cohesion) likely contributed to the increases in reflective functioning. Participants in groups composed of those with low attachment anxiety were likely able to better use these group interventions and engage in these therapeutic group processes to improve their skills at reflective functioning. Participants with higher attachment anxiety may have had to spend more time focusing on regulating affect (i.e., hyperactivated affect) thereby not being able to fully benefit from group therapeutic factors to improve their reflective functioning. Change in Coherence of Mind scores from pre-treatment to six months post-treatment was not statistically significant. However, a third of participants experienced clinically significant improvement in coherence of mind, indicating that some experienced a considerable improvement in the degree to which their narratives became more concise and relevant.

Implications for Understanding Binge-Eating Disorder and Co-Morbid Overweight Status

The results from the current dissertation indicate that insecure and/or unresolved/disorganized attachment states of mind and low reflective functioning may be implicated in the etiology and maintenance of BED and overweight status. It is possible for example, that attachment-related vulnerabilities, including difficulties with affect regulation characteristic of a preoccupied attachment state of mind in those with BED, and/or an unresolved/disorganized attachment state of mind in those with BED and those who are overweight might be associated with eating-related physiological mechanisms like hypothalamic-pituitary-adrenal (HPA) axis dysregulation. Researchers argue that dysregulation of the HPA axis may lead to over eating or binge eating that in turn stimulates the dopaminergic system that moderates HPA hyperactivity (Adam & Epel, 2007; Morris et al., 2015). Concurrently, binge eating or over eating may be a maladaptive means of coping with problematic affect triggered by interpersonal distress (Ivanova et al., 2015; Wilfley et al., 1998). As such attachment experiences characterized by insecure and/or unresolved/disorganized attachment states of mind may be implicated in the etiology and maintenance of BED, as well as being overweight or obese.

When I looked at specific attachment functioning, I found that reflective functioning in particular differentiated women with BED and overweight women without BED from those who are normal weight without BED. In other words, it may be that the ability to be aware of mental states, understand that mental states underlie behaviour, recognize the developmental aspects of mental states, and identify mental states in people with whom one is interacting serves as a protective function from developing BED and/or becoming overweight.

In terms of etiology, Fonagy (1998) theorized that interactions with caregivers that are laden with affect and that include imaginary play are important for the development of reflective functioning. Unreliable or unresponsive attachment figures likely do not respond sufficiently to children's behaviour and mental states to help children develop the capacity to effectively recognize, identify, and anticipate changes in one's own or others' mental states or behaviour. Unreliable and/or unresponsive caregiving likely does not contain imaginary play in which the integration of inner and outer reality is modeled effectively. Experiences of loss and abuse, such as for those with an unresolved/disorganized attachment state of mind, may disrupt further the development of mentalization, reducing an individual's ability to reach for support from others to moderate difficult emotions.

Findings from this dissertation and results from previous research (Tasca, Ritchie, Zachariades, et al., 2013; Tasca et al., 2009) suggest that early attachment experiences may lead to an insecure and/or unresolved/disorganized attachment states of mind which may be implicated in the etiology and maintenance of BED and overweight status. Difficulties with reflective functioning may be an especially important factor in the treatment of BED.

Implications for the Group Treatment of Binge-Eating Disorder

The results of the current dissertation provide additional evidence that attachment states of mind and attachment dimensions play an important role in case conceptualization for group psychological treatment of BED. For women with BED and a secure attachment state of mind, GPIP therapists can help them to consider their binge eating as a response to dietary restraint rather than to negative affect (Stice et al., 2001). However, for women with BED and a preoccupied attachment state of mind, therapists can help them to understand the explicit associations between interpersonal distress and the hyperactivation of their emotions that lead to

BED symptoms (Tasca, Ritchie, & Balfour, 2011). Similarly, for those with a dismissing attachment state of mind, therapists might help them to make associations between the dismissing of relationships and the deactivation of their emotions that may result in BED symptoms (Tasca et al., 2011). Finally, for patients with an unresolved/disorganized attachment states of mind, group therapists may: assess the patient's capacity for safely developing a coherent narrative related to the trauma; provide psychoeducation on the association between trauma, affect dysregulation, and binge eating; and foster a secure base within the group from which the patient can begin to develop a more coherent reality-based narrative related to the trauma.

Since women with BED present with a range of attachment states of mind, a focus on normalizing the various affect regulation strategies, including those related to past experiences of loss and abuse that can lead to binge eating, may increase the sense of cohesion and security in a group (Tasca et al., 2005). Identifying participants' varying attachment states of mind during the group provides a foundation for group members to understand one another when the group is working on moderating affective experiences and interpersonal behaviour in the here and now. Furthermore, safely discussing the impact of loss and abuse on binge eating symptoms allows group members to support each other in exploring their experiences and the impact of those experiences on their current functioning.

Understanding attachment states of mind also can inform the types of interventions on which group therapists might focus. For group members with a secure attachment state of mind, therapists might integrate aspects of Cognitive Behavioural Therapy for eating disorders like food monitoring to encourage normal eating and to identify triggers for binge eating (Fairburn, 2008). For group members with a preoccupied attachment state of mind, GPIP therapists might

focus on helping them to take some distance from emotions, downregulate their affect, and to use the group for interpersonal feedback regarding their need for approval (Tasca et al., 2005). For group members with a dismissing attachment state of mind, therapists might encourage them to gradually approach emotional experiences and expression, and to use the group as a means of gaining a better understanding of their own and other's needs and motives (Tasca et al., 2005). For those who have an unresolved/disorganized attachment state of mind, therapists may help them to develop a more coherent and reality-based narrative of the trauma, and to use the secure group context to slowly and safely discuss the effects of the experience on their current functioning as a means of exposure. If one considers the group as a social microcosm (Yalom & Leszcz, 2005), then clients who explore past experiences of loss and abuse have the opportunity to receive support and validation in ways they may not have experienced in the past.

The results of the current dissertation also indicate that the initial level of reflective functioning may be a predictor of change in GPIIP, and that modifying the treatment to accommodate initial level of reflective functioning might contribute to improved outcomes. Assessing reflective functioning in patients with BED who seek psychotherapy will provide therapists with an understanding of the way in which clients might understand the nature of their disorder and might engage in interventions. For example, clients with BED who receive GPIIP and who demonstrate lower reflective functioning might benefit from more time to explore the link between attachment needs, interpersonal behaviours, affect, and binge eating in the group. Those who demonstrate higher reflective functioning might identify and accept their case conceptualizations more quickly and might be ready to explore their relational patterns (CMIP) as they emerge in the group. In general, GPIIP therapists could use group therapeutic factors to facilitate reflective functioning. The concept of the group as a social microcosm (Yalom &

Leszcz, 2005) allows the GPIP therapist to identify in the here and now patients' CMIPs as they occur. This provides the group an opportunity to explore maladaptive interpersonal behaviour and associated mental states as they are occurring in the group. This form of immediate feedback from group members allows clients to be more emotionally engaged and increases the impact of interventions (Teyber, 2000; Yalom & Leszcz, 2005). Similarly, interpersonal learning, whereby patients share aspects of their mental state including emotions, thoughts, and perceptions while receiving feedback from group members (Yalom & Leszcz, 2005) allows patients to receive immediate feedback and insight on their mental state from a number of people in a safe environment.

Implications for Attachment Theory in Understanding Binge-Eating Disorder

The results of this dissertation have implications for attachment theory's utility in understanding BED. First, the results suggest that differences captured in attachment state of mind classifications (i.e., general category descriptors and subtle differences in state of mind scales) may be important for differentiating clinical from non-clinical samples. Categorical classifications emerged as more sensitive than the Coherence of Mind scale scores in differentiating groups, likely because the clinical samples' Coherence of Mind scores were on the border of the cut off of the secure versus insecure classification. For example, although the three samples in the current dissertation were not significantly different on Coherence of Mind scores, women with BED had a significantly higher rate of preoccupied attachment state of mind classification compared to normal weight women without BED. As such, the results of the current dissertation suggest that attachment state of mind classifications may be useful in understanding aspects of attachment insecurity that are specific to BED.

Second, women with BED and those who were overweight had significantly lower Reflective Functioning scores than normal weight women, indicating a difference in this attachment dimension. This emerged despite no significant differences in Coherence of Mind scores among the groups. As such, reflective functioning may be the most sensitive and potentially useful attachment measure to understand further what underlies and maintains binge eating and overweight status. The ability to reflect upon, identify, and understand mental states including thoughts, emotions, and intentions and how mental states impact behaviour may be an important predictor of how individuals understand themselves and others which impacts affect regulation, interpersonal functioning, and coping mechanisms like binge eating or overeating. Greater reflective functioning is related to better interpersonal communication (Fonagy et al., 1998), which indicates that communication is enhanced by a greater ability to understand one's own and others' mental states and behaviours. The ability to communicate in an effective way is impacted by the way a person regulates their affect, understands their needs and mental states, and can understand the mental states of others. As such, it makes sense that the ability to mentalize is related to binge eating and emotional overeating which are conceptualized by some as a maladaptive coping response to interpersonal difficulties and dysregulated affect (Tasca et al., 2005; Wilfley et al., 1998).

Implications for Using the Adult Attachment Interview for Research Purposes

The results of the current dissertation also have implications for using the AAI in research studies. The AAI is an intensive, expensive, and time consuming method for assessing attachment states of mind and dimensions, and it requires extensive training to learn to code reliably. Compared to self-report measures, the AAI demands substantial resources to administer, transcribe, and code. In addition, researchers or clinicians must undertake additional training and

complete reliability testing to code the AAI using the Reflective Functioning Scale. As such, researchers should consider the differences in the type of information gathered by the AAI versus self-report measures for a particular research study or question. Self-report measures assess consciously available information about one's interpersonal relationship and affect regulation (i.e., thoughts, feelings and behaviour of which the individual is aware), whereas interview methods like the AAI assess unconscious state of mind related to attachment (Roisman et al., 2007). These two methods of assessing attachment have low to moderate correlations (Roisman et al., 2007). This may not be surprising since the two methods of assessing attachment were developed from two different research traditions (AAI from developmental psychology, and self-reports from social psychology), and attachment theory represents a broad and very complex conceptual framework (Roisman et al., 2007).

One of the biggest advantages of the AAI is the ability to assess processes that are typically outside of one's awareness, like reflective functioning and coherence of mind. Hence, self-report measures may not be adequate for research questions on implicit processes. However, recently, Fonagy and colleagues (2016) have begun to develop and validate a self-report measure of mentalization, the Reflective Functioning Questionnaire (RFQ). Fonagy and colleagues (2016) report good psychometric data that supports the RFQ as a screening measure of reflective functioning; however, additional research is necessary to determine whether the RFQ yields the same information as the Reflective Functioning Scale scored using the AAI. In terms of coherence of mind, researchers have not yet attempted to reliably assess this construct with self-reports, and so coherence of mind remains a construct that can only be assessed through interview method. Assessing attachment states of mind and attachment dimensions by self-report measures may not allow one to collect potentially important process information that is not

consciously available and that can only be gained from observer ratings (e.g., defense mechanisms, changes in affect, coherence of narratives and their relation to reality). As such, the value of using the AAI or self-reports of attachment should be considered in the context of specific research questions and data that the researcher is interested in collecting.

Clinical Training Issues related to using the Adult Attachment Interview

The process of completing the current dissertation highlighted for me, the utility of learning to administer and code the AAI and reflective functioning in clinical training. Through this training, I became more sensitized to clients' narrative coherence and reflective functioning which had an impact on how I conceptualize symptoms, understand the therapeutic process, and choose interventions. In terms of case conceptualization, understanding the impact of having an insecure and/or unresolved/disorganized attachment state of mind and low reflective functioning has informed my understanding of how past and current interpersonal functioning and affect regulation may contribute to symptom maintenance. This training can provide trainees with substantial information on how the client might interact with the therapist or group throughout treatment. For example, knowing that a client with a preoccupied attachment state of mind might present as overly accommodating and nurturing towards a therapist or group, has allowed me to be more mindful of and to explore this behaviour when it occurs, thus reducing the probability of responding to the client in a way that reinforces the client's maladaptive patterns. Further, for those with an unresolved/disorganized attachment state of mind, trainees might be cued to understand the context of incompatible behaviour (e.g., seeking and avoiding contact during psychotherapy; Tasca et al., 2011) or of subtle shifts in states of mind during therapy (e.g., the client losing track of the narrative or suddenly shifting narrative direction) as indicators of mental state disorganization related to trauma. Also, identifying low and limited reflective

functioning during an assessment has cued me to the need for interventions that develop reflective functioning early in therapy, and the importance of doing so prior to helping the client better understand their symptoms within the context of affect regulation and interpersonal problems. In group psychotherapy, this might include using group level interventions like checking out assumptions or thoughts with other group members.

In addition to enhancing case conceptualization and understanding therapeutic process, learning the AAI coding system and the Reflective Functioning Scale may be useful to trainees who are exposed to interventions based on a range of therapeutic orientations. For example, a cognitive behavioural therapist might be cued to cognitive distortions in a client who demonstrates limited reflective functioning (e.g., black and white thinking) or an emotionally focused therapist might use empty chair work for a client whose disorganized mental state indicates unfinished business with an abusive or unresponsive caregiver.

Future Directions

In addition to the future research directions described in each of the separate studies, it would be beneficial for researchers to continue to use attachment theory, specifically attachment states of mind and reflective functioning, to improve our understanding of BED and overweight status/obesity. First, research might examine how changes in attachment states of mind and reflective functioning are related to decreases in binge eating and over eating in the long-term. Researchers might also compare therapies for BED and weight loss treatments for those who are overweight that do and do not facilitate changes in attachment states of mind and reflective functioning. Changes in attachment functioning that persist might impact affect regulation and interpersonal functioning in the long-term, thus continuing to facilitate adaptive emotion regulation and interpersonal functioning that in turn result in adaptive ways of coping rather than

binge eating or over eating. Examining the impact of changes in attachment functioning on eating behaviour over the longer term would provide further insight into whether attachment states of mind and dimensions underlie and maintain binge eating and/or over eating, and whether these attachment variables are especially important to prevent relapse. If so, this would inform treatment for BED and new directions for weight loss treatment. Second, research might examine further the role of having an unresolved/disorganized attachment state of mind on group therapeutic process and treatment outcomes, and any added benefit in terms of symptom reduction by including a more explicit focus on the effects of loss and abuse on current mental states. If a high proportion of clients in a group present with an unresolved/disorganized attachment state of mind, it will likely have an impact on the group's ability to process and manage some emotions. As such, an explicit but safe focus on the unresolved loss and abuse would likely enhance treatment, the group process, and the clients overall functioning. Third, future research might examine the impact of attachment states of mind on group processes such as therapeutic alliance or group cohesion. This may include examining whether insecure and unresolved/disorganized attachment states of mind and/or low Coherence of Mind and Reflective Functioning scores at pre-treatment impact the development of group cohesion or therapeutic alliance. Research examining whether change in alliance or cohesion over the course of therapy leads to change in attachment states of mind may indicate the role that group therapeutic relationships have in creating a context for promoting attachment security. Fourth, future research might investigate using the AAI and Reflective Functioning Scale in clinical training. Training on the AAI and coding Reflective Functioning may help to develop further and in a unique way, a clinician's attunement to their client's narrative coherence, to subtle shifts in a client's narrative that may indicate disorganization related to trauma, and to the client's

awareness of mental states and capacity for reflection that may impact therapeutic relationships and symptoms.

Conclusions

This doctoral dissertation adds to an emerging body of research applying attachment theory as a framework from which to understand the etiology and maintenance of eating disorders, and from which to understand the potential mechanisms of group psychotherapy for BED. The findings suggest that a preoccupied attachment state of mind may underline and maintain BED, that an unresolved/disorganized attachment states of mind and lower reflective functioning may underlie and maintain both BED and overweight status/obesity, and that a higher initial level of reflective functioning facilitates greater decrease in binge eating following group psychotherapy for BED. In addition, this dissertation demonstrated the importance of: attachment states of mind and attachment dimensions in case conceptualization for group psychological treatment of BED; attachment states of mind and dimensions in informing the types of interventions on which group therapists might focus; and learning to code the AAI and the Reflective Functioning Scale for trainees in terms of case conceptualizations and understanding therapeutic processes. Future research directions might include examining: how changes in attachment states of mind and attachment dimensions are related to changes in eating behaviour over the long-term; the impact of including a more explicit focus on unresolved/disorganized attachment state of mind in group psychotherapy on group therapeutic process and outcomes; the role of group cohesion and therapeutic alliance in providing a secure base for change in attachment insecurity; and the impact of learning to use the AAI and the Reflective Functioning Scale in clinical training.

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Appendix A

DSM-IV-TR Research Criteria for Binge-Eating Disorder

- A. Recurrent episodes of binge eating. An episode of binge eating is characterized by both of the following:
1. eating, in a discrete period of time (e.g., within any 2-hour period), an amount of food that is definitely larger than most people would eat in a similar period of time and under similar circumstances
 2. a sense of lack of control over eating during the episode (e.g., a feeling that one cannot stop eating or control what or how much one is eating)
- B. The binge-eating episodes are associated with three (or more) of the following:
1. eating much more rapidly than normal
 2. eating until feeling uncomfortably full
 3. eating large amounts of food when not feeling physically hungry
 4. eating alone because of being embarrassed by how much one is eating
- feeling disgusted with oneself, depressed, or very guilty after over eating
- C. Marked distress regarding binge eating is present.
- D. The binge eating occurs, on average, at least 2 days a week for 6 months.
- E. The binge eating is not associated with the regular use of inappropriate compensatory behaviors (e.g., purging, fasting, excessive exercise) and does not occur exclusively during the course of Anorexia Nervosa or Bulimia Nervosa.

(APA, 2000, p. 787)

Appendix B

Overweight Women with BED Assessment

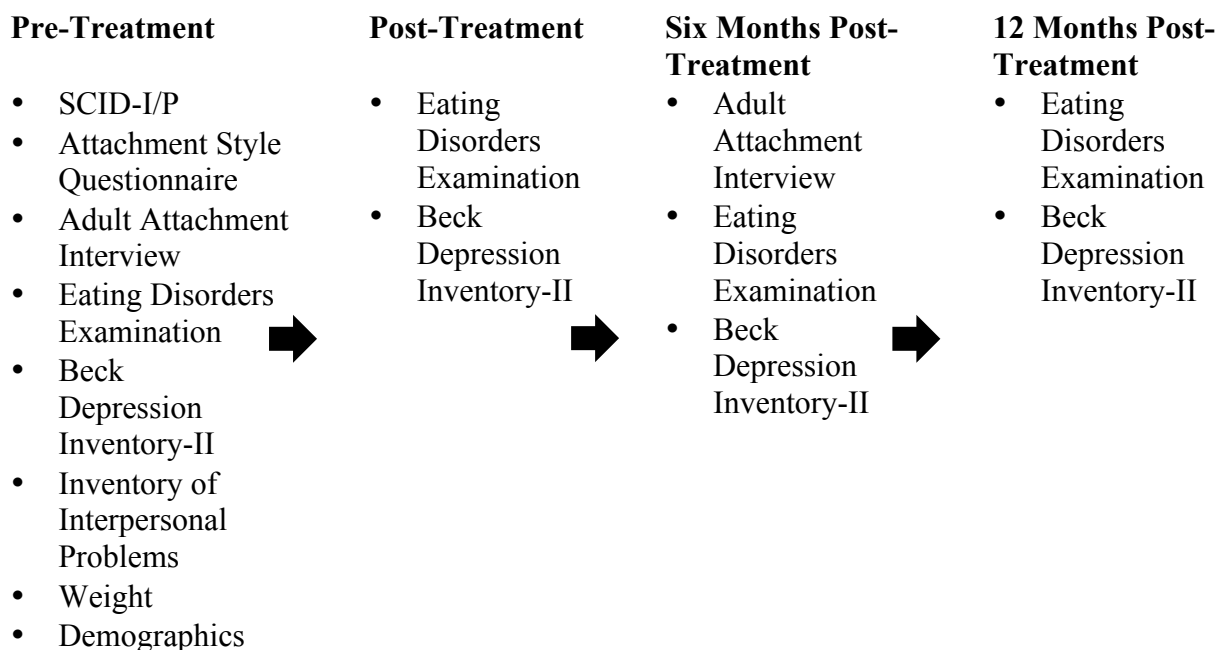


Figure D1. SCID-I/P = Patient Edition of the Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Research Version; BED = binge-eating disorder.

Overweight Women and Normal Weight Women without BED Assessment

One Time Point

- SCID-I/P
- Adult attachment Interview
- Beck Depression Inventory-II
- Inventory of Interpersonal Problems
- Weight
- Demographics

Figure D2. SCID-I/P = Patient Edition of the Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Research Version. BED = binge-eating disorder.

Appendix C

Attachment Dimensions as Mediators of Treatment Outcomes

The literature indicates that higher pre-treatment reflective functioning may be related to earlier engagement in and response to psychotherapy (Gullestad et al., 2013; Taubner et al., 2011). As such, changes in Reflective Functioning and Coherence of Mind scores might mediate changes in outcomes (i.e., binge eating and symptoms of depression). As such, I examined whether attachment dimensional scale scores mediated treatment outcomes for women with binge-eating disorder who completed Group Psychodynamic Interpersonal Psychotherapy. Reflective Functioning and coherence of mind were rated on the Adult Attachment Interview which was completed with participants at pre- and six months post-treatment. Time-varying covariate models were run to estimate the slope parameters, β_{10} , needed for the mediation analyses (see the model below). Binge eating frequency and symptoms of depression were the outcomes and Reflective Functioning and Coherence of Mind scores were the covariates in separate models. As discussed in study three, the ICC for binge eating frequency was ignorable, $\rho = .0015$. The ICC for symptoms of depression was not ignorable, $\rho = .092$, so the p-value was adjusted to .008 for analyses involving the BDI (Kenny and colleagues; 1998). Similarly, to other multilevel models in study three, attachment anxiety condition and pre-treatment BDI scores were controlled in the multilevel models.

Statistical significance was tested by the 95% confidence interval (CI) using the RMediation program (Tofighi & MacKinnon, 2011). The RMediation program computes the confidence intervals (CI) for the mediated effect, using the distribution of the product of the coefficients method. Mediated pathways are significant if the CI does not include 0. There was a significant effect of change in Coherence of Mind on the slope of binge eating frequency, $\beta_{10} = -$

.61, $SE = .26$, $t(58) = -2.35$, $p = .020$, however, there was not a significant effect of Coherence of Mind on the slope of depression scores, $p = .090$. There was no significant effect of change in Reflective Functioning on the slope of binge eating frequency, $p = .290$, or depression scores, $p = .540$. The results indicated that change in Reflective Functioning did not mediate changes in binge eating, $a*b = -.33$, 95% CI: -1.05, 0.27, or symptoms of depression, $a*b = -.14$, 95% CI: -.64, 0.31. Change in Coherence of Mind also did not mediate changes in binge eating, $a*b = -0.002$, 95% CI: -.63, 0.62, or symptoms of depression, $a*b = -.001$, 95% CI: -.33, 0.33.

Time Varying Covariate Model used to obtain Slope Parameters for Mediation Analyses

Level-1: Outcome Variable_{ti} = $\pi_{0i} + \pi_{1i}(\text{Covariate}) + \pi_{2i}(\text{Time}) + e_{ti}$

Level-2: $\pi_{0i} = \beta_{00} + \beta_{01}(\text{Condition}) + \beta_{02}(\text{BDI-II pre-score}) + r_{0i}$

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

$$\pi_{2i} = \beta_{20} + \beta_{21}(\text{Condition}) + \beta_{22}(\text{BDI-II pre-score})$$

Note. Outcome variable = binge eating frequency and depression scores; Covariate = Reflective Functioning and Coherence of Mind scores; Time = pre (0) and six months post-treatment (1); Condition = Attachment anxiety condition; BDI-II = Beck Depression Inventory-II.