Relationships Among Attachment, Cohesion, Interpersonal Learning and Outcomes in Group Psychotherapy for Binge Eating Disorder

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Abstract

The current dissertation is comprised of two studies that examined the relationship between group dynamics, attachment anxiety, and post-treatment outcomes in a sample of women (N = 102) with binge eating disorder (BED) who received Group Psychodynamic Interpersonal Psychotherapy. The first study explored the relationship between the development of group cohesion, the individuals' level of attachment anxiety, and frequency of binge eating, symptoms of depression, and self-esteem at post-treatment. The second study explored the relationship between the interpersonal learning, individuals' level of attachment anxiety, and outcomes. Interpersonal learning was conceptualized as the convergence between multiple perspectives of group cohesion: one's own and the group's perception of one's cohesion to the group. Parallel measures of individual self-rated cohesion (CQ-I) and mean group-rated cohesion (CQ-G) were developed based on the original Cohesion Questionnaire (CQ; Piper et al., 1983) for this study. Participants were assigned to homogeneous groups composed of either high or low attachment anxiety to assess the impact of pre-treatment attachment anxiety. Findings indicated significant growth in cohesion over time, and a significant convergence in multiple ratings of cohesion. These processes did not differ significantly based on level of attachment anxiety. Growth in cohesion was related to greater reductions in binge eating for those high in attachment anxiety, while the convergence in ratings of cohesion (i.e., interpersonal learning) was related to improvements in self-esteem for individuals in both attachment anxiety conditions. The findings support the importance of group interventions for BED that are sensitive to individuals' attachment anxiety, and that emphasize cohesiveness, and interpersonal learning to improve outcomes.

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Group-based interventions are widely applied treatments in institutional (e.g., hospitals) and community treatment settings for many disorders and conditions (Burlingame, MacKenzie, & Strauss, 2004). Research supports the effectiveness of group-based interventions, indicating that group treatments produce outcomes equivalent to those achieved through individual treatment, while allowing settings to maximize resources by treating multiple patients at a given time (Burlingame et al., 2004; McRoberts, Burlingame, & Hoag, 1998; Yalom & Leszcz, 2005). Research in the area of group therapy and group dynamics continues to grow as these interventions become increasingly common (de Moura, Leader, Pelletier, & Abrams, 2008).

The present dissertation will address two aspects of group dynamics that are important factors in group-based psychotherapy: cohesion and interpersonal learning. This investigation will examine these factors in the context of a group treatment trial for Binge Eating Disorder (BED). Before discussing the goals of the proposed studies, this review will highlight the BED diagnosis and will introduce the interpersonal/psychodynamic approach to the treatment of BED. Next, this review will discuss the relationship between attachment theory, group cohesion, and interpersonal learning, and will outline the need to study these factors in relation to treatment outcomes.

Binge Eating Disorder and Associated Features

In the most recent version of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR), the American Psychiatric Association (APA) identifies BED as a distinct Axis I eating disorder "requiring further study" (APA, 2000). A growing volume of empirical research and clinical reports indicate that the addition of the BED diagnosis to future editions of the DSM

will reduce the prevalence and the heterogeneity of the Eating Disorders Not Otherwise Specified (EDNOS) diagnostic category (Wilfley, Bishop, Wilson, & Agras, 2007) in which BED currently belongs. According to the DSM-IV-TR, the BED diagnosis requires an individual to meet five criteria. First, binge eating episodes are defined as the consumption of an unusually large amount of food in a discrete period of time, and a subjective loss of control over eating during these episodes (criterion A). Second, binge eating episodes must be associated with at least three of the following features: eating more rapidly than normal, eating until uncomfortably full, eating large amounts of food when not physically hungry, eating alone because of being embarrassed by how much one is eating, and feeling disgusted with oneself, depressed, or very guilty after over eating (criterion B). Furthermore, this behavior must cause marked distress (criterion C), occur at least 2 days a week for 6 months (criterion D), and must not be associated with inappropriate compensatory behaviors (e.g., self-induced vomiting or laxative misuse) or occur exclusively during the course of another eating disorder (criterion E).

Binge Eating Disorder predominantly affects females, with recent population based estimates suggesting a 3.5% lifetime prevalence of BED among women (Hudson, Hiripi, Pope & Kessler, 2007). Furthermore, BED is associated with greater depressive symptoms, body dissatisfaction, obesity, anxiety, and interpersonal difficulties compared to non-bingeing weight-matched controls (APA, 2000; Hudson et al., 2007; Marcus, 1997). Recent findings indicate a relationship between the degree of comorbid depression and the caloric intake of women with BED (Dingemans, Martijn, Jansen, & van Furth, 2009). Dingemans and colleagues (2009) hypothesized that individuals with BED overeat in an effort to sooth an acute negative mood state, rather than engaging in other forms of self-regulation. The authors found that women with BED who experienced moderate to severe comorbid depression ingested a significantly larger

amount of calories during an experimental mood regulation condition compared to those with BED in the absence of significant depressive symptoms. The authors posit that the presence of comorbid eating and mood disturbances is indicative of greater impairment in coping strategies with negative mood fluctuations (Dingemans et al., 2009). The relationship between negative affect and binge eating behaviors is widely acknowledged and can be understood as a maintaining factor for both binge eating and depressive symptoms. In a recent study, Ansell, Grilo, and White (2012) found support for the interpersonal model of binge eating in a non-clinical sample of women. Ansell and colleagues describe an indirect relationship between the degree of interpersonal problems and the frequency of objective binge eating and loss of control that is mediated by negative affect. Greater interpersonal problems, particularly interpersonal affiliation, was negatively correlated with depressive symptoms, and was positively correlated with the frequency of binge eating, loss of control, and concerns about eating and body weight (Ansell et al., 2012).

Approximately 40% of patients with BED fail to benefit from existing treatments for eating disorders (Tasca, Ritchie, et al., 2006; Stice, 1999). In the treatment of BED, outcomes are discussed in terms of reductions in binge episodes, as well as reductions in associated features such as depressive symptoms, interpersonal difficulties, obesity, and maladaptive coping styles (Tasca, Ritchie, et al., 2006). Researchers theorize that matching eating disorder patients to appropriate treatments according to specific attributes may increase the effectiveness of existing treatments (Kaplan, Olmsted, Carter, & Woodside, 2001; McKisack & Waller, 1997; Tasca, Ritchie, et al., 2006). Published studies attempting to match patients to treatment types demonstrate mixed results for individual and group psychotherapy (e.g., Piper, Ogrodniczuk, Joyce, Wideman, & Rosie, 2007; Walters, 2002). In a review of the results of Project MATCH, a

study that examined the results of matching individuals to treatment modalities for individual treatment of alcohol abuse, Walters (2002) describes mixed results. The Project MATCH data suggests a positive effect of matching client and therapist beliefs systems, which led to improved ratings of therapeutic alliance. In contrast, this data does not support outcome difference when matching clients to treatment modalities (Walters, 2002). Similarly, in their 2007 study examining the effects of matching clients to psychotherapy groups for complicated grief, Piper and colleagues (2007) did not find support for matching individuals to create homogenous treatment groups. Their results suggest that creating homogeneous groups did not result in improved outcomes. Rather, heterogeneous therapy groups comprised of a high percentage of individuals with a history of mature interpersonal relationships did demonstrate superior outcomes. Following the results of the recent randomized control trial (RCT) by Tasca and colleagues (2006), level of attachment anxiety will be used as a matching variable for a treatment seeking sample of adult women with BED in the proposed studies.

An Interpersonal/Psychodynamic Approach to the Treatment of Binge Eating Disorder

From an interpersonal/psychodynamic point of view, the relationship between binge eating, depression, and maladaptive interpersonal patterns is cyclical. According to this perspective, interpersonal stressors trigger negative mood states, leading to binge eating. In turn, binge eating serves as a coping mechanism to alleviate negative moods (Tasca, et al., 2005; Tasca, Ritchie et al., 2006). Interpersonal approaches to therapy aim to change maladaptive interpersonal patterns that reinforce negative perceptions of the self and of others (Strupp & Binder, 1984; Tasca et al., 2005). Disrupting these patterns leads to lower depressive symptoms, thus resulting in reduced binge eating as a means of coping (Tasca, Ritchie, et al., 2006). A group format is well suited for the treatment of BED, in that the maladaptive interpersonal

patterns that trigger mood and eating disturbances can be observed, explored, and changed through the process of social learning and feedback (Chen & Mallinckrodt, 2002; Marcus, 2006; Tasca et al., 2005; Yalom & Leszcz, 2005).

Group Psychodynamic Interpersonal Psychotherapy (GPIP; Tasca, et al., 2005) is a manualized treatment protocol that incorporates elements of psychodynamic, interpersonal, and group theories. This treatment emphasizes the interpersonal learning process to improve the quality of interpersonal interactions to decrease eating disorder and depression related symptoms. This model fosters group cohesion while employing group members' feedback, interactions, and reactions to assist patients in developing more adaptive behaviors and more accurate perceptions of the self and of others (Chen & Mallinckrodt, 2002; Tasca, Mikail, & Hewitt, 2002; Tasca et al., 2005). A more detail description of GPIP, including the theoretical basis for the model and the therapist responsibilities, will be provided in the Methods section of the two studies contained in the current dissertation.

Group Therapy and Group Cohesion

A psychotherapy group can be conceptualized in part as a social microcosm that allows interpersonal patterns to occur in vivo, and offers patients the opportunity to receive immediate feedback from the therapist and other group members about their style of relating (Yalom, 1995). Yalom and Leszcz (2005) identify 11 key factors for effective group therapy: Instillation of Hope, Imparting Information, Altruism, Corrective Recapulation of the Primary Family Group, Development of Socializing Techniques, Imitative Behavior, Interpersonal Learning, Catharsis, Existential Factors, and Group Cohesiveness. As indicated previously, the construct of group cohesion has received a great deal of attention, and will be a primary focus of the present investigation.

Group cohesion is defined as "an emotional bond among the group members and leaders, or a form of attachment held by an individual member for the group as a whole", and is an important element for positive group processes and outcomes (Chen & Mallinckrodt, 2002, p. 312). Strong group cohesion is beneficial in increasing members' investment in and commitment to the group process (McCallum, Piper, Ogrodniczuk, & Joyce, 2002). Furthermore, increased group cohesion is associated with reduced attrition from groups and more positive treatment outcomes in a variety of populations (Castonguay et al., 1998; Conolley, Piper, Carufel, & Debbane, 1986; Crowe & Grenyer, 2008; Joyce, Piper, & Ogrodniczuk, 2007; McCallum, Joyce, Piper, & Ogrodniczuk, 2002; Tschuschke & Dies, 1994; Yalom & Leszcz, 2005). Specific to the current study, Castonguay and colleagues (1998) found that among patients seeking treatment for BED, more cohesive group environments were related to increased positive change in BED symptoms. Similarly, a number of studies confirm the relationship between group cohesion and improvements in those seeking treatment for depression (e.g., Crowe & Grenyer, 2008).

The majority of studies that examine group cohesion, and other group processes, utilize static time point measurements (e.g., pre- and post-assessments of cohesion). However, a growing number of studies have employed growth curve modeling analyses to examine the development of group cohesion in longitudinal investigations (e.g., Kivlighan & Lilly, 1997; Tasca et al., 2012; Tasca et al., 2007; Tasca, Balfour, et al., 2006). Growth curve modeling allows researchers to examine the development of group cohesion, i.e., its rate of change over time, and thus provides more information than a static time point approach. The notion that group process variables may show marked changes over the course of treatment is consistent with theoretical or clinical models of group development. MacKenzie (1983a, 1997) described the group as a dynamic entity that passes through three sequential stages of development.

According to MacKenzie, the first stage of development is engagement, in which members commit to the group, begin to self disclose, and begin to form bonds. Differentiation is the second stage of development in which group members begin to confront and question each other, which may lead to a decrease in cohesion or perceived similarity. Lastly, the individuation stage is marked by a focus on individual problems and interpersonal functioning, which promotes an increase in cohesion. The present study seeks to examine the growth of group cohesion over the course of a 16-session treatment of BED. A growth curve modeling approach will be employed to determine the rates of change in group cohesion over the course of therapy.

Attachment Theory

Group therapy theorists and researchers identify attachment theory as an important contributing factor to understanding group process, including the development of group cohesion, and outcome (e.g. Levy, Ellison, Scott, & Bernecker, 2011; Rom & Mikulincer, 2003). While factors such as cohesion represent group processes, attachment styles represent individual characteristics that may influence the patient's investment in the group and treatment outcome. Attachment theory, originally proposed by Bowlby (1969), posits that attachment styles are acquired from childhood relationships with primary caregivers. These attachment styles act as an enduring lens through which individuals view the self, perceive and respond to other people and to situations, including the therapeutic process (Bowlby, 1982; Shorey & Snyder, 2006).

As Shorey and Snyder (2006) explain, attachment styles are typically described along two dimensions: attachment avoidance and attachment anxiety. According to this model, high levels of attachment avoidance and low levels of attachment anxiety result in dismissive styles characterized by a lack of interest in interpersonal relationships and down regulation of emotions. Low levels of both attachment avoidance and anxiety result in a secure attachment

style whereby individuals demonstrate adaptive interpersonal relationships and emotion regulation. High levels of attachment anxiety may result in preoccupied attachments if accompanied by low attachment avoidance, or fearful attachment if accompanied by high attachment avoidance. High levels of attachment anxiety often result in interpersonal distress and maladaptive behaviors, including hypervigilance toward social threats, distorted perceptions of the self and of others, difficulty forming genuine emotional bonds, preoccupation with gaining approval, maintaining proximity, soliciting comfort from others, and up regulation of emotions (Chen & Mallinckrodt, 2002; Shorey & Snyder, 2006). Difficulties associated with attachment insecurity, specifically interpersonal distress, maladaptive coping behaviors, and distorted perceptions of the self and others, are characteristic of women who meet the DSM-IV-TR diagnosis for BED (Tasca et al., 2005).

Although attachment theory emerged as a developmental framework to explain the relationships between young children and their caregivers, the area of adult attachment has grown rapidly in recent years. Early attachment styles are thought to represent enduring patterns that impact one's sense of self, the ability to self-regulate emotions, and affect the characteristics of one's interpersonal relationships over the lifespan (Main, Kaplan & Cassidy, 1985; Rom & Mikulincer, 2003; Wallin, 2007). Moving beyond a theoretical construct, models of adult attachment are currently being applied to individual, couples, and group psychotherapy (Johnson, 2009; Wallin, 2007). Attachment theory represents a useful framework for the conceptualization of individuals' problems or impairments, and for guiding intervention strategies. Treatment modalities such as GPIP offer an attractive option for addressing attachment insecurity because the group context allows patients to evaluate their interpersonal patterns in a safe, responsive, and cohesive group environment (Tasca et al., 2005).

In addition to attachment to a caregiver or significant other, the concept of attachment to the group has emerged in the group treatment and social psychology literature (Smith, Murphy, & Coats, 1999; Rom & Mikulincer, 2003). Smith and colleagues (1999) assert that the group is capable of meeting the requirements of individual relationships, such that members show preference for the group and seek proximity to the group in times of distress. Also, the group provides support, comfort, and relief, and facilitates learning and self-exploration. Thus, Smith and colleagues propose the following group attachment styles: Group attachment anxiety in which the individual views themselves as unworthy of group member status and is preoccupied with group acceptance, and group attachment avoidance in which the individual views group membership as unnecessary and avoids relying on the group. Rom & Mikulincer (2003) observed the direct manifestation of the group attachment anxiety and group attachment avoidance styles in a recent study. The authors reported that both group attachment styles were related to negative cognitive and emotional responses to the group. Individuals high in group attachment anxiety held a negative view of themselves as group members, had a tendency to view interpersonal interactions negatively, and sought out external support and comfort in a way that was detrimental to the group's functioning. In contrast, individuals high in group attachment avoidance held negative views of the other group members, rejected the benefits of group membership, emphasized self-reliance, and did not encourage closeness within the group. However, the authors observed that high levels of group cohesion reduced the manifestation of anxious and avoidant behaviors, and facilitated a close and supportive environment that was conducive to more effective task-oriented behavior (Rom & Mikulincer, 2003).

Attachment, Group Cohesion, and Social Learning

At this point, it is important to clarify terms such as *rater* and *target*, as these are central to the remaining discussion. As Marcus (1998) explains, researchers who study group dynamics within a social relations framework define the individual who provides the rating (a) of another group member, (b) of the self, or (c) of an interaction as the "rater". The rater is distinguished from the individual who performs the action or who is the subject of the rating, i.e., the "target." The terms "rater" and "target" are useful in distinguishing between these two roles, and will be used to specify the source and subject of ratings in the studies described below.

Individuals high in attachment anxiety typically show a strong desire to experience cohesion, despite their own difficulties in eliciting positive interpersonal reactions. When rating group members according to symptom severity, commitment to the group, and likeability during the initial stages of group therapy, individuals high in attachment anxiety are more likely to rate other group members similarly (i.e., there is little variability among the individual's rating of each target group member) and positively (Chen & Mallinckrodt, 2002; Marcus, 2006). However, as therapy progresses the raters provide more variable perceptions of the other group members. Furthermore, there is typically a convergence in the rater's perception of the target (i.e. the other group member), and the target's perception of him or herself (Chen & Mallinckrodt, 2002). That is, the rater's evaluation of each group member becomes more similar to each member's rating of his or her own experiences. These changes (i.e., convergence in ratings over time) are hypothesized to occur as patients high in attachment anxiety become more realistic in their perceptions of self and others through feedback and social learning (Marcus, 2006; Piper, Ogrodniczuk, Lamarche, & Joyce, 2006).

Self- and Other-Rated Perceptions of Cohesion

As indicated, group cohesion is an important element required for change in group therapy, and so is a construct of empirical and clinical interest. Several authors, including Piper and colleagues have been interested in measuring group cohesion from multiple rater and target perspectives. For example, the Cohesion Questionnaire developed by Piper and colleagues (1983) is a set of measures that allows each participant to rate their cohesion to several targets, including: (1) the group as a whole, (2) each other group member individually, and (3) the therapist. However, to our knowledge, there are no scales available in which individuals can rate their own personal impact on the group (i.e. rating the self as a target) in terms of cohesion.

Self-ratings can be conceptualized as an individual acting as both rater and target (e.g., Jane rates her own impact on the group). Other-ratings, such as in the Cohesion Questionnaire format, can be conceptualized as the self (i.e., target) being rated by other group members (e.g., Joan, Janice, and Jennifer rate Jane's impact on the group). Self-ratings of the self versus other-ratings of the self may allow the researcher to examine meaningful discrepancies between an individual's perceptions of one's self versus others' perceptions of one's self. The extent of these discrepancies (e.g., Jane rates herself as highly cohesive with the group, but on average other group members rate her as less cohesive) may be indicative of problems in adequately perceiving social feedback, or a lack of insight regarding one's contribution to interpersonal interactions. Further, change in these discrepancies towards convergence of self- and other-ratings of the self (e.g., Jane's and other group members' ratings of Jane's cohesion to the group become more similar by the end of therapy) may be indicative of interpersonal learning (Chen & Mallinckrodt, 2002).

To date, research regarding discrepancies in self- versus other-ratings has been applied to the predictions of behavior, and of personality traits (Biesanz, West, & Millevoi, 2007; Rom &

Mikulincer, 2003; Vazire & Mehl, 2008). The present study will apply the self- versus other-rating framework to the study of the development of group cohesion and interpersonal learning. Previous research indicates that both sources (i.e., the self as rater and the other as rater) can provide equally important, but different information (Chambers, Epley, Savitsky, & Windschitl, 2008). Different sources (i.e. raters) have access to different types of information, and thus may hold discrepant views from the target (Vazire & Mehl, 2008). While self-ratings are based on private or internal sources (e.g., thoughts, emotional states, internal working models, self-esteem, memories, etc.), ratings of the self provided by others are based on external or public information (e.g., factual information, overt/observable characteristics; Chambers et al., 2008), or may be influenced by the internal experiences of the rater. Research suggests that there is an increased agreement between self- and other-ratings of the self as the relationship between rater and target increases in duration (Biesanz et al., 2007; Chambers et al., 2008). That is, people such as friends, family members, and romantic partners gain a greater understanding of one another's internal working models, and become more aware of how they are perceived by the other as the relationship progresses over time (Chambers et al., 2008; Rom & Mikulincer, 2003). Similar to dyadic relationships, convergence of self-ratings and other-ratings of the self may occur in the context of group therapy. That is, over time group members are encouraged to discuss their internal experiences including thoughts, emotions, and working models of self and of relationships, and receive feedback about their impact on interactions within the group and how they are perceived by other group members.

Although group cohesion and convergent perceptions of the self may increase over the course of group-based treatment, individual characteristics such as attachment style or degree of psychological symptoms/impairment may influence: (1) the discrepancies of self- versus other-

rating of the self, and (2) the rate of convergence of self- versus other-ratings of the self over time. Bartholomew and Horowitz (1991) presented a four-category model of attachment to define attachment anxiety and avoidance in terms of models of the self and models of others. Figure 1 is adapted from the model described by these authors and provides a schematic for how attachment style may affect ratings of self and others.

Model of Others	Model of Self: Positive	Model of Self: Negative
Positive	Secure (Low anxiety, low avoidance) Positive view of self and others	Preoccupied (High anxiety, low avoidance) Negative view of self, positive view of others
Negative	Dismissing (Low anxiety, high avoidance) Positive view of self, negative view of others	Fearful (High anxiety, high avoidance) Negative view of self and others

Figure 1. Adaptation of the four-category model discussed in Bartholomew & Horowitz (1991).

For example, those high in attachment anxiety (e.g., the "preoccupied" cell in Figure 1) typically hold negative views of themselves and positive views of others (Bartholomew & Horowitz, 1991). These individuals may view themselves as unworthy and may strive for others to perceive them positively. Others are likely to rate the preoccupied individual positively at first because he or she strives for acceptance from others. This combination may result in a discrepancy in self- versus other-ratings of the self so that self-ratings will likely be negative while others provide positive ratings. In effective group therapy, the individual's negative self-perception may be modified by ongoing positive interactions with other group members, and this may result in a convergence in self- and other-ratings of the self.

In contrast, those who demonstrate an avoidant attachment style (e.g., the "dismissing" cell in Figure 1) are likely to provide positive ratings of the self and negative ratings of others (Bartholomew & Horowitz, 1991). These individuals may view themselves as being worthy of others' esteem in relationships, but hold the view that others will not meet their needs and so will keep others at a distance. This combination may result in a discrepancy in self- versus other ratings whereby self-ratings are positive, while others may provide negative ratings because the individual appears uncaring and detached. Ongoing positive and supportive interactions within a therapy group may lead the avoidant individual to view the group members more positively, and may lead the group to view the avoidant individual more positively, which would likely result in a convergence in self- and other-ratings of the self.

In effective group therapy, the therapist and group members will encourage the attachment anxious or avoidant individual to self disclose in a safe environment. This will provide other group members with an increased understanding of the individual's internal working models. Further, comments from other group members about the individual's interpersonal behaviors in the group as a form of constructive feedback may bridge the gap between the individual's internal experiences and their social interactions (Chambers et al., 2008; Chen & Mallinckrodt, 2002). The resulting convergence of the self's experience versus others' experiences of the self can be conceptualized as part of the process of interpersonal learning that takes place in groups. Yalom and Leszcz (2005) identify interpersonal learning as a key therapeutic factor in group therapy. The goal of increased interpersonal learning is to address maladaptive interpersonal pathology that may underlie or maintain mental health difficulties. Based on group therapy literature (e.g., Yalom & Leszcz, 2005), I expect that interpersonal

learning through feedback provided by group members will be related to improved interpersonal functioning, and to greater symptom reduction following treatment.

The Present Dissertation

The present dissertation is composed of two studies. Study 1 explores the relationship between the growth of group cohesion, attachment anxiety, and changes in clinical outcomes in the context of a group therapy treatment trial for BED. Specifically, Study 1 examines (a) rates change in group cohesion over the course of group psychotherapy, (b) whether personality factors such as attachment affect the growth of group cohesion, and (c) the relationship between growth of group cohesion and changes in depressive symptoms, self-esteem, interpersonal problems, and frequency of binge eating at post-treatment.

Study 2 assesses interpersonal learning across sessions of group psychotherapy for BED. To do so, I assess convergence of self and other ratings of the participant's cohesion to the group across sessions. Since there is currently no measure to rate the self's cohesion to the group, the first part of study 2 describes the development and pilot testing of the Cohesion Questionnaire-Self Version (CQ-S), a self-rated (i.e., self as rater and as target) measure of cohesion. Study 2: (1) describes the development and testing of the psychometric properties of the newly developed CQ-S and (2) describes a modification and psychometric testing of Piper and colleagues' (1983) original Cohesion Questionnaire (CQ). Modifications were made to the original CQ scale in order to produce a parallel other-rated (i.e., others as raters and self as target) measure of cohesion to the new self-rated cohesion questionnaire (CQ-S).

Using the CQ-S and parallel modified CQ measure, Study 2 explores the relationship between discrepancies between self- versus other-rating of the self's cohesion, attachment anxiety, changes in clinical outcomes in the context of a group therapy treatment trial for BED.

Specifically, Study 2 explores differences between self-rating and others' ratings of the self's cohesion to the group, examines whether these differences converge over the course of group psychotherapy, and explores whether personality factors such as attachment affect the level of discrepancy and the rate of convergence in the self- versus other-ratings of the self's cohesion to the group. Finally, this study will investigate the relationship between the change in convergence in the self- versus other-ratings of the self's cohesion to the group and changes in depressive symptoms, self-esteem, interpersonal problems, and the frequency of binge eating.

Attachment Anxiety Moderates the Relationship Between Growth in Group Cohesion and Treatment Outcomes in Group Psychodynamic Interpersonal Psychotherapy for Women with Binge Eating Disorder

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Abstract

Previous research suggests an association between increased group cohesion and: (a) improved group process, and (b) improved treatment outcomes for those with binge eating disorder (BED) and depression (Castonguay et al., 1998; Crowe & Grenyer, 2008). Other research indicated that attachment anxiety may be associated with treatment outcomes for women with BED (Tasca et al, 2006). Our goals for this study included to examine the relationship between group cohesion, attachment anxiety, and change in clinical outcomes at post-treatment. Participants, 102 women with BED, were assigned to homogeneously composed psychotherapy groups based on their pre-treatment level of attachment anxiety (i.e., high vs low attachment anxiety). The group treatment was 16 weeks of Group Psychodynamic Interpersonal Psychotherapy (GPIP; Tasca, Mikail & Hewitt, 2005). Outcomes were measured pre and post-therapy, and cohesion was measured weekly. We found a significant increase in group cohesion over the course of treatment in both high and low attachment anxiety conditions. We also found that attachment anxiety at study baseline moderated the relationship between growth in group cohesion and change in binge eating. Increase in group cohesion was associated with improved binge eating, but only for those high in attachment anxiety. Our findings are consistent with an interpersonal model of BED, and suggest that group therapists should emphasize the growth of cohesion in therapy groups, especially for those with high attachment anxiety, so as to maximize interventions aimed at reducing binge eating and associated presenting problems.

Keywords: group psychotherapy, cohesion, binge eating disorder

Attachment Anxiety Moderates the Relationship Between Growth in Group Cohesion and Treatment Outcomes in Group Psychodynamic Interpersonal Psychotherapy for Women with Binge Eating Disorder

In his influential seminal writing on group psychotherapy, Irvin Yalom identified group cohesion as one of the key therapeutic factors in effective group therapy (Yalom, 1995; Yalom & Leszcz, 2005). Group cohesion refers to a positive bond, alliance, engagement, attraction to the group as a whole, or attachment between group members and between members and leaders (Burlingame, McClendon & Alonso, 2011; Chen & Mallinckrodt, 2002; Dion, 2000; Johnson, Burlingame, Olson, Davies & Gleave, 2005). Increased group cohesion is associated with improvement in both group process and treatment outcome in a variety of clinical populations and in community samples (Burlingame et al., 2011; Castonguay, Pincus, Agras, & Hines, 1998; Connelley, Piper, Carufel, & Debbane, 1986; Crowe & Grenyer, 2008; Joyce, Piper, & Ogrodniczuk, 2007; Kivlighan & Lilly, 1997; McCallum, Joyce, Piper, & Ogrodniczuk, 2002; Tschuschke & Dies, 1994; Yalom & Leszcz, 2005). These studies found that stronger group cohesion was related to increased investment and commitment to the group, reduced attrition, and enhanced symptom improvement. Previous research also found a significant positive relationship between group cohesion and improvements in symptoms of binge eating disorder (BED) and depression (Castonguay et al., 1998; Crowe & Grenyer, 2008). The purpose of the current study was to further examine the relationship between group cohesion and outcome, and to explore the potential moderating role of attachment anxiety in women with BED.

Binge eating disorder is the most prevalent eating disorder, and is defined as recurrent consumption of an unusually large amount of food in a short period of time, a sense of loss of control during these episodes, significant distress, and the absence of inappropriate

compensatory behaviours (e.g., self-induced vomiting or laxative misuse; American Psychiatric Association (APA), 2000). In a recent study, Hudson, Hiripi, Pope, and Kessler (2007) found that 3.5% of women in the general population met criteria for BED. Previous research indicates that BED is associated with greater depressive symptoms, body dissatisfaction, obesity, and anxiety, compared to non-bingeing weight-matched controls (APA, 2000; Hudson et al., 2007; Marcus, 1997).

Mood disorders are the most common comorbid condition among individuals with BED, and the relationship between binge eating and negative affect is well documented (Ansell, Grilo, & White, 2012; Dingemans, Martijn, Jansen, & van Furth, 2009; Hudson et al., 2007). A recent study by Ansell and colleagues (2012) found positive correlations between the frequency of binge eating and depression. Furthermore, these authors found that there was a significant relationship between lower interpersonal affiliation (measured using the Inventory of Interpersonal Problems-Short Circumplex (IIP-SC); Soldz, Budman, Demby, & Merry, 1995) and increased binge eating in the presence of negative affect. This is consistent with the Group Psychodynamic Interpersonal Psychotherapy (GPIP; Tasca, Mikail, & Hewitt, 2005) model for BED in which binge eating may be a maladaptive means of coping with negative affect, which in turn is associated with unmet attachment needs. As Tasca and colleagues (2012) reported, the participants in the present sample received 16 weeks of GPIP and showed significant improvements in frequency of binge eating, depression, and self-esteem, at post-treatment and at one year follow-up.

Treatment approaches including GPIP (Tasca et al., 2005) and Group Cognitive Behavioural Therapy (GCBT; Wilfley, Stein, Friedman, Beren, & Wiseman, 1996) have demonstrated moderate effectiveness for the treatment of BED and associated features (e.g.,

Tasca, Ritchie, et al., 2006; Wilfley et al., 2002; Vocks et al., 2010). Despite encouraging findings, approximately 40% of eating disordered patients do not benefit from existing treatments, and as such, researchers continue to explore mechanisms and methods to improve treatment outcomes (Stice, 1999; Tasca, Ritchie, et al., 2006). A number of researchers have proposed matching individuals to treatment conditions based on personal attributes to improve the response to existing treatments (Kaplan, Olmstead, Carter, & Woodside, 2001; Tasca, Ritchie, et al., 2006).

Previous studies have yielded mixed results when they examined the effects of matching patients according to treatment condition based on individual characteristics. The results of Project MATCH failed to demonstrate support for matching clients to individual therapy modalities in the treatment of alcohol abuse, but did suggest improved ratings of therapeutic alliance when clients and therapists were matched according to their belief systems (Walters, 2002). Similarly, a group therapy study for complicated grief demonstrated mixed results when clients were matched to create homogeneous groups based on quality of object relations (Piper, Ogrodniczuk, Joyce, Weideman, & Rosie, 2007). Outcomes did not vary significantly between homogeneous and heterogeneous treatment group; however homogenous groups in which most individuals had a history of mature relationships demonstrated a greater improvement compared to other groups. In the current study, women with BED were assigned to homogeneously composed treatment groups according to their level of attachment anxiety (i.e., high vs. low attachment anxiety groups) in an effort to explore the relationship between attachment characteristics and the effectiveness of GPIP.

An individual's level of attachment anxiety can shape interpersonal interactions, perceptions of the self and of others, and one's tendency to form emotional bonds and to solicit

comfort from others (Chen & Mallinckrodt, 2002; Shorey & Snyder, 2006). Individuals high in attachment anxiety may exhibit a preoccupation with attachments and gaining approval, hypervigilance toward social threats, interpersonal distress, maladaptive coping behaviours, and an up-regulation of their emotions (Chen & Mallinckrodt, 2002; Shorey & Snyder, 2006). These individuals may also hold distorted perceptions of the self and of others, such that self-perceptions are often excessively negative, and the other may be viewed as overly positive (Bartholomew & Horowitz, 1991). Some may also experience the other as a potential threat or potential source of abandonment.

Group therapy researchers acknowledge the impact that individual characteristics, such as attachment style, might have on group processes such as group cohesion, and on clinical outcomes (e.g., Levy, Ellison, Scott, & Bernecker, 2011; Rom & Mikulincer, 2003). Despite their difficulties eliciting positive interpersonal feedback, individuals high in attachment anxiety are more likely to show a stronger desire for group cohesion (Bartholomew & Horowitz, 1991; Smith, Murphy, & Coats, 1999). Further, compared to those who are low in attachment anxiety, those high in attachment anxiety typically perceive other group members more favourably (Chen & Mallinckrodt, 2002; Marcus, 2006). In the current study we assessed the relationship between participants' level of attachment anxiety and group cohesion at the outset of treatment (i.e., session 1) in order to explore initial differences between those high and low in attachment anxiety in their experience of group cohesion. We continued to assess group cohesion on a weekly basis over the course of treatment to explore differences between those high and low in attachment anxiety in the rate of growth of group cohesion over time.

Based on recommendations made by Guthrie (2000) and by Westen, Novotny, and Thompson-Brenner (2004), the current BED treatment trial was designed as a follow-up to a

randomized control trial (RCT) conducted by Tasca, Ritchie, and colleagues (2006), which compared GPIP and GCBT interventions in the treatment of BED. The results of the RCT conducted by Tasca, Ritchie, and colleagues (2006) indicated that those higher in attachment anxiety showed greater improvement in the GPIP condition compared to the GCBT condition. Rather than randomly assigning participants to treatment conditions, the participants in the present study were grouped according to levels of attachment anxiety in order to examine mechanisms and optimal conditions that produce change in a clinical setting. In the current trial homogeneous groups were created based on level of attachment anxiety at study baseline to assess the relationship between attachment anxiety, group cohesion, and clinical outcomes at post-treatment.

Purpose of this study

The first aim of this study was to investigate the relationship between attachment anxiety and the growth of group cohesion for women receiving GPIP for BED. Three hypotheses were proposed concerning group process. *Hypothesis 1*: There will be a significant increase (i.e. growth) of group cohesion over the course of treatment. *Hypothesis 2:* Group cohesion will be significantly higher in the high attachment anxiety condition compared to the low attachment anxiety condition at the outset of treatment (i.e., session 1). *Hypothesis 3*: The rate of change in group cohesion will be more rapid among women in the high attachment anxiety condition compared to women in the low attachment anxiety condition.

The second aim of this study was to evaluate the relationship between group cohesion and outcome. Specifically, we tested the relationships between the development of group cohesion and pre to post-treatment changes in depression, self-esteem, and the frequency of

binge eating in women with BED who received GPIP. In a previous report of this sample, Tasca and colleagues (2012) found that participants in both treatment conditions (i.e., high versus low on attachment anxiety conditions) had significant improvements on outcome measures (i.e., a decrease in depressive symptoms, frequency of binge eating, and an increase in self-esteem). In the current study, two hypotheses concerning outcomes, growth in group cohesion, and study condition were proposed. *Hypothesis 4*: Participants who show increases in group cohesion across therapy sessions will report better outcomes from pre to post-treatment (Hill, Zrull, & McIntire, 1998; Marcus, 2006; Tasca, Ritchie, et al., 2006). *Hypothesis 5*: Treatment condition (i.e., high vs. low attachment anxiety) will moderate the relationship between cohesion growth and outcome at post-treatment, such that those with higher attachment anxiety at study baseline will report a greater relationship between cohesion growth and outcomes.

Method

Participants

One hundred and two adult women (18 years of age or older) with BED participated in the current treatment study. Eighty-four completed group treatment, and 18 participants discontinued prematurely at various points, resulting in an attrition rate of 17.65%. Data from the 18 participants who discontinued were included in analyses where appropriate. The sample had a mean age of 44.25 years (SD = 11.76), 86% were White, 41% were married (n = 42), 27% were single (n = 28), and the sample reported a median family income of $60 000-$69 000. Over half of the sample completed post-secondary education (65%, n = 67), and 60% were employed full-time (n = 61). At pre-treatment, on average the sample was obese (average body mass index [BMI; kg/m^2] = 38.8, SD = 6.82; BMI $\geq$ 30 indicates obesity).

Measures

Structured Clinical Interview for DSM-IV (SCID; First, Spitzer, Gibbon, & Williams, 1997). The SCID is a semi-structured interview used to make Axis I diagnoses consistent with the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR; APA, 2000) criteria. The SCID demonstrated "superior validity when compared with the standard clinical interview on intake" (First et al, 1997, p.46), and demonstrated high test-retest reliability for current and lifetime eating disorder diagnoses (kappas of .72 and .84 respectively). A trained psychometrist administered the SCID interview as a screening tool to determine potential participants' eligibility for the study. For this study sample, inter rater reliability was very good for the presence of current mood disorders, $k = .82$, when independent ratings were compared (Tasca et al., 2012).

Attachment Styles Questionnaire (ASQ; Feeney, Noller, &Hanrahan, 1994). The ASQ is a 40-item self-report measure that is scored on five scales: Confidence in Relationships (i.e., attachment security), Relationships as Secondary (i.e., attachment avoidance), Discomfort with Closeness (i.e., attachment avoidance), Preoccupied (i.e., attachment anxiety), and Need for Approval (i.e., attachment anxiety). The items are scored on a 6-point scale ranging from "totally disagree" (one) to "totally agree" (six).

Based on previous findings using a sample of women with BED (Tasca, Ritchie, et al., 2006), the Need for Approval scale was used to match participants to attachment anxiety treatment conditions. The point of intersection of the regression lines in the Attachment by Treatment interaction was used to determine the cut-off for the high vs. low attachment anxiety groups (Aiken & West, 1991) such that a mean item score of 3.59 on the Need for Approval

scale was used as a cut-off. Those reporting a score greater than 3.59 were classified as high in attachment anxiety, and those scoring below 3.59 were classified as low in attachment anxiety. For the current study the mean inter-item correlation for Need for Approval scale was .34 indicating good internal consistency (Clarke & Watson, 1993). The ASQ was administered at pre-treatment to determine the appropriate condition assignment.

The Group Climate Questionnaire (GCQ; MacKenzie, 1983). The GCQ is a 12-item measure of group climate, in which participants rate their degree of agreement with each statement on a 6-point scale ranging from "not at all" (zero) to "extremely" (six). The GCQ is composed of three scales: 1) the Engaged scale that measures work orientation and engagement; 2) the Conflict scale that measures interpersonal conflict and distrust; 3) the Avoiding scale that measures the degree to which the respondent avoids taking responsibility for change and/or relies on other group members (Kivlighan & Goldfine, 1991, MacKenzie, 1983). The GCQ is a widely used measure of group climate and has been validated in numerous studies (e.g., Johnson et al., 2006, Kivlighan & Goldfine, 1991). For the current study, mean inter-item correlations on the Engaged, Conflict, and Avoiding scales was .31, .37, and .15 respectively, indicating adequate internal consistency (Clarke & Watson, 1993). In the present study, the Engaged scale was selected as a measure of group cohesion (MacKenzie, 1983). The Engaged scale was used in previous research to measure cohesion (e.g., Kivlighan & Lilly, 1997), and the Engaged scale is highly correlated with other measures of cohesion (Johnson et al., 2005). The GCQ was administered following each session to assess change in group cohesion over the course of the 16-week treatment protocol.

Beck Depression Inventory-II (BDI-II, Beck, Steer, & Brown, 1996). The BDI-II is a 21-item self-report measure that assesses the severity of recent depressive symptoms. The item

ratings are summed to compute a BDI-II total score, with higher scores reflecting higher levels of depression. Scores of 0-13 are classified as minimal, 14-19 as mild, 20-28 as moderate and 29-63 as severe depressive symptoms. The BDI-II was administered at pre and post-treatment to assess changes in depressive symptoms. In the current study the mean inter-item correlation was adequate at .36 indicating good internal consistency (Clarke & Watson, 1993).

Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1979). The RSES is a 10-item self-report measure of self-esteem. The items are rated on a 4-point scale and ratings are summed to compute a total RSES score, with higher scores reflecting higher levels of self-esteem. The RSES was administered at pre and post-treatment to assess changes in self-esteem. In a previous study, Wilfley and colleagues (2002) reported a mean RSES score of 27.05 (*SD* = 5.75) in a sample of women with BED. In the current study the mean inter item correlation was .59.

Eating Disorder Examination (EDE; Fairburn & Cooper, 1993). The EDE is a semistructured interview used to assess Eating Disorder symptoms. The EDE was administered at pre and post-treatment to assess changes in binge frequency following GPIP. There was a high degree of inter rater reliability in the current sample for the assessment of days binged in the past 28 days, $\rho = .98$, as measured by the intraclass correlation (Tasca et al., 2012).

Intervention

Group Psychodynamic Interpersonal Psychotherapy (GPIP; Tasca, et al., 2005). Group Psychodynamic Interpersonal Psychotherapy is a manualized treatment protocol that incorporates elements of psychodynamic, interpersonal, and group theories, and has been used in the treatment of BED and depression (Tasca et al., 2005). The model emphasizes group processes described by Yalom & Leszcz, (2005) such as here-and-now interactions and

interpersonal learning to improve the quality of interpersonal interactions, and to decrease BED and depression symptoms.

In their description of the treatment protocol, Tasca and colleagues (2005) explained that understanding Cyclical Relational Patterns (CRP; Strupp & Binder, 1984) is central to GPIP. The CRP emphasize the influence of affective experiences on one's style of relating to the self and to others. The use of CRP emphasizes elements of the clients' interpersonal patterns organized around four themes: Acts of Self (i.e., needs, affective states, cognitions, and perceptions), Expectations of Others, Acts of Others, and Acts of Self Towards Self (or Introject). CRP assists the therapist and client to make sense of the clients' interpersonal behaviours by providing a framework for understanding the relationship between attachment needs, affective states, and binge eating. In this model, binge eating is seen as a maladaptive means of coping with negative affect that arises from unmet attachment needs. The therapist can use group therapy techniques such as working in the here-and-now (Yalom & Leszcz, 2005) to explain the impact of CRP in the client's life, and in order to expand the client's understanding of their adaptive and maladaptive interpersonal patterns in the group and elsewhere.

The GPIP protocol consists of 16 weekly 90-minute long sessions delivered to a group of eight to 10 individuals. The first phase of therapy focuses on engagement to understand and explore the relationship between interpersonal patterns and self-concept. During this time, the therapist assists each group member to enhance their ability to make accurate self-observations, and to cultivate group cohesion and genuine attachment with the group. During the second phase of GPIP, the goal of therapy is to interrupt maladaptive interpersonal patterns and to reorganize views of the self and reactions to others. The role of the therapist is to encourage emotional processing and to comment on the group process. Group members use their interactions to

examine how the Acts of Self, Expectations of Others, and Acts of Others combine to result in interpersonal patterns, and the therapist encourages changes in interaction pattern in the group. The goal is to improve interpersonal patterns that underlie negative affect, which in turn results in reduced need to binge eat as a means of coping. The final phase of GPIP emphasizes consolidation of changes, and explores issues surrounding termination. The therapist addresses and empathizes with the clients' feelings and concerns about termination, and acknowledges clients' interpersonal growth and learning.

Procedure

The group treatment trial from which these data were drawn was a study in which women with BED were assigned to homogenously composed groups based on their level of attachment anxiety. Those in the high attachment anxiety condition attended therapy groups together and those with low attachment anxiety attended groups together. Potential participants were screened by telephone to assess for exclusion criteria and frequency of binge eating. No information was provided to participants or therapists concerning the hypotheses or the study condition assignment.

Inclusion criteria for the group treatment study required that each of the participants was overweight (i.e., BMI > 27) and met the DSM-IV-TR (APA, 2000) criteria for BED at the time of the initial assessment. Participants self-referred from newspaper advertisements, or were referred by health professionals in the region who treat those with eating disorders or weight problems. Individuals who could not speak or read in English were excluded from the study. Additional exclusion criteria included a history of another eating disorder or a history of purging behavior, a DSM-IV-TR diagnosis of bipolar disorder, psychosis, current drug or alcohol dependence, currently or planning to become pregnant, and present or planned participation in a

weight-loss program during the next year. Individuals who previously received treatment for BED were eligible for this study. Participants taking antidepressant medications were required to be on the medication for eight weeks or more to reduce the likelihood that changes in binge eating behavior or depression would be attributed to the effect of the medication, thus confounding the effects of GPIP (Gelenberg & Chesen, 2000).

A psychologist or psychometrist with experience in the assessment and treatment of eating disorders interviewed participants to assess for BED, binge eating, exclusion criteria, co-morbid disorders, medications, medical problems, and personal and psychiatric history. Participants also completed the ASQ to assess attachment anxiety and for allocation to treatment conditions. Recruitment continued until 12 GPIG groups were completed (i.e., six high and six low attachment anxiety condition groups). Each therapist conducted two groups (i.e., one high and one low attachment anxiety group) simultaneously, resulting in a balanced design. Both the participants and the therapist were blind to the group's study condition. Participants completed outcome measures (i.e., BDI-II, RSES, and EDE) at pre and post-treatment, and the GCQ after each weekly session.

Therapy was conducted according to the GPIP manual, by six mental health professionals with experience in group therapy and the treatment of eating disorders (three Psychologists, two Psychiatrists, and one Advanced Practice Nurse). The therapists completed a 4-session GPIP training program (16 hours of total training time) and attended weekly supervision. To ensure adherence to the GPIP protocol, the therapy sessions were videotaped and sessions 4, 8, 12, and 16 were evaluated according to the Tape Rating Instrument for Psychotherapy of Eating Disorders (TRIPED; Olmsted, Issacs, Bemis, & Garner, 1988). Feedback was provided to therapists on a weekly basis to correct non-adherent behaviours. In the current study, inter rater

reliability of adherence was good, ρ = .78, as measured by the intraclass correlation coefficient. Therapists demonstrated sufficient adherence to the GPIP manual, with a mean adherence rating of 3.88 (*SD* = .55; Tasca et al., 2012). Participants provided informed consent, and the study protocol was approved by the institution's research ethics board.

Statistical Analyses

This study employed a Multilevel Modeling (MLM) approach to data analysis, which addressed the potential violations of the assumption of independence of observations that may occur as result of two factors present in this study: 1) nested data from the shared group experience (i.e., data nested within groups) and 2) repeated sampling (data nested within individuals; Boyle &Willms, 2001; Diez-Roux, 2000). The MLM approach was also useful because it made use of all data when estimating parameters without listwise deletion as long as the data were missing at random (Gallop & Tasca, 2009). As such, all participant data (*N* = 102) were used in the analyses. The MLM analyses were conducted using the HLM version 7 program, with full maximum likelihood estimation (Raudenbush, Bryk, & Congdon, 2010).

Intraclass correlations (ICC) were calculated to assess dependence in the data according to methods described by Tasca, Illing, Joyce, and Ogrodniczuk (2009). A three level MLM was conducted to assess the degree of dependence of scores on the dependent variable (e.g., Engagement scores after each of 16 sessions) at level 1, which were nested within individual participants at level 2. Individuals were nested within groups at level 3. Two-level random effects MLMs were also conducted for each outcome variable to assess the degree of dependence (Tasca et al., 2009). The post-treatment score was the dependent variable, with individual pre-treatment scores entered at level 1 (i.e., individual) and condition (attachment anxiety level) at

level 2 (i.e., group). Kenny, Kashy, & Bolger (1998) recommend that for groups of this size, ICC values less than .05 indicate ignorable dependence. For dependent variables with ICC < .05, analyses were conducted at the level of the individual with 2-level repeated measurement MLM. When ICC exceeded .05, the Type I error rate was adjusted according to the values provided by Kenny et al. (1998).

The GCQ Engaged Scale was used to measure group cohesion and was the dependent variable for the first three hypotheses concerning the growth in group cohesion and difference in group cohesion between conditions. Hypothesis 1, that significant growth on the Engaged Scale will occur over the course of treatment was assessed using a 2-level growth model, in which time was specified at level 1, and the GCQ Engaged pre-score was controlled at level 2 (Model 1 in the Appendix). Hypothesis 2, that group cohesion will be significantly higher in the high compared to the low attachment anxiety condition at the outset of treatment, was assessed using a 2-level growth model, in which condition (i.e., level of attachment anxiety) was specified as a predictor at level 2 (Model 2 in the Appendix). Hypothesis 3, that the high attachment anxiety condition will display a more rapid rate of change in group cohesion compared to the low attachment anxiety condition, also was tested with a 2-level linear growth MLM in which condition was specified at level 2 (Model 2 in the Appendix).

Hypotheses four and five were evaluated by examining change on outcome measures (i.e., BDI-II, RSES, and EDE scores) using a 2-level linear growth MLM with fixed slopes. Growth parameters of the Engaged scale, treatment condition, and an Engaged growth x condition interaction term were specified at level 2 (Model 3 in the Appendix). The growth of the Engaged scale parameter refers to individual Engaged scale ordinary least square slopes that were generated by the previous group cohesion MLM (Model 1 in the Appendix). These slope

parameters were saved for each individual and then entered as predictors at level 2 to test hypotheses 4 and 5.

The effect sizes for the MLM analyses were evaluated using the pseudo-R^2 statistic and improvement in model fit was assessed with the difference chi squared statistic ($\Delta\chi^2$). Pseudo-R^2 was used as a measure of effect size only in instances where the random effects linear model was compared to the base model (Singer & Willett, 2003). Improved model fit ($\Delta\chi^2$) was evaluated using the difference in deviance statistics in instances where subsequent growth models were compared to one another (i.e., comparing to the previous growth model that may contain a subset of the predictors contained in the current growth model). Singer and Willett (2003) indicate that the deviance statistic is the preferred statistic for evaluating model fit when comparing nested models.

Results

There were no univariate or multivariate outliers, and the data were normally distributed. Intraclass correlations for the GCQ Engaged Scale scores, and pre to post BDI-II, and RSES did not indicate a degree of dependence in the data that required correction (i.e., all ICCs < .05). The ICC for pre to post binge eating frequency exceeded the recommended cut-off (ICC = .085). To correct for inflated Type I error due to group dependence, all analyses that included binge frequency used a Type I error rate of .02 (Kenney et al., 1998). We conducted a pattern-mixture model to assess for the effects of drop out on group cohesion (Gallop & Tasca, 2009). The pattern of participant drop out did not significantly affect the growth in group cohesion, and so the data were considered missing at random. Tasca and colleagues (2012) previously reported that the other outcome variables were also missing at random.

We first examined changes in group cohesion (growth on the Engaged scale) over the course of 16-weeks of GPIP. There was a medium sized correlation between the growth on the Engaged scale and the baseline estimate (r = -0.40), and as such the growth models controlled for the Engaged scale score at session 1 (Models 1 and 2 in Appendix). As predicted in hypothesis 1, there was significant linear growth on the Engaged scale over time for both conditions (β_{01} = .06, t(102) = 11.32, p < .001) that accounted for 26.73% (pseudo-R^2) of the variance in the model. Adding the linear change parameter improved the model fit to the data, $\Delta\chi^2$ (5) = 365.51, p < .001. On average, participants reported an Engaged Scale rating of 4.06 after the first session, with an average growth of 0.059 at each measurement point, for a total average growth of 0.944 across 16 weeks of treatment. Table 1 shows participants' weekly GCQ Engaged scores by condition. We also examined the impact of level of attachment anxiety (high and low attachment anxiety condition) on engagement at session 1. Contrary to our prediction in hypothesis 2, the conditions did not differ significantly at the outset of treatment (β_{01} = -0.15, t(102) = -1.13, p = .260). Likewise, contrary to hypothesis 3 there was no significant difference between conditions in the rate of growth of the Engaged Scale (β_{11} = -0.01, t(101) = -1.07, p = .286).

Next, we examined the relationship between changes on outcome variables (i.e., depression, self-esteem, and frequency of binge eating) from pre to post-treatment, growth on the Engaged scale, and study condition. As previously noted, participants in the current sample reported significant improvement on all outcome measures (Tasca et al., 2012). Table 2 presents the pre and post-treatment means and standard deviations for the outcome measures by study condition. Table 3 presents the fixed and within-person random effects for the 2-level MLMs for each outcome variable.

We assessed the distribution of the Engaged scale growth parameters by condition and identified four univariate outliers. The outliers were corrected to fall within 3.3 *SD*, as per recommendations set forth by Tabachnick and Fidell (2001). There was no significant main effect of growth on the Engaged scale on changes in frequency of binge eating (β_{12}= -15.16, $t(96) = -1.47$, $p = .146$). Thus, hypothesis 4 was not supported. However, there was a significant condition x Engaged scale growth parameter interaction ($\beta_{14} = -71.07$, $t(94) = -3.64$, $p < .001$) when predicting change in binge eating. Adding the Engaged slope and condition parameters improved the model fit to the data, $\Delta\chi^2 (2) = 18.60$, $p < .001$. To further explore the condition x Engaged growth parameter interaction, we conducted 2-level MLM analyses for each condition separately with time specified at level 1, the binge eating frequency pre-treatment score as a control variable, and growth on the Engaged scale ordinary least square slopes parameter entered at level 2. As predicted in hypothesis 5, there was a significant negative relationship between growth on the Engaged scale and change in binge eating for the high attachment anxiety group ($\beta_{12} = -43.07$, $t(46) = -3.97$, $p < .001$), such that greater growth in group cohesion was associated with better binge eating outcomes for those with high attachment anxiety. Engaged scale growth was not significantly associated with change in binge eating for the low attachment anxiety condition once we applied the correction to the Type I error rate of .02 ($\beta_{12} = 33.58$, $t(47) = 2.21$, $p = .032$). There was no significant relationship between the Engaged scale growth by condition interaction and outcome with respect to depression, or self-esteem.

Discussion

The first goal of the current study was to examine the relationship between attachment anxiety at study baseline and the growth of group cohesion over the course of a 16-week GPIP for BED. Group cohesion is a key therapeutic factor as defined by group psychotherapy

researchers and clinicians (e.g., Burlingame et al., 2011; Yalom & Leszcz, 2005). Consistent with theories of group dynamics, we observed significant growth in group cohesion over time, as measured by the GCQ Engaged scale. This growth suggests that group members experienced stronger emotional attachments and attraction to the group as therapy progressed, which is consistent with previous research and with theoretical models of therapeutically effective working groups and group development (e.g., Kivlighan & Lily, 1997; MacKenzie 1983; Tasca et al., 2007; Tasca, Balfour et al., 2006; Yalom & Leszcz, 2005).

Based on previous research, which suggests that individual characteristics such as attachment anxiety may impact the development of group cohesion (Levy et al., 2011; Rom & Mikulincer, 2003; Tasca, Ritchie, et al., 2006), we expected greater overall cohesion and more rapid growth in cohesion to occur in groups that were homogeneously comprised of individuals high in attachment anxiety. Contrary to our predictions, the high and low attachment anxiety conditions reported similar overall group cohesion and similar rates of change in cohesion over the course of treatment. It is possible that since GPIP emphasizes a cohesive therapeutic environment, the heightened sense of cohesiveness created by GPIP therapists from the start may have over-ridden the potential effects of attachment anxiety (Rom & Mikulincer, 2003). Previous group therapy research suggests that a cohesive group environment may satisfy the attachment needs of individuals high in attachment anxiety, which may reduce the tendency to engage in hyperactivating strategies, thus resulting in improved social and emotional functioning in the group setting (Rom & Mikulincer, 2003).

The second goal of this study was to examine the relationship between group cohesion growth, attachment anxiety, and change on clinical outcome measures at post-treatment. Our findings indicated a moderating effect of attachment anxiety condition on the relationship

between growth in cohesion and changes in the frequency of binge eating. Individuals high in attachment anxiety at study baseline reported greater reductions in binge eating in the presence of faster rate of group cohesion growth. Although the individuals in the low attachment anxiety condition did report reductions in binge eating, group cohesion growth was not significantly related to change in binge eating for these individuals. Based on these findings, it appears that growth in a cohesive group environment is an important element in the group psychotherapy for women with BED who are high in attachment anxiety at study baseline. This finding is consistent with recent research concerning the interpersonal model of BED. That is, Ansell and colleagues (2012) found that lower affiliation was related to increased BED symptoms when individuals experience negative affect (Ansell et al., 2012). Given that individuals who are high in attachment anxiety desire a greater sense of affiliation, we suggest that experiencing a growing sense of cohesiveness may offer a secure base to those high in attachment anxiety, leading to a decrease in the frequency of binge eating.

Limitations

We recognize several limitations in this study. First, participants' level of attachment anxiety was assessed using a single scale of a self-report measure of attachment styles (i.e. the ASQ Need for Approval scale). Although the ASQ demonstrated adequate psychometric properties in general and in BED samples in previous research, the matching variable used in this study was based solely on the participants' self-reports. Alternative or supplemental methods of assessing participants' attachment style, such as a clinical interview (e.g., the Adult Attachment Interview; George, Kaplan, & Main, 1985) or multiple scales might have resulted in more reliable condition assignment. A second and related limitation is that condition assignment was based on a cut-off score of 3.59 on the ASQ Need for Approval scale. Tasca and colleagues

(2012) identified this limitation in their research of this treatment sample, and they suggested that the use of this cut-off score might have resulted in groups that were not as distinct as was intended. Consequently, the high and low groups might have been too similar in level of attachment anxiety to test the hypotheses concerning different rates of growth and differences on outcome measures. Nevertheless we did find that attachment anxiety condition moderated the cohesion growth x binge eating outcome relationship lending some support to this categorization of individuals with attachment anxiety. A third limitation of this study is the relatively homogeneity of the sample. The treatment sample was comprised of adult women with BED who were predominantly White, well educated, and obese. Hence, the results might not generalize to men and should to be replicated with more socio-economically, ethnically, and clinically diverse patient populations. Finally, attrition and missing data may have biased the results. However, the data were shown to be missing at random when assessed by a missing data pattern related to drop out.

Conclusions

Given the wide application of group psychotherapy, researchers and clinicians have shown increasing interest in exploring the impact of group dynamics and of individual patient characteristics on treatment outcome (Burlingame, MacKenzie, & Strauss, 2004; Levy et al., 2011; Rom & Mikulincer, 2003). The current study adds to the growing body of literature that emphasizes the importance of group cohesion growth and the impact of attachment anxiety in women with BED. In interventions such as GPIP, group therapists may use information about attachment functioning to help group members explore their view of self, view of others, and to frame maladaptive interpersonal interactions that arise in the group context. Clinicians may assess group members' CRPs at the outset of treatment, and may use knowledge of these

interpersonal patterns to guide interventions. Group-based treatment offers the advantage of allowing CRPs to emerge in a supportive context, and allow clinicians to work in the "here and now" to explore patterns that emerge within group sessions. These interventions may increase the individual's understanding of their emotions, behaviours, and internal working models of self and of others (Tasca et al., 2005). Our results also suggest the potential for continuous monitoring of group cohesion over the course of psychotherapy. This monitoring may be particularly important for group members who experience high levels of attachment anxiety and whose experience of the growth of group cohesion may be particularly important with respect to improvements in binge eating. Consistent with interpersonal models of BED, group cohesion growth may be most salient for those who desire a strong sense of affiliation with the group, and who may exhibit problematic interpersonal behaviours in an effort to elicit support from others. Group therapists might maximize treatment outcomes by encouraging ongoing group engagement, and by addressing and rectifying any disruptions in group cohesion as they arise in sessions especially for those with higher attachment anxiety.

References

Aiken, L. S. & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions.* London: Sage.

American Psychiatric Association (2000). *Diagnostic and statistical manual of mental disorders* (4th ed. Text Revision). Washington, DC: Author.

Ansell, E. B., Grilo, C., M., & White, M. A. (2012). Examining the interpersonal model of binge eating and loss of control over eating in women. *International Journal of Eating Disorders, 45,* 43-50.

Bartholomew, K. & Horowitz, L. M. (1991). Attachment styles among young adults: A test of a four-category model. *Journal of Personality and Social Psychology, 61*, 226-244.

Beck, A., Steer, R. A., & Brown, G. K. (1996). *The Beck Depression Inventory – II professional manual.* San Antonio: The Psychological Corporation.

Boyle, M. H., & Willms, J. D. (2001). Multilevel modeling of hierarchical data in development studies. *Journal of Child Psychology and Psychiatry, 42,* 141-162.

Burlingame, G. M., MacKenzie, K. R., & Strauss, B. (2004). Small group treatment: Evidence for effectiveness and mechanisms of change. In M. J. Lambert (Ed.), *Handbook of psychotherapy and behavior change* (5th ed., pp.647-696). New York: Wiley.

Burlingame, G., McClendon, D. T., & Alonso, J. (2011). Cohesion in group therapy. *Psychotherapy, 48,* 34-42.

Castonguay, L., Pincus, A., Agras, W., & Hines, C. (1998). The role of emotion in group cognitive-behavioral therapy for binge eating disorder: When things have to feel worse before they get better. *Psychotherapy Research, 8,* 225-238.

Chen, E. C., & Mallinckrodt, B. (2002). Attachment, group attraction, and self-other agreement in interpersonal circumplex problems and perceptions of group members. *Group Dynamics, 6,* 311-324.

Clark, L. A., & Watson, D. (1995). Constructing validity: Basic issues in objective scale development. *Psychological Assessment, 7,* 309-319.

Connelly, J. L., Piper, W. E., Carufel, F. L., & Debbane, E. G. (1986). Premature termination in group psychotherapy: Pretherapy and early therapy predictors. *International Journal of Group Psychotherapy, 36,* 145-152.

Crowe, T. P., & Grenyer, B. F. S. (2008). Is therapist alliance or whole group cohesion more influential in group psychotherapy outcomes? *Clinical Psychology and Psychotherapy, 15,* 239-246.

Diez-Roux, A. V. (2000). Multilevel analysis in public health research. *Annual Review of Public Health, 21,* 171-192.

Dingemans, A. E., Martijn, C., Jansen, A. T. M., & van Furth, E. F. (2009). The effect of suppressing negative emotions on eating behavior in binge eating disorder. *Appetite, 52,* 51-57.

Dion, K. L. (2000). Group cohesion: From "field of forces" to multidimensional construct. *Group Dynamics, 4,* 7-26.

Fairburn, C. G., & Cooper, Z. (1993). The Eating Disorder Examination (12th edition). In C. G. Fairburn & G. T. Wilson (Eds.). *Binge eating: Nature, assessment, and treatment.* New York: Guilford Press.

Feeney, J. A., Noller, P., & Hanrahan, M. (1994). Assessing adult attachment. In M. B. Sperling & W. H. Berman (Eds.) *Attachment in adults* (pp.128-151). New York: Guilford.

First, M. B., Spitzer, R. L, Gibbon, M., & Williams, J. B., & MHS Staff (1997). *Computer-assisted SCID – Clinician version*. Toronto, Ontario: Multi-Health Systems.

Gallop, R. & Tasca, G. A. (2009). Multilevel modeling of longitudinal data for psychotherapy researchers: II. The complexities. *Psychotherapy Research, 00,* 1-15.

Gelenberg, A. J., & Chesen, C. L., (2000). How fast are antidepressants? *Journal of Clinical Psychiatry, 61,* 712-721.

George, C. Kaplan, N., & Main, M. (1985). *Adult Attachment Interview.* Unpublished Manuscript. University of California, Berkeley.

Guthrie, E. (2000). Psychotherapy for patients with complex disorders and chronic symptoms: The need for a new research paradigm. *British Journal of Psychiatry, 177*, 131-137.

Hill, R. W., Zrull, M. C., & McIntire, K. (1998). Differences between self- and peer ratings of interpersonal problems. *Assessment, 5,* 67-83.

Hudson, J. I., Hiripi, E., Pope, H. G., & Kessler, R. C. (2007). The prevalence and correlates of eating disorders in the National Comorbidity Survey replication. *Biological Psychiatry, 61,* 348-358.

Johnson, J. E., Burlingame, G. M., Olson, J. A., Davies, D. R., & Gleave, R. (2005). Group climate, cohesion, alliance, and empathy in group psychotherapy: Multilevel structural equation models. *Journal of Counseling Psychology, 52,* 310-321.

Johnson, J. E., Pulsipher, D., Ferrin, S. L., Burlingame, G. M., Davies, D. R., & Gleave, R. (2006). Measuring group processes: A comparison of the GCQ and CCI. *Group Dynamics, 10,* 136-145.

Joyce, A. S., Piper, W. E., & Ogrodniczuk, J. S. (2007). Therapeutic alliance and cohesion variables as predictors of outcome in short-term group psychotherapy. *International Journal of Group Psychotherapy, 57,* 269-296.

Kaplan, A. S., Olmsted, M. P., Carter, J. C., & Woodside, B. (2001). Matching patient variables to treatment intensity: The continuum of care. *Psychiatric Clinics of North America, 24*, 281-292.

Kenny, D. A., Kashy, D., & Bolger, N. (1998). Data analysis in social psychology. In D. Gilbert, S. Fiske, and D. Lindzey (Eds.), *Handbook of social psychology* (4th ed., pp. 233-265). New York: McGraw-Hill.

Kivlighan, D. M., & Goldfine, D. C. (1991). Endorsement of therapeutic factors as a function of stage of group development and participant interpersonal attitudes. *Journal of Counseling Psychology, 38,* 150-158.

Kivlighan, D.M., & Lilly, R. (1997). Developmental changes in group climate as they relate to therapeutic gain. *Group Dynamics, 3,* 208-221.

Levy, K. N., Ellison, W. D., Scott, L. N., & Bernecker, S. L. (2011). Attachment style. *Journal of Clinical Psychology: In Session, 67,* 193-203.

MacKenzie, K. R. (1983). The clinical application of a group climate measure. In R. R. Dies, & K. R. MacKenzie (Ed.), *Advances in group psychotherapy: Integrating research and practice* (pp.159-170). New York: International University Press.

Marcus, D. K. (2006). Interpersonal feedback: A social relations perspective. *International Journal of Group Psychotherapy, 56,* 173-189.

Marcus, M. D. (1997). Adapting treatment for patients with binge eating disorder. In D.M. Garner & P.E. Garfinkel (Eds.), *Handbook of treatments for eating disorders* (pp. 484-493). New York: Guilford Press.

McCallum, M., Piper, W. E., Ogrodniczuk, J. S., & Joyce, A. S. (2002). Early process and dropping out from short-term group therapy for complicated grief. *Group Dynamics, 6*, 243-254.

Olmsted, M. P., Isaacs, P., Bemis, K., & Garner, D. M. (1988). *Tape rating instrument for psychotherapy of eating disorders (TRIPED)*. Unpublished manuscript.

Piper, W. E., Ogrodniczuk, J. S., Joyce, A. S., Weideman, R., & Rosie, J. S. (2007). Group Composition and group therapy for complicated grief. *Journal of Consulting and Clinical Psychology, 75,* 116-125.

Raudenbush, S. W., Bryk, A. S., & Congdon, R. (2010). *HLM 7 Hierarchical Linear and Nonlinear Models*. Scientific Software International, Inc.

Rom, E. & Mikulincer, M. (2003). Attachment theory and group processes: The association between attachment style and group-related representations, goals, memories, and functioning. *Journal of Personality and Social Psychology, 84*, 1220-1235.

Rosenberg, M. (1979). *Conceiving the self.* New York: Basic Books.

Shorey, H. S., & Snyder, C. R. (2006). The role of adult attachment styles in psychopathology and psychotherapy outcomes. *Review of General Psychology, 10,* 1-20.

Singer, J. D. & Willett, J. B. (2003). *Applied longitudinal data analysis: Modeling change and event occurrence*. New York: Oxford University Press.

Smith, E. R., Murphy, J., & Coats, S. (1999). Attachment to groups: Theory and measurement. *Journal of Personality and Social Psychology, 77,* 94-110.

Soldz, S., Budman, S., Demby, A., & Merry, J. (1995). A short form of the Inventory of Interpersonal Problems Circumplex scales. *Assessment, 2,* 53-63.

Stevens, J. P. (2002). *Applied multivariate statistics for the social sciences* (4th ed). Mahwah, NJ: Erlbaum.

Stice, E. (1999). Clinical implications of psychosocial research on bulimia nervosa and binge eating disorder. *Psychotherapy in Practice, 55,* 675-683.

Strupp, H. H. & Binder, J. L. (1984). *Psychotherapy in a new key: A guide to time-limited dynamic psychotherapy*. New York: Basic Books, Inc.

Tabachnick, B. G. & Fidell, L. S. (2001). *Using multivariate statistics* (4th ed.). New York: Harper Collins.

Tasca, G. A., Balfour, L., Ritchie, K., & Bissada, H. (2006). Developmental changes in group climate in two types of group therapy for Binge Eating Disorder: A growth curve analysis. *Psychotherapy Research, 16*, 499-514.

Tasca, G. A., Illing, V., Joyce, A. S., & Ogrodniczuk, J. S. (2009). Three-level multilevel growth models for nested change data: A guide for group researchers. *Psychotherapy Research, 19,* 453-461.

Tasca, G. A., Mikail, S., & Hewitt, P. (2005). Group psychodynamic interpersonal psychotherapy: Summary of a treatment model and outcomes for depressive symptoms. In M. E. Abelian (Ed.) *Focus on psychotherapy research* (pp. 159-188). New York: Nova.

Tasca, G. A., Ritchie, K., Conrad, G., Balfour, L., Gayton, J., Daigle, V., & Bissada, H. (2006). Attachment scales predict outcome in a randomized controlled trial of two group therapies

for Binge Eating Disorder: An aptitude by treatment interaction. *Psychotherapy Research, 16*, 106-121.

Tasca, G. A., Ritchie, K., Demidenko, N., Balfour, L., Krysanski, V., Weeks, K.,… Bissada, H. (2012). Matching women with binge eating disorder to group treatment based on attachment anxiety: outcomes and moderating effects. *Psychotherapy Research*, DOI:10.1080/10503307.2012.717309.

Tschuschke, V., & Dies, R. R. (1994). Intensive analysis of therapeutic factors and outcome in long-term inpatient groups. *International Journal of Group Psychotherapy, 44,* 185-208.

Vocks, S., Tuschen-Caffer, B., Pietrowsky, R., Rustenbach, S. J., Kersting, A., & Herpertz, S. (2010). Meta-analysis of effectiveness of psychological and pharmacological treatments for binge eating disorder. *International Journal of Eating Disorders, 43,* 205-217.

Walters, G. D. (2002). Lessons Learned From Project MATCH. *Addictive Disorders & Their Treatment, 1*, 135–139.

Westen, D., Novotny, C. M., & Thompson-Brenner, H. (2004). The empirical status of empirically supported psychotherapies; Assumptions, findings, and reporting in controlled clinical trials. *Psychological Bulletin, 30,* 631-663.

Wifley, D. E., Stein, R. I., Friedman, M. A., Beren, S. A., & Wiseman, C. V. (1996). Group cognitive-behavioral therapy for Binge Eating Disorder. Unpublished manuscript.

Wilfley, D. E., Welch, R. R., Stein, R. I., Spurrell, E. B., Cohen, L. R., Saelens, B. E.,…Matt, G. E. (2002). A randomized comparison of group cognitive-behavioral therapy and group interpersonal psychotherapy for the treatment of overweight individuals with binge eating disorder. *Archives of General Psychiatry, 59,* 713-721.

Yalom, I. D. (1995). *The theory and practice of group psychotherapy* (4th ed.). New York: Basic Books.

Yalom, I. D. & Leszcz, M. (2005). *The theory and practice of group psychotherapy* (5th ed.). New York: Basic Books.

Table 1

GCQ Engaged Scale Means and Standard Deviations by Study Condition

	High			Low		
Week	*n*	*M*	*SD*	*n*	*M*	*SD*
1	45	3.46	.94	45	3.82	.95
2	44	4.22	1.00	44	4.22	.78
3	44	4.54	.75	41	4.34	.90
4	39	4.45	1.83	39	4.25	.73
5	42	4.34	.80	39	4.52	.80
6	38	4.50	.83	38	4.67	.70
7	36	4.19	.77	37	4.72	.68
8	38	4.36	.82	39	4.63	.66
9	36	4.54	.78	37	4.79	.67
10	37	4.77	.90	33	4.85	.65
11	35	5.34	2.61	36	4.88	.74
12	38	4.57	.95	36	4.53	.89
13	30	4.75	.92	29	4.97	.77
14	36	4.77	.85	32	4.81	.77
15	32	4.86	.78	34	5.09	1.52
16	38	4.69	1.00	35	4.96	.72

Note. Low = low attachment anxiety condition; high = high attachment anxiety condition. GCQ = Group Climate Questionnaire.

Table 2

Means and Standard Deviations of Outcome Variables by Study Condition

Variables and Condition	Pre-treatment		Post-treatment	
	M	*SD*	*M*	*SD*
BDI-II				
Low	16.09	10.37	10.14	8.17
High	25.74	10.46	15.26	11.29
RSES				
Low	28.67	6.38	30.68	5.45
High	23.55	5.90	26.99	5.85
EDE Days Binged in Past 28 Days				
Low	14.48	4.69	7.40	8.18
High	16.06	6.57	6.26	6.45

Note. Low = low attachment anxiety condition (n = 52); high = high attachment anxiety condition (n = 50); BDI-II = Beck Depression Inventory-II; RSES = Rosenberg Self-Esteem Scale; EDE = Eating Disorder Examination. At post-treatment low n = 42, high n = 44.

Table 3

Fixed and Random Effects for Slopes (β_{10}) of Pre- to Post-Treatment from the Multilevel Models for Outcome Each Variable

	Fixed Effects			Random Effects			Base	Linear
Outcomes	β_{10}	*t*	*p*	σ^2_b	σ^2_t	R^2	*D*	*D*
BDI-II	-7.59	-7.16	<.001	89.21	38.89	.56	1385.03	1176.94
RSES	25.00	6.33	<.001	13.00	7.00	.46	299.05	38.11
Binge 28 Days	-7.88	-11.87	<.001	57.22	19.88	.65	1272.34	1078.64

Note. σ^2_b = the within-person variance component from the base model, σ^2_t = the within-person variance component from the linear growth model, R^2 = pseudo-R^2, *D* = deviance statistic. BDI-II = Beck Depression Inventory-II (n = 99); RSES = Rosenberg Self-Esteem Scale (n = 98); EDE = Eating Disorder Examination (n = 102).

Appendix: Multilevel Models

Model 1: *Two-Level Random Effects Growth Model Used to Assess Overall Growth in Cohesion*

Level 1: $Y_{ti} = \pi_{0i} + \pi_{1i}(week_{ti}) + e_{ti}$

Level 2: $\pi_{0i} = \beta_{00} + \beta_{01}(\text{individual engaged score time } 1_i) + r_{0i}$

$\pi_{1i} = \beta_{10} + \beta_{11}(\text{individual engaged score time } 1_i) + r_{1i}$

Model 2: *Two-Level Conditional Growth Model Used to Assess the Effect of Condition*

Level 1: $Y_{ti} = \pi_{0i} + \pi_{1i}(week_{ti}) + e_{ti}$

Level 2: $\pi_{0i} = \beta_{00} + \beta_{01}(\text{individual engaged score time } 1_i) + \beta_{02}(condition_i) + r_{0i}$

$\pi_{1i} = \beta_{10} + \beta_{11}(\text{individual engaged score time } 1_i) + \beta_{12}(condition_i) + r_{1i}$

Note. For models 1 and 2, Y = Engaged scale scores. The pre scores and predictors were grand mean centered, time and condition uncentered.

Model 3: *Two-Level Model to Assess Change in Outcome*

Level 1: $Y_{ti} = \pi_{0i} + \pi_{1i}(week_{ti}) + e_{ti}$

Level 2: $\pi_{0i} = \beta_{00} + \beta_{01}(\text{outcome measure pre score}_i) + \beta_{02}(\text{Engaged growth parameter}_i) +$

$\beta_{03}(condition_i) + \beta_{04}(\text{Engaged growth x condition}_i) + r_{0i}$

$\pi_{1i} = \beta_{10} + \beta_{11}(\text{outcome measure pre score}_i) + \beta_{12}(\text{Engaged growth parameter}_i) +$

$\beta_{13}(condition_i) + \beta_{14}(\text{Engaged growth x condition}_i)$

Note. Model 3 was used to assess change in depressive symptoms, self-esteem, and binge eating, with Y = Beck Depression Inventory-Second Edition scores, Rosenberg Self-Esteem Scale scores, or binge eating frequency assessed with the Eating Disorder Examination. The pre scores and predictors were grand mean centered, time and condition were uncentered.

Interpersonal Learning is Associated with Improved Self Esteem in Group Psychotherapy for Women with Binge Eating Disorder

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Abstract

Yalom and Leszcz (2005) indicated that interpersonal learning is a key therapeutic factor in group psychotherapy. In this study, we conceptualized interpersonal learning as the convergence over time between an individual's and the group's perception of the individual's cohesion to the group. First, we developed parallel measures of: (a) an individual's self-rated cohesion to the group (CQ-I), and (b) the group's rating of the individual's cohesion to the group (CQ-G) based on the original Cohesion Questionnaire (CQ; Piper et al., 1983). Second, we used these parallel scales to assess differences between an individual's self-rating and the mean of the group's ratings of the individual's cohesion to the group. Women with binge eating disorder ($N = 102$) received Group Psychodynamic Interpersonal Psychotherapy. Participants were assigned to homogeneously composed groups of either high or low attachment anxiety. Outcomes were measured pre and post treatment, and the CQ-I and CQ-G were administered every fourth group session. We found significant convergence over time between the CQ-I and mean CQ-G scale scores in both attachment anxiety conditions. Participants with higher attachment anxiety had lower individual self-ratings of cohesion and had greater discrepancies between the CQ-I and CG-G compared to those with lower attachment anxiety. There was a significant relationship between greater convergence in cohesion ratings and improved self-esteem at post-treatment. More accurate self-perceptions through feedback from group members may be a key factor in facilitating increased self-esteem in group therapy. Group therapists may facilitate such interpersonal learning, especially for those higher in attachment anxiety, by noting discrepancies and then encouraging convergence between an individual and the group in their perceptions of cohesion to the group.

Keywords: group psychotherapy, interpersonal learning, cohesion, binge eating disorder.

Interpersonal Learning is Associated with Improved Self Esteem in Group Psychotherapy for Women with Binge Eating Disorder

Interpersonal learning is an important and dynamic factor in group-based psychotherapy that allows group members to share aspects of their emotions, thoughts, and perceptions while receiving feedback from fellow group members in a safe and collaborative setting (Yalom & Leszcz, 2005; Rom & Mikulincer, 2003). As Yalom and Leszcz (2005) explained, this process allows individuals to challenge their interpersonal distortions and to improve their awareness of the self, and of the dynamics in their interpersonal relationships. Previous research suggested that individuals gain a greater understanding of the internal working models of others through their ongoing relationships (Biesanz, West, & Millevoi, 2007; Rom & Mikulincer, 2003; Vazire & Mehl, 2008). These researchers argued that the increased agreement between an individual's ratings of self and another's rating of the individual was a form of interpersonal learning. Researchers observed this agreement in ratings (i.e., convergence) in the context of friendships, familial, and romantic relationships (Biesanz et al., 2007; Vazire & Mehl, 2008).

Given the ongoing nature of the relationships between members of psychotherapy groups, individuals have the opportunity to become more self-aware, and to learn about their impact and impression on others through in-session feedback provided by other group members. Treatment approaches such as Group Psychodynamic Interpersonal Psychotherapy (GPIP; Tasca, Mikail, & Hewitt, 2005) emphasize interpersonal learning and group cohesion by encouraging feedback and interactions between group members, thus assisting participants to develop more adaptive behaviours and more coherent views of the self and of others.

In this study we assessed interpersonal learning across sessions of GPIP by evaluating the increased agreement (i.e., convergence) between an individual's perspective of their own

cohesion to the group and the other group members' perspective of the individual's cohesion to the group. Group cohesion refers to a positive bond, alliance, connection, or attachment that can occur between group members, between members and the group leader, or between the member and the group as a whole (Burlingame, McClendon & Alonso, 2011; Chen & Mallinckrodt, 2002; Dion, 2000; Johnson, Burlingame, Olson, Davies, & Gleave, 2005; Yalom & Leszcz, 2005). Yalom and Leszcz (2005) identify cohesion as an important element of effective group therapy, and increased group cohesion is related to reduced attrition and improved treatment outcome in a variety of populations including clinical samples with depression and binge eating disorder (BED; e.g., Burlingame et al., 2011; Castonguay, Pincus, Agras, & Hines, 1998; Crowe & Grenyer, 2008; Joyce, Piper, & Ogrodniczuk, 2007). Several researchers have highlighted the value of assessing cohesion from multiple perspectives including member to member, member to leader, member to the group, or leader to the group. The qualities of relationship dynamics may differ across perspectives and different sources may provide different views of cohesion (Burlingame et al., 2011; Johnson et al., 2005; Vazire & Mehl, 2008).

Although group-based factors are frequently the focus of group psychotherapy research, group researchers also acknowledge that individual characteristics, such as attachment style, have an impact on group processes like group cohesion and interpersonal learning (e.g., Levy, Ellison, Scott, & Bernecker, 2011; Rom & Mikulincer, 2003). Specific to the current study, previous research suggests that individuals high in attachment anxiety are more likely to desire strong group cohesion, and are more likely to hold positive views of others and negative views of the self (Bartholomew & Horowitz, 1991; Chen & Mallinckrodt, 2002; Marcus, 2006). In light of these findings, we suggest that those high in attachment anxiety may be more likely to have a greater discrepancy between their ratings of themselves versus how others rate them. We also

suggest that convergence of these ratings (i.e., interpersonal learning) might indicate a self concept that is more consistent with how one is viewed by fellow group members. As such, compared to those with lower attachment anxiety, those with higher attachment anxiety might show a greater convergence in ratings over time. In this study, we assessed impact of high versus low attachment anxiety on interpersonal learning (i.e., convergence) across sessions of GPIP provided to women with BED.

Binge eating disorder is the most prevalent eating disorder, and is characterized by a pattern of objective binge episodes (i.e., eating an unusually large amount of food and experiencing loss of control during these episodes), in the absence of compensatory behaviours (American Psychiatric Association (APA), 2000). In addition to regular episodes of binge eating, individuals with BED report greater degrees of depressive symptoms, body dissatisfaction, and anxiety compared to weight-matched controls (APA, 2000; Hudson, Hiripi, Pope, & Kessler, 2007; Marcus, 1997). The interpersonal model of BED describes a relationship between low interpersonal affiliation and a higher degree of negative affect (Ansell, Grilo, & White, 2012). Ansell and colleagues also found that negative affect moderated the relationship between low interpersonal affiliation and an increased frequency of binge eating. Group-based interpersonal treatments (e.g., GPIP) foster group cohesion and aim to disrupt maladaptive patterns that trigger mood disturbances and binge eating partly through feedback and social learning (Chen & Mallinckrodt, 2002; Marcus, 2006; Tasca et al., 2005). The GPIP model is presented in greater detail in the Method section of this study.

The Current Study

The first goal of the current study was to investigate the relationship between attachment anxiety and interpersonal learning for women receiving GPIP for BED. Following Yalom &

Leszcz's (2005) definition, we assessed interpersonal learning by comparing individual self-rated cohesion to the group versus the mean of others group members' ratings of the individual's cohesion to the group. A comprehensive literature review failed to identify any validated scales that measure an individual's self-rated cohesion to the group. Consequently we created a parallel individual self-rated cohesion to the group scale (i.e., CQ-I) for this study by re-wording items from the Cohesion Questionnaire (CQ; Piper, Marache, Lacroix, Richardsen, & Jones, 1983) so that the new CQ-I items allowed each individual to rate their own cohesion to the group. We then conducted psychometric testing to validate this newly developed scale. We expected that the original CQ and the new CQ-I would yield similar factor structures, and would demonstrate adequate convergent validity, discriminant validity, and internal consistency. Besides the original study by Piper and colleagues (1983), no other researchers report on the psychometrics of the CQ, including its purported factor structure. Hence we also re-validated the CQ, especially given the small sample size of the original Piper et al. (1983) study (N = 45). Further, we used principal axis factoring rather than principal components analysis (PCA) that was originally employed by Piper and colleagues, as a more reliable method of factor extraction.

We proposed three hypotheses. First, we hypothesized that individuals in the high attachment anxiety condition versus those with low attachment anxiety will provide more negative ratings of their cohesion to the group with the CQ-I compared to mean ratings of the individual provided by fellow group members on the CQ (Bartholomew & Horowitz, 1991; Hill, Zrull, & McIntire, 1998; Shorey & Snyder, 2006). Second, we hypothesized that convergence of the CQ-I and mean group CQ ratings will occur over time as an index of interpersonal learning. Third, we hypothesized that participants in the high attachment anxiety condition will show a more rapid convergence of ratings compared to those in the low attachment anxiety condition.

The second goal of this study was to evaluate the relationship between group processes and outcomes. Specifically, we hypothesized that interpersonal learning (i.e., convergence of CQ-I and mean group CQ ratings) will be associated with positive changes in depressive symptoms, self-esteem, and binge eating at post-GPIP.

Method

Participants

CQ-I Validation Study Sample. One hundred and seventy three participants' data were used in the validation of the parallel CQ and CQ-I measures. Participants were recruited from several group-based treatment programs at The Ottawa Hospital and from the community. Participating programs at The Ottawa Hospital included the BED treatment study (n = 102), the Eating Disorders Intensive Day Hospital, Inpatient, and Outpatient programs (n = 18, n = 13 and n = 24 respectively), and an HIV group treatment program (n = 8). Eight additional participants were recruited from a treatment group in the community. Demographic data was collected from the BED and Day Hospital participants. Demographic data was not collected from the other group participants to ensure anonymity. Of those who provided demographic data, 98% were female (N = 117) and had a mean age of 41 years (SD = 11.9). Twenty-eight percent were married (N =34), 33% were single (N = 40), and the sample reported a median family income of $70 000-$79 000 in Canadian funds. Over half of the sample completed post-secondary education (59%, N = 71), and 38% were employed full-time (N = 46).

Group Treatment Study Sample. One hundred and two adult women (18 years of age or older) with BED participated in the group treatment study. Eighty-four women completed group treatment, while 18 participants discontinued prematurely at various points, resulting in an

attrition rate of 17.65%. Data from the 18 participants who discontinued were included in analyses where appropriate. The sample had a mean age of 44.25 years (*SD* = 11.76), 86% were White, 41% were married (*N* = 42), 27% were single (*N* = 28), and the sample reported a median family income of $60 000-$69 000. Over half of the sample completed post-secondary education (65%, *N* = 67), and 60% were employed full-time (*N* = 61). At pre-treatment, on average the sample was obese (average body mass index (kg/m^2) = 38.8, *SD* = 6.82).

Measures

Cohesion Questionnaire (CQ; Piper et al, 1983). The original CQ is an 8-item scale in which participants (raters) evaluate each other participant (targets) separately in the group (e.g., "If she left, I would miss her"). A participant score was calculated as the average of the raters' scores for that individual. The items were rated on a 6-point scale with a range from "very little" (one) to "very much" (six). In the original publication of the CQ scales, Piper and colleagues (1983) conducted a PCA with an orthogonal rotation of patients' average ratings of other group members. Three factors emerged from the original PCA: Positive Qualities, Personal Compatibility, and Significance as a Group Member. Items included in each factor demonstrated eigenvalues greater than 1 and factor loadings ranging from .63 to .87 (Piper et al., 1983).

The Cohesion Questionnaire-Individual Version (CQ-I). The CQ-I is an 8-item scale created for this study in which each individual rated their own cohesion to the group (e.g. "If I left, the group members would miss me"). The items were rated on a 6-point scale with a range from "very little" (one) to "very much" (six). This scale was created specifically for this study to parallel the CQ items by modifying the original scale items so that the new CQ-I reflected the individual's ratings of their own cohesion to the group. The modified CQ-I items were reviewed by one of the authors of the original CQ scales (W.E. Piper) and by several group therapy

experts. Each reviewer agreed that the modified items were appropriate and maintained the content of the original items.

For this study, and based on factor analyses reported below, we scored the CQ and CQ-I by summing all scale items within each scale to obtain a separate single factor score of cohesion. The first item on both scales (i.e., "I irritate or annoy the group members" on the CQ-I, and "She irritates or annoys me" on the CQ) were reverse scored. Discrepancy scores were calculated by subtracting the mean group CQ score of the target from the target's own CQ-I score (i.e., CQ-I – mean CQ), which is consistent with procedures in previous studies of self-other agreement (e.g., Chen & Mallinckrodt, 2002). Positive values indicated that the individual's rating of their cohesion to the group was more positive than the group's average rating of the individual, whereas a negative value indicates that the individual's self-perception was more negative than the group's average rating of the individual. Discrepancy scores were calculated at sessions 4, 8, 12, and 16 and were the dependent variables in subsequent analyses.

The Group Climate Questionnaire (GCQ; MacKenzie, 1983). The GCQ is a 12-item measure of group climate, in which participants rated their degree of agreement with each statement on a 6-point scale ranging from "not at all" (zero) to "extremely" (six). The GCQ is composed of three scales: 1) the Engaged scale that measures work orientation and engagement; 2) the Conflict scale that measures interpersonal conflict and distrust; 3) the Avoiding scale that measures the degree to which the respondent avoids taking responsibility for change and/or relies on other group members (Kivlighan & Goldfine, 1991, MacKenzie, 1983). The GCQ is a widely used measure of group climate and has been validated in numerous studies (e.g., Johnson et al., 2006, Kivlighan & Goldfine, 1991). For the current study, mean inter-item correlations on the Engaged, Conflict, and Avoiding scales was .31, .37, and .15 respectively, indicating adequate

internal consistency (Clarke & Watson, 1993). The GCQ was administered following each session during the course of the 16-week treatment protocol.

Structured Clinical Interview for DSM-IV (SCID; First, Spitzer, Gibbon, & Williams, 1997). The SCID is a semi-structured interview used to make Axis I diagnoses consistent with the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR; APA, 2000) criteria. The SCID demonstrated "superior validity when compared with the standard clinical interview on intake" (First et al, 1997, p.46), and demonstrated high test-retest reliability for current and lifetime Eating Disorder diagnoses (kappas of .72 and .84 respectively). A trained psychometrist administered the SCID as a screening tool to determine potential participants' eligibility for the study. Inter rater reliability for the current sample was very good for the presence of current mood disorders, $k = .82$ (Tasca et al., 2012).

Attachment Styles Questionnaire (ASQ; Feeney, Noller, &Hanrahan, 1994). The ASQ is a 40-item self-report measure that is scored on five scales: Confidence in Relationships (i.e., attachment security), Relationships as Secondary (i.e., attachment avoidance), Discomfort with Closeness (i.e., attachment avoidance), Preoccupied (i.e., attachment anxiety), and Need for Approval (i.e., attachment anxiety). The items were scored on a 6-point scale ranging from "totally disagree" (one) to "totally agree" (six).

Based on previous findings using a sample of women with BED (Tasca, Balfour, Ritchie, & Bissada, 2006), the Need for Approval scale was used to determine the appropriate condition assignment. The point of intersection of the regression lines in the Attachment by Treatment interaction were used to determine the cut-off for the high versus low attachment anxiety groups (Aiken & West, 1991). A mean item score of 3.59 on the Need for Approval scale was used as a cut-off. Those reporting a score greater than 3.59 were classified as high in attachment anxiety,

and those scoring below 3.59 were classified as low in attachment anxiety. For the current study the mean inter-item correlation for Need for Approval scale was .34.

Beck Depression Inventory-II (BDI-II, Beck, Steer, & Brown, 1996). The BDI-II is a 21-item self-report measure that assesses the severity of recent depressive symptoms. The item ratings are summed to compute a BDI-II total score, with higher scores reflecting higher levels of depression. Scores of 0-13 are classified as minimal, 14-19 as mild, 20-28 as moderate and 29-63 as severe depressive symptoms. The BDI-II was administered at pre- and post-treatment to assess changes in depressive symptoms. In the current study the mean inter item correlation was .36.

Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1979). The RSES is a 10-item self-report measure of self-esteem. The items are rated on a 4-point scale and ratings are summed to compute a total RSES score, with higher scores reflecting higher levels of self-esteem. The RSES was administered at pre- and post-treatment to assess changes in self-esteem. In a previous study, Wilfley and colleagues (2002) reported a mean RSES score of 27.05 (*SD* = 5.75) in a sample of women with BED. In the current study the mean inter item correlation was .59.

Eating Disorder Examination (EDE; Fairburn & Cooper, 1993). The EDE is a semistructured interview used to assess Eating Disorder symptoms. The EDE was administered at pre- and post-treatment to assess the frequency of binge eating in the past 28 days. There was a high degree of inter rater reliability in the current sample for the assessment of days binged in the past 28 days, $\rho = .98$, as measured by the intraclass correlation (Tasca et al., 2012).

Intervention

Group Psychodynamic Interpersonal Psychotherapy (GPIP; Tasca et al., 2005). Group Psychodynamic Interpersonal Psychotherapy is a manualized treatment protocol that

incorporates elements of psychodynamic, interpersonal, and group theories, and has been used in the treatment of BED and depression (Tasca et al., 2005). The model emphasizes group processes described by Yalom & Leszcz, (2005) such as here-and-now interactions and interpersonal learning to improve the quality of interpersonal interactions, and to decrease BED and depression symptoms.

In their description of the treatment protocol, Tasca and colleagues (2005) explained that understanding Cyclical Relational Patterns (CRP; Strupp & Binder, 1984) is central to GPIP. The CRP emphasize the influence of affective experiences on one's style of relating to the self and to others. The CRP describes elements of the clients' interpersonal patterns organized around four themes: Acts of Self (i.e., wishes, needs, affective states, cognitions, and perceptions), Expectations of Others, Acts of Others, and Acts of Self Toward Self (or Introject). The CRP assists the therapist to make sense of the clients' interpersonal behaviours by providing a framework for understanding the relationship between attachment needs, affective states, and binge eating. The therapist can use group therapy techniques such as working in the here-and-now to explain the impact of CRP in the client's life in order to expand the client's understanding of their adaptive and maladaptive interpersonal patterns.

The GPIP protocol consists of 16 weekly sessions (each 90 minutes) delivered to a group of eight to 10 women with BED. The first phase of therapy focuses on engagement and attachment to understand and explore the relationship between interpersonal patterns and self-concept. During this time, the therapist assists each group member to enhance their ability to make accurate self-observations, and to cultivate group cohesion and genuine attachment. During the second phase of GPIP, the goal of therapy is to interrupt maladaptive interpersonal patterns and to reorganize views of the self and reactions to others. The role of the therapist is to

encourage emotional processing and to comment on the group process. Group members use their interactions to examine how the Acts of Self, Expectations of Others, and Acts of Others combine to result in interpersonal patterns and the therapist encourages changes in interaction pattern in the group. The goal is to improve interpersonal patterns that underlie negative affect, which in turn results in reduced need to binge eat as a means of coping with disregulated/negative affect. The final phase of GPIP emphasizes consolidation and explores issues surrounding termination. The therapist addresses and empathizes with the clients' feelings and concerns and acknowledges clients' interpersonal growth and learning.

Procedure

CQ-I validation. Participants in the BED treatment groups ($N = 102$) completed the CQ-I, the CQ, and the GQC following group session 4, 8, 12, and 16. For this validation study, only data from session 4 was used. The questionnaires were administered as part of an assessment package consistent with the BED treatment study protocol. The 71 participants in the additional 5 therapy groups (i.e. eating disorders program groups, HIV group, and community group) completed the CQ-I at the end of a therapy session determined by the therapist. Participants were asked to make their ratings of other group members in the context of the last few group sessions.

Group treatment study. Potential participants ($N = 230$) were screened by telephone to assess for exclusion criteria and frequency of binge eating. No information was provided concerning the hypotheses or the study conditions. After screening for exclusion criteria (listed below), 102 women with BED ($N = 102$) were assigned to homogenously composed groups based on their pre-treatment level of attachment anxiety as measured by the Need for Approval

Scale of the ASQ. Those in the high attachment anxiety condition attended therapy groups together and those with low attachment anxiety attended groups together.

Inclusion criteria for the group treatment study required that each of the participants was overweight (i.e., body mass index > 27) and met the DSM-IV-TR (APA, 2000) criteria for BED at the time of the initial assessment. Participants self-referred from newspaper advertisements, or were referred by health professionals in the region who treat those with eating disorders or weight problems. Individuals who could not speak or read in English were excluded from the study. Additional exclusion criteria included a history of another eating disorder or a history of purging behaviour, a DSM-IV-TR diagnosis of bipolar disorder, psychosis, current drug or alcohol dependence, currently or planning to become pregnant, and present or planned participation in a weight-loss program during the next year. Participants taking antidepressant medications were required to be on the medication for eight weeks or more to reduce the likelihood that changes in binge eating behaviour or depression would be attributed to the effect of the medication, thus confounding the effects of GPIP (Gelenberg & Chesen, 2000).

A psychologist or psychometrist with experience in the assessment and treatment of eating disorders interviewed participants to assess for BED, binge eating, exclusion criteria, co-morbid disorders, medications, medical problems, and personal and psychiatric history. Recruitment continued until 12 GPIP groups were completed (i.e., six high and six low attachment anxiety condition groups). Each therapist conducted two groups (i.e., one high and one low attachment anxiety condition) simultaneously, resulting in a balanced design. Both the participants and the therapist were blind to the group condition. Participants completed outcome measures (i.e., BDI-II, RSES, and EDE) at pre- and post-treatment, the GCQ after each weekly session, and the CQ-I and CQ at sessions 4, 8, 12, and 16.

Therapy was conducted according to the GPIP manual, by six mental health professionals with experience in group therapy and the treatment of eating disorders (three Psychologists, two Psychiatrists, and one Advanced Practice Nurse). The therapists completed a 4-session GPIP training program (16 hours of total training time) and attended weekly supervision. To ensure adherence to the GPIP protocol, the therapy sessions were videotaped and sessions 4, 8, 12, and 16 were evaluated according to the Tape Rating Instrument for Psychotherapy of Eating Disorders (TRIPED; Olmsted, Issacs, Bemis, & Garner, 1988). To ensure GPIP treatment integrity, feedback was provided to therapists in weekly supervision to correct for any therapist behaviours in consistent with the GPIP intervention manual. In the current study, inter rater reliability of therapists' adherence to the GPIP manual was good, $\rho = .78$, as measured by the intraclass correlation. Therapists demonstrated sufficient adherence to the GPIP manual, with a mean adherence rating of 3.88 ($SD = .55$; Tasca et al., 2012). Participants provided informed consent and the study protocol was approved by the research institution's research ethics board.

Statistical Analyses

CQ-I validation. Analyses to evaluate the psychometric properties of the new CQ-I were conducted according to recommendations for scale development by Clark and Watson (1995). An exploratory factor analysis (EFA) using principal axis factoring with Promax rotation was conducted to evaluate the construct validity of the CQ-I. Factors with eigenvalues equal to or greater than 1 and items with factor loadings equal to or greater than .32 were retained (Tabachnick & Fidell, 2001). A parallel EFA was conducted for the CQ using the mean score per person as the unit of analysis.

Pearson correlations between the CQ-I, the CQ, and the GCQ Engaged scales at week 4 were conducted to assess convergent validity of the CQ-I. The following benchmarks were used

to evaluate the strength of association between the measures: $r < .30$ indicates a small association, $r \geq .30$ indicates a medium association, and $r \geq .50$ indicates a large association (Cohen, 1988). Discriminant validity of the CQ-I was evaluated by correlating the CQ-I with the GCQ Conflict and Avoiding scales at week 4 using the previously noted benchmarks for strength of association. Internal consistency was evaluated using a Cronbach's alpha of .80 or greater and a mean inter-item correlation between .15 and .50 as benchmarks (Clark & Watson, 1995).

Group treatment study. The BED treatment trial portion of this study employed a Multilevel Modeling (MLM) approach to data analysis, which addresses the potential violations of the assumption of independence of observations that may arise from two factors present in this study: 1) nested data from the shared group experience (i.e., data nested within groups) and 2) repeated sampling (data nested within individuals; Boyle &Willms, 2001; Diez-Roux, 2000). The MLM approach was also useful because it made use of all participant data ($N = 102$) when estimating parameters without listwise deletion (Gallop & Tasca, 2009). The MLM analyses were conducted using the HLM version 7 program, with full maximum likelihood estimation (Raudenbush, Bryk, & Congdon, 2010).

Participants were hierarchically organized, or nested, within therapy groups, hence the data may not be independent resulting in inflated Type I error rates (Stevens, 2002). Intraclass correlations (ICC) were calculated to assess dependence in the data according to methods described by Tasca, Illing, Joyce, and Ogrodniczuk (2009). A three level MLM was conducted to assess the degree of dependence of scores on the dependent variable (i.e., discrepancy scores at sessions 4, 8, 12, and 16) at level 1, which were nested within individual participants at level 2. Individuals were nested within groups at level 3. Two level random effects MLMs were also conducted for each outcome variable to assess the degree of dependence (Tasca et al., 2009). The

post-treatment score was selected as the dependent variable, with individual pre-treatment scores at level 1 (i.e., individual), and condition at level 2 (i.e., group). Kenny, Kashy, & Bolder (1998) recommend that ICC values less than .05 indicate ignorable dependence for groups of this size. For dependent variables with ICC < .05, analyses were conducted at the level of the individual with 2-level repeated measurement MLM. When ICC exceeded .05, the Type I error rate was adjusted according to the values provided by Kenny et al. (1998).

For hypothesis 1, that individuals in the high attachment anxiety condition would show greater discrepancies compared to those in the low attachment anxiety condition, we evaluated differences in discrepancy scores between the two attachment anxiety conditions at each time point (i.e., sessions 4, 8, 12, and 16). We used a 2 level MLM, in which condition was specified as a predictor at level 2 (Model 1 in the Appendix A). For hypothesis 2, that there would be significant convergence over the course of treatment, we conducted a 2 level growth curve MLM with time specified at level 1 and the discrepancy pre-score controlled for at level 2 (Model 2 in the Appendix A). For hypothesis 3, that the rate of convergence in discrepancy scores across therapy sessions would be greater for individuals in the high attachment anxiety condition, we examined the interaction between attachment anxiety condition and slopes of the discrepancy scores over time using a 2 level linear growth MLM (Model 2 in the Appendix A).

Hypothesis 4 proposed that participants who show convergence in their self-ratings compared to mean group ratings of their cohesion to the group were expected to report a greater improvement on outcome measures across treatment conditions. Hypothesis 5 proposed that there would be a significant convergence x condition interaction. Hypotheses 4 and 5 were evaluated by examining change on outcome measures from pre to post treatment (i.e., BDI-II, RSES, and binge eating frequency) using 2-level linear growth MLM with fixed slopes.

Convergence in discrepancy (i.e., slopes of discrepancy values), outcome pre-score, condition, and convergence slopes x condition interaction were specified at level 2 (Model 3 in the Appendix A). The slopes of discrepancy values refers to the individual's CQ-I – CQ-G ordinary least square slopes that were generated in the previous MLM (Model 2 in the Appendix A). The convergence slopes were saved for each individual and entered as predictors at level 2.

The effect size for all MLMs was evaluated using the pseudo-R^2 statistic and model fit was assessed with the difference chi-square test ($\Delta\chi^2$; Raudenbush & Bryk, 2002). In some cases, such as when the pseudo-R^2 was calculated from variance components at different levels, we only reported the $\Delta\chi^2$, which has superior statistical qualities (Singer & Willett, 2003).

Results

CQ-I Validation

There were no univariate or multivariate outliers, and the data were normally distributed for the CQ-I and CQ scale items. The EFA of the CQ-I items yielded a single interpretable factor, which accounted for 49.3% of the item variance. With the exception of one item ("The group members are similar to (share things in common with) me"), the items demonstrated loadings of .32 or greater. The item that did not meet the pre-determined inclusion criteria was removed, and the EFA was conducted a second time with the remaining seven items. The second EFA of the 7-item CQ-I yielded a single interpretable factor, which accounted for 55.7% of the item variance, and all remaining seven items loaded greater than .32 (Table 1). All subsequent analyses used the 7-item CQ-I (Appendix B). We modified the original CQ to contain the same parallel seven items. The equivalent item, "I am similar to (share things in common with) her", was removed from the CQ scale to create the 7-item scale that yielded a single interpretable factor, accounting for 59.3% of the item variance. All items loaded greater than .32 (Table 1).

All subsequent analyses used this modified 7-item version of the CQ, which we refer to as the CQ-G (Appendix C) to indicate that it is the parallel version of the 7-item CQ-I.

Since the CQ-I is new and CQ-G was modified for this study, we assessed convergent and discriminant validity for both scales. Convergent validity was supported by the significant medium-sized correlation between the CQ-I and the GCQ Engaged scale ($r = .301$, $p < .01$). Discriminant validity was supported by the small and non-significant correlations between the CQ-I and the Conflict ($r = -.024$, ns) and Avoidance ($r = -.073$, ns) scales of the GCQ. Similarly, convergent validity for the CQ-G was supported by a significant large-sized correlation with the Engaged scale ($r = .556$, $p < .01$). The CQ-G was not significantly correlated with the Avoidance ($r = -.018$, ns) or Conflict ($r = -.186$, ns) scales, thus providing evidence of discriminant validity. The CQ-I and CQ-G were moderately and significantly correlated ($r = .400$, $p < .01$). The CQ-I demonstrated good internal consistency, with a coefficient alpha of .90 and a mean inter-item correlation of .52. The 7-item CQ-G also demonstrated good internal consistency, with a coefficient alpha of .90 and a mean inter-item correlation of .56.

Group Treatment Study

There were no univariate or multivariate outliers, and the data were normally distributed. Intraclass correlations for the CQ-I – CQ-G discrepancy scores, BDI-II, and RSES did not indicate a degree of dependence in the data that required correction (i.e., all ICCs < .05). The ICC for binge eating frequency exceeded the recommended cut-off (ICC = .085). To correct for inflated Type I error due to group dependence, all analyses that included binge eating frequency used a Type I error rate of .02 (Kenney et al., 1998). We conducted a pattern-mixture modelling to assess for the effects of drop out on group cohesion (Gallop & Tasca, 2009). The pattern of

participant drop out did not significantly affect the growth in group cohesion, and so the data were considered missing at random.

Table 2 shows participants' CQ-I, mean CQ-G, and discrepancy scores by attachment anxiety condition across four sessions of GPIP. As predicted in hypothesis 1, there was a significant difference in overall discrepancies between high and low attachment anxiety conditions at week 4 (γ_{01} = -.44, $t(91)$ = -2.83, p = .006), week 8 (γ_{01} = -.42, $t(79)$ = -2.51, p = .014), week 12 (γ_{01} = -.48, $t(78)$ = -2.86, p = .005), and week 16 (γ_{01} = -.39, $t(69)$ = -2.33, p = .023). Participants in the high attachment anxiety condition demonstrated larger discrepancies at each measurement point compared to those in the low attachment anxiety condition. Adding the attachment anxiety condition parameter improved model fit at each measurement point: week 4 $\Delta\chi^2$ (1) = 7.71, p < .01, week 8 $\Delta\chi^2$ (1) = 47.89, p < .001, week 12 $\Delta\chi^2$ (1) = 53.74, p < .001, and week 16 $\Delta\chi^2$ (1) = 137.45, p < .001.

There was a medium-sized correlation between the slope of discrepancy ratings and the baseline (i.e., session 4) discrepancy estimate (r = -.30). As such subsequent growth models controlled for the discrepancy score at session 4. As predicted in hypothesis 2, there was significant linear change in discrepancy ratings over time across both conditions (β_{10} = .13, $t(91)$ = 5.24, p < .001) that accounted for 41.24% (pseudo-R^2) of the within-person variance in the model. Adding the linear change parameter resulted in a better fitting model to the data, $\Delta\chi^2$ (3) = 25.79, p < .001. This suggested significant convergence over time between the individual's versus the mean of the group's rating of the individual's cohesion to the group. Contrary to our prediction in hypothesis 3, there was no significant difference between the conditions in rate of convergence over time (β_{11}= -0.07, $t(90)$ = -1.45, p = .151).

Next, we examined the relationships between the change on outcome variables (i.e., depression, self-esteem, and binge eating frequency), reductions in discrepancy scores, and attachment anxiety condition. A previous study reported that participants showed significant improvements on all outcome measures (Tasca et al., 2012). Table 2 shows participants' BDI-II, RSES, and EDE scores by attachment anxiety condition at pre and post-treatment (week 16). As predicted in hypothesis 4, participants who had a greater convergence between individual versus mean group ratings of cohesion also reported significant improvements in self-esteem. There was a significant relationship between change in discrepancy and change in self-esteem ($\beta_{12} = .41$, $t(84) = 2.61$, $p = .011$). Adding the discrepancy growth parameter as a predictor resulted in a better fitting model to the data, $\Delta\chi^2 (2) = 12.81$, $p < .005$. Contrary to our predictions, there were no significant relationships between convergence of ratings and outcome with respect to depression, or binge eating frequency.

Discussion

The main goal of the current study was to assess the convergence in ratings of group cohesion as an index of interpersonal learning, and to assess the relationship between convergence, attachment anxiety, and clinical outcomes. In order to assess these relationships, we created the CQ-I and modified the CQ into the CQ-G to create parallel measures that assessed alternate perspectives of group cohesion (i.e., the individual's versus the mean group rating of the individual's cohesion to the group). Testing of these new measures produced a single factor solution for each of the CQ-I and CQ-G. This single factor structure differed from the results reported in Piper and colleagues' (1983) study of the original 8-item CQ. Differences are likely attributable to different methods of factor extraction, rotation, and the larger sample size in this study. This single factor solution is consistent with recent research on group cohesion suggesting

an overarching single construct (Johnson et al., 2005). The CQ-I and CQ-G used in this study also showed good concurrent validity and discriminant validity.

As noted previously, researchers and clinicians are interested in assessing the levels and development of group cohesion from multiple perspectives (e.g., Burlingame et al., 2011; Johnson et al., 2005). Together, the parallel CQ-I and CQ-G provide the opportunity to do so. These scales may offer a more comprehensive view of group cohesion, and may help to identify discrepancies in these perspectives. We conceptualized convergence on these scales as an index of interpersonal learning (Biesanz et al., 2007). From a social learning perspective, convergence suggests corrections of interpersonal misperception that may result in improved interpersonal interactions and in a more accurate understanding of how one is perceived by others (Chen & Mallinckrodt, 2002).

Women with BED had significantly lower ratings of their cohesion to the group compared to their fellow group members' evaluations. We found that as treatment progressed, individuals in both study conditions provided ratings of themselves that became more similar to the average rating provided by the other group members. This convergence suggests that women with BED were able to develop more realistic and positive self-perceptions of their participation and impact on the group. Consistent with theories of group dynamics, this change may be the result of interpersonal learning that occurs when individuals receive immediate feedback from group members (Yalom & Leszcz, 2005). Yalom and Leszcz (2005) asserted that a primary focus of group psychotherapy should be to correct interpersonal distortions through relational experiences within the group context, which may challenge an individual's maladaptive beliefs about the self and others through interpersonal feedback. Consequently, interpersonal learning promotes insight into one's impact on others, which may lead to more adaptive and rewarding

interpersonal interaction both within and outside of the group (Yalom & Leszcz, 2005). In the case of women with BED, improved interpersonal interactions likely led to a less self-critical introject as suggested by the GPIP model. In their recent article Tasca, Foot, and colleagues (2011) provide case examples of GPIP interventions and discuss the impact of these interventions on interpersonal processes in a treatment sample of women with BED.

As predicted, compared to those with lower attachment anxiety, individuals with high attachment anxiety reported significantly lower ratings of their cohesion compared to the mean ratings provided by their fellow group members. Although these ratings converged over the course of treatment in both conditions, women with BED who reported high attachment anxiety at pre-treatment continued to provide more negative ratings of themselves at the end of therapy. These findings are consistent with Bartholomew and Horowitz's (1991) explanation that individuals who are high in attachment anxiety typically hold more negative views of themselves and more positive views of others. Furthermore, our findings suggest the importance of assessing individual characteristics such as attachment anxiety that may impact group dynamics or the individual's experience in the psychotherapy group. Individuals high in attachment anxiety may have a very strong need for closeness to group members, while at the same time they may be preoccupied with fears of loss (Rom & Mikulincer, 2003). These individuals may be hypervigilant for signs of rejection and may amplify their reported distress in order to elicit closeness and support (Chen & Mallinckrodt, 2002). Working within the GPIP framework, group therapists may help those with high attachment anxiety by providing additional support to solicit constructive feedback from fellow group members that challenge the individual's negative views of themselves (i.e., introject) in the group, and that alter their expectations that others will leave or disappoint them (i.e., expectations of others). In their recent article, Tasca, Ritchie, and

Balfour (2011) provide case examples of interventions that are tailored to the individual's attachment style for patients with eating disorders.

We also assessed if interpersonal learning was related to change in outcome at post-treatment. The data showed a significant relationship between convergence of cohesion ratings and improved self-esteem at post-treatment. We conceptualize this improvement in self-esteem occurring as a function of feedback from other group members in a cohesive group context. That is, individuals with BED may have experienced a shift in self-esteem because of a developing view of self that was more consistent with the positive way they were perceived by others with whom they felt close. Such a result is at the core of the GPIP model which emphasizes the need for change in the introject as the basis of lasting interpersonal and symptomatic change. Consistent with theories of group dynamics (e.g., Yalom & Leszcz, 2005), we suggest that over the course of treatment interpersonal feedback from fellow group members resulted in a more accurate understanding of how they were perceived by others, and of how they affected the group.

Limitations

We recognize several limitations regarding this study. First, although our sample size of 173 exceeded Tabachnick and Fidell's (2001) suggested minimum sample sized of 150 for factor analysis, and was larger than the sample size in Piper and colleagues' (1983) original study, we recommend additional research to continue to validate the CQ-I and parallel CQ-G scales. Despite the moderate sample size, we concluded that the single factor of both the CQ-I and modified CQ-G are likely reliable given the size of the factor loadings and amount of variance accounted for by each scale. Furthermore, the single factor structure that emerged was consistent with recent research supporting an overall single factor of group cohesion (e.g., Johnson et al.,

2005). Second, with regard to the group treatment study sample, there was some attrition over the course of treatment that may have biased the results and reduced generalizability to treatment completers. However, as previously noted we assessed the pattern of missing data and concluded that these data were missing at random. Furthermore, the use of the MLM approach maximized the use of all participant data without listwise deletion, thus minimizing the impact of attrition on the sample size and reliability of parameters. Third, participants' level of attachment anxiety was assessed using a single self-report measure of attachment styles (i.e. the ASQ Need for Approval scale), and condition assignment was based on a discrete cut-off score (> 3.59 on the ASQ Need for Approval scale). Although the ASQ has previously demonstrated adequate psychometric properties in a BED sample, and the selected cut-off score was based in previous research with a similar patient sample, this method of group assignment might have resulted in groups that were not as distinct as we had intended (Tasca et al., 2006; Tasca et al., 2012). As a result of the assignment method, the conditions might have been too similar in level of attachment anxiety to test the hypotheses concerning attachment anxiety. Nevertheless, the high and low attachment anxiety conditions did differ in discrepancy scores in the hypothesized direction. A fourth limitation is the relatively homogeneous sample comprised of adult women with BED who were predominantly White, well educated, and obese. Consequently, the results might not generalize to men or to other more socio-economically and ethnically diverse patient populations. Fifth, although we conceptualized improved self-esteem as being the result of convergence in ratings, it is also possible that as the individual's self-esteem improved other group members perceived the individual more positively such that the convergence may be the result of improved self-esteem and not vice versa. Sixth, contrary to our predictions, there was no significant impact of increased convergence on symptoms of depression and binge eating. It is possible that

interpersonal learning as defined by Yalom and Leszcz (2005) might not be directly related to changes in depression and binge eating at post-treatment but mediated by another therapeutic factor. Our index of interpersonal learning (i.e., convergence of CQ-I and CG-G ratings) may be specific to changes in self-esteem because of its emphasis on self perception.

Conclusions

Interpersonal learning and group cohesion have long been seen as cornerstones of positive outcomes in group psychotherapy (Yalom & Leszcz, 2005). Groups offer a unique context for interpersonal learning given the opportunities for immediate feedback from peers and therapists. Results of this study suggest that clinicians may improve the effectiveness of group-based interventions by encouraging interpersonal learning through helping individuals work towards convergence between their own and the group's perceptions of the individual's cohesion to the group. Practically, group therapists might use the CQ-I and CQ-G together for ongoing monitoring of discrepancies in an individual's and group's perceptions of the individual's cohesion to the group. A GPIP therapist might combine this information with their assessment of the individual's CRP and attachment style. For example, a group therapist might highlight discrepancies between the individual's internal experiences (i.e., affective states, motivations, needs, perceptions, etc.) and the perceptions of other group members to help to create a view of self that is more congruent with the perceptions of the group. Such a discussion about views of self and expectations of others and can facilitate experiential interventions that allow the individual to internalize an introject that is less harsh and more in line with other group members' evaluations. This may be particularly relevant for those with higher attachment anxiety who reported a more negative rating of their cohesion to the group compared to their fellow group members.

References

Aiken, L. S. & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions.* London: Sage.

American Psychiatric Association (2000). *Diagnostic and statistical manual of mental disorders* (4th ed Text Revision.). Washington, DC: Author.

Ansell, E. B., Grilo, C., M., & White, M. A. (2012). Examining the interpersonal model of binge eating and loss of control over eating in women. *International Journal of Eating Disorders, 45,* 43-50. doi: 10.1002/eat.20897

Bartholomew, K. & Horowitz, L. M. (1991). Attachment styles among young adults: A test of a four-category model. *Journal of Personality and Social Psychology, 61*, 226-244.

Beck, A., Steer, R. A., & Brown, G. K. (1996). *The Beck Depression Inventory – II professional manual.* San Antonio: The Psychological Corporation.

Biesanz, J.C., West, S.G., & Millevoi, A. (2007). What do you learn about someone over time? The relationship between length of acquaintance and consensus and self-other agreement in judgments of personality. *Journal of Personality and Social Psychology, 92(1)*. 119-135.

Boyle, M. H., & Willms, J. D. (2001). Multilevel modeling of hierarchical data in development studies. *Journal of Child Psychology and Psychiatry, 42,* 141-162.

Burlingame, G., McClendon, D. T., & Alonso, J. (2011). Cohesion in group therapy. *Psychotherapy, 48,* 34-42. doi. 10.1037/a0022063

Castonguay, L., Pincus, A., Agras, W., & Hines, C. (1998). The role of emotion in group cognitive-behavioral therapy for binge eating disorder: When things have to feel worse before they get better. *Psychotherapy Research, 8(2),* 225-238.

Chen, E.C., & Mallinckrodt, B. (2002). Attachment, group attraction, and self-other agreement in interpersonal circumplex problems and perceptions of group members. *Group Dynamics, 6,* 311-324.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences.* New York: Guilford.

Clark, L. A., & Watson, D. (1995). Constructing validity: Basic issues in objective scale development. *Psychological Assessment, 7,* 309-319.

Crowe, T. P., & Grenyer, B. F. S. (2008). Is therapist alliance or whole group cohesion more influential in group psychotherapy outcomes? *Clinical Psychology and Psychotherapy, 15,* 239-246.

Diez-Roux, A. V. (2000). Multilevel analysis in public health research. *Annual Review of Public Health, 21,* 171-192.

Dion, K. L. (2000). Group cohesion: From "field of forces" to multidimensional construct. *Group Dynamics, 4,* 7-26.

Fairburn, C. G., & Cooper, Z. (1993). The Eating Disorder Examination (12th edition). In C.G. Fairburn & G. T. Wilson (Eds.). *Binge eating: Nature, assessment, and treatment.* New York: Guilford Press.

Feeney, J. A., Noller, P., & Hanrahan, M. (1994). Assessing adult attachment. In M.B. Sperling & W.H. Berman (Eds.) *Attachment in adults* (pp.128-151). New York: Guilford.

First, M. B., Spitzer, R. L, Gibbon, M., & Williams, J. B., & MHS Staff (1997). *Computer-assisted SCID – Clinician version*. Toronto, Ontario: Multi-Health Systems.

Gallop, R. & Tasca, G. A. (2009). Multilevel modeling of longitudinal data for psychotherapy researchers: II. The complexities. *Psychotherapy Research, 00,* 1-15.

Gelenberg, A. J., & Chesen, C. L., (2000). How fast are antidepressants? *Journal of Clinical Psychiatry, 61,* 712-721.

Hill, R. W., Zrull, M. C., & McIntire, K. (1998). Differences between self- and peer ratings of interpersonal problems. *Assessment, 5,* 67-83.

Hudson, J. I., Hiripi, E., Pope, H. G., & Kessler, R. C. (2007). The prevalence and correlates of eating disorders in the National Comorbidity Survey replication. *Biological Psychiatry, 61,* 348-358.

Johnson, J. E., Burlingame, G. M., Olson, J. A., Davies, D. R., & Gleave, R. (2005). Group climate, cohesion, alliance, and empathy in group psychotherapy: Multilevel structural equation models. *Journal of Counseling Psychology, 52,* 310-321.

Johnson, J. E., Pulsipher, D., Ferrin, S. L., Burlingame, G. M., Davies, D. R., & Gleave, R. (2006). Measuring group processes: A comparison of the GCQ and CCI. *Group Dynamics: Theory, Research, and Practice, 10,* 136-145.

Joyce, A. S., Piper, W. E., & Ogrodniczuk, J. S. (2007). Therapeutic alliance and cohesion variables as predictors of outcome in short-term group psychotherapy. *International Journal of Group Psychotherapy, 57(3),* 269-296.

Kenny, D. A., Kashy, D., & Bolger, N. (1998). Data analysis in social psychology. In D. Gilbert, S. Fiske, and D. Lindzey (Eds.), *Handbook of social psychology* (4th ed., pp. 233-265). New York: McGraw-Hill.

Kivlighan, D. M., & Goldfine, D. C. (1991). Endorsement of therapeutic factors as a function of stage of group development and participant interpersonal attitudes. *Journal of Counseling Psychology, 38,* 150-158.

Levy, K. N., Ellison, W. D., Scott, L. N., & Bernecker, S. L. (2011). Attachment style. *Journal of Clinical Psychology: In Session, 67,* 193-203.

MacKenzie, K. R. (1983). The clinical application of a group climate measure. In R. R. Dies, & K. R. MacKenzie (Ed.), *Advances in group psychotherapy: Integrating research and practice* (pp.159-170). New York: International University Press.

Marcus, D. K. (2006). Interpersonal feedback: A social relations perspective. *International Journal of Group Psychotherapy, 56,* 173-189.

Marcus, M. D. (1997). Adapting treatment for patients with binge eating disorder. In D.M. Garner & P.E. Garfinkel (Eds.), *Handbook of treatments for eating disorders* (pp. 484-493). New York: Guilford Press.

Olmsted, M. P., Isaacs, P., Bemis, K., & Garner, D. M. (1988). *Tape rating instrument for psychotherapy of eating disorders (TRIPED)*. Unpublished manuscript.

Piper, W. E., Marache, M., Lacroix, R., Richardsen, A. M., & Jones, B. D. (1983). Cohesion as a basic bond in groups. *Human Relations, 36*, 93-108.

Raudenbush, S. W., Bryk, A. S., & Congdon, R. (2010). *HLM 7 Hierarchical Linear and Nonlinear Models*. Scientific Software International, Inc.

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models* (2nd Ed.). Newbury Park, London: Sage.

Rom, E. & Mikulincer, M. (2003). Attachment theory and group processes: The association between attachment style and group-related representations, goals, memories, and functioning. *Journal of Personality and Social Psychology, 84(6)*, 1220-1235.

Rosenberg, M. (1979). *Conceiving the self.* New York: Basic Books.

Shorey, H. S., & Snyder, C. R. (2006). The role of adult attachment styles in psychopathology and psychotherapy outcomes. *Review of General Psychology, 10,* 1-20.

Singer, J. D. & Willett, J. B.(2003). *Applied longitudinal data analysis: Modeling change and event occurrence*. New York: Oxford University Press.

Stevens, J. P. (2002). *Applied multivariate statistics for the social sciences* (4th ed). Mahwah, NJ: Erlbaum.

Strupp, H. H. & Binder, J. L. (1984). *Psychotherapy in a new key: A guide to time-limited dynamic psychotherapy*. New York: Basic Books.

Tabachnick, B. G. & Fidell, L. S. (2001). *Using multivariate statistics* (4th ed.). New York: Harper Collins.

Tasca, G. A., Mikail, S., & Hewitt, P. (2005). Group psychodynamic interpersonal psychotherapy: Summary of a treatment model and outcomes for depressive symptoms. In M.E. Abelian (Ed.) *Focus on psychotherapy research* (pp. 159-188). New York: Nova.

Tasca, G. A., Balfour, L., Ritchie, K., & Bissada, H. (2006). Developmental changes in group climate in two types of group therapy for Binge Eating Disorder: A growth curve analysis. *Psychotherapy Research, 16*, 499-514.

Tasca, G.A., Illing, V., Joyce, A.S., & Ogrodniczuk, J.S. (2009). Three-level multilevel growth models for nested change data: A guide for group treatment researchers. *Psychotherapy Research, 19,* 453-461.

Tasca, G. A., Foot, M., Leite, C., Maxwell. H., Balfour, L., & Bissada, H. (2011). Interpersonal process in psychodynamic-interpersonal and cognitive behavioral group therapy : A systematic case study of two groups. *Psychotherapy, 48,* 260-273.

Tasca, G., A., Ritchie, K., & Balfour, L. (2011). Implications of attachment theory and research for the assessment and treatment of eating disorders. *Psychotherapy, 48,* 249-259.

Tasca, G. A., Ritchie, K., Demidenko, N., Balfour, L., Krysanski, V., Weeks, K., …Bissada, H. (2012). Matching women with binge eating disorder to group treatment based on attachment anxiety: outcomes and moderating effects. *Psychotherapy Research, 1-14.*

Vazire, S. & Mehl, M. R. (2008). Knowing me, knowing you: The accuracy and unique predictive validity of self-ratings and other-ratings of daily behavior. *Personality and Individual Differences, 95,* 1202-1216.

Wilfley, D. E., Welch, R. R., Stein, R. I., Spurrell, E. B., Cohen, L. R., Saelens, B. E., Dounchis, J. Z., et al. (2002). A randomized comparison of group cognitive-behavioral therapy and group interpersonal psychotherapy for the treatment of overweight individuals with binge eating disorder. *Archives of General Psychiatry, 59,* 713-721.

Yalom, I. D. & Leszcz, M. (2005). *The theory and practice of group psychotherapy* (5th ed.). New York: Basic Books.

Table 1

Cohesion Questionnaire- Individual Self Version (CQ-I) and the parallel 7-Item Cohesion Questionnaire (CQ-G) Items and Factor Loadings

Measure and Items	Factor Loading
CQ-I	
I irritate or annoy the group members.	.33
The group members feel attracted toward me.	.75
The group members would like to be in a future group with me.	.83
The group members find it easy to communicate with me.	.79
The group members would like to form a friendship outside the group with me.	.78
If I left, the group members would miss me.	.79
The group members like me.	.84
CQ-G	
She irritates or annoys me.	.34
I feel attracted toward her.	.76
I would like to be in a future group with her.	.90
I find it easy to communicate with her.	.87
I would like to form a friendship outside of group with her.	.76
If she left, I would miss her.	.82
I like her.	.81

Note. Item 1 was reverse scored for both measures. CQ-I $N = 173$, CQ-G $N = 102$.

Table 2

CQ-I, CQ-G, Discrepancy, and Outcome Means and Standard Deviations by Study Condition

Variables and Condition	Pretreatment		Week 4		Week 8		Week 12		Week 16 (post)	
	M	SD	M	SD	M	SD	M	SD	M	SD
CQ-I										
Low			3.62	.86	3.86	.79	4.06	.83	4.43	.81
High			3.05	.80	3.44	.73	3.41	.74	4.01	.83
CQ-G										
Low			4.20	.69	4.24	.68	4.33	.80	4.60	.80
High			3.85	.75	4.30	.84	4.37	.84	4.39	.74
Discrepancy										
Low			-.58	.87	-.38	.81	-.27	.96	-.16	.85
High			-.80	.92	-.86	.84	-.93	.80	-.43	.76
BDI-II										
Low	16.09	10.37							10.14	8.17
High	25.74	10.46							15.26	11.29
RSES										
Low	29.65	5.69							31.47	5.60
High	21.80	4.49							25.93	4.85
Binge Eating										
Low	14.48	4.69							7.40	8.18
High	16.06	6.57							6.26	6.45

Note. Low = low attachment anxiety condition; High = high attachment anxiety condition. CQ-I = Cohesion Questionnaire-Individual Version ; CQ-G = 7-item Cohesion Questionnaire-Group Version; Discrepancy = CQ-I – (group mean CQ-G); BDI-II = Beck Depression Inventory-II; RSES = Rosenberg Self Esteem Scale; Binge Eating = Frequency of binge eating in past 28 days assessed by the Eating Disorder Examination. At pretreatment low $n = 52$; high $n = 50$. At week 4 low $n = 43$; high $n = 47$. At week 8 low $n = 41$; high $n = 40$. At week 12 low $n = 41$; high $n = 39$. At week 16 low $n = 36$; high $n = 36$ for the CQ-I, CQ-G, and Discrepancy, and low $n = 42$; high $n = 44$ for the outcome variables.

Appendix A: Multilevel Models

Model 1: *Two-Level Random Effects Model Used to Assess Difference in Discrepancy Between Conditions*

Level 1: $Y_{ti} = \beta_{0i} + r_{ti}$

Level 2: $\beta_{0i} = \gamma_{00} + \gamma_{01}(\text{condition}_i) + u_{0i}$

Model 2: *Two-Level Conditional Growth Model Used to Assess the Effect of Condition*

Level 1: $Y_{ti} = \pi_{0i} + \pi_{1i}(\text{week}_{ti}) + e_{ti}$

Level 2: $\pi_{0i} = \beta_{00} + \beta_{01}(\text{individual discrepancy score time } 1_i) + \beta_{02}(\text{condition}_i) + r_{0i}$

$\pi_{1i} = \beta_{10} + \beta_{11}(\text{individual discrepancy score time } 1_i) + \beta_{12}(\text{condition}_i) + r_{1i}$

Note. For models 1 and 2, *Y*= Discrepancy score. The pre scores and predictors were grand mean centered; time and condition were not centered. To test hypothesis 2, the "condition" parameters were not included in the model.

Model 3: *Two-Level Model to Assess Change in Outcome*

Level 1: $Y_{ti} = \pi_{0i} + \pi_{1i}(\text{week}_{ti}) + e_{ti}$

Level 2: $\pi_{0i} = \beta_{00} + \beta_{01}(\text{outcome measure pre score}_i) + \beta_{02}(\text{Discrepancy growth parameter}_i)$

$+ \beta_{03}(\text{condition}_i) + \beta_{04}(\text{Discrepancy x condition}_i) + r_{0i}$

$\pi_{1i} = \beta_{10} + \beta_{11}(\text{outcome measure pre score}_i) + \beta_{12}(\text{Discrepancy growth parameter}_i)$

$+ \beta_{13}(\text{condition}_i) + \beta_{14}(\text{Discrepancy x condition}_i)$

Note. Model 3 was used to assess change in which *Y* = depressive symptoms, self-esteem, or binge eating in the past 28 days. In all analyses, pre scores and predictors were grand mean centered; time and condition were not centered. To test hypothesis 4, all parameters associated with "condition" were not included in the model.

Appendix B : Cohesion Questionnaire – Individual Version (CQ-I)

Cohesion Questionnaire – Individual Version (CQ-I)

ID: _____ Group: _____
Date: _____ Therapist: _____

This booklet focuses on your impressions of yourself. Please be open and honest as you respond. If you have negative reactions as well as positive ones, let us know. Your responses are confidential. The other patients will not have access to your responses and your therapist will not receive feedback until after your therapy group has ended. Please respond to all of the items, even if you are not certain about some of your reactions. We are interested in capturing some of your "hunches" and "gut" reactions as well as those that are more established. Your cooperation is appreciated and will help us better understand the workings of therapy groups in our clinic.

For this page please focus on your impressions of **yourself**. Circle the appropriate X.

	Very Little					Very Much
1. I irritate or annoy the group members.	X	X	X	X	X	X
2. The group members feel attracted toward me.	X	X	X	X	X	X
3. The group members would like to be in a future group with me.	X	X	X	X	X	X
4. The group members find it easy to communicate with me.	X	X	X	X	X	X
5. The group members would like to form a friendship outside the group with me.	X	X	X	X	X	X
6. If I left, the group members would miss me.	X	X	X	X	X	X
7. The group members like me.	X	X	X	X	X	X

Note. Each item is scored one (“very little”) to six (“very much”). Item 1 is reverse scored. All items are summed to calculate a single factor score.

Appendix C: Cohesion Questionnaire- Group Version (CQ-G)

Cohesion Questionnaire- Group Version (CQ-G)

ID: _____ Group: _____
Date: _____ Therapist: _____

This booklet focuses on your impressions of the each person in your therapy group. Please be open and honest as you respond. If you have negative reactions as well as positive ones, let us know. Your responses will be confidential. The other patients will not have access to your responses and your therapist will not receive feedback until after your therapy group has ended. Please respond to all of the items, even if you are not certain about some of your reactions. We are interested in capturing some of your "hunches" and "gut" reactions as well as those that are more established. Your cooperation is appreciated and will help us better understand the workings of therapy groups in our clinic.

For this page please focus on your impressions of _____. Circle the appropriate X.

	Very Little					Very Much
1. She irritates or annoys me.	X	X	X	X	X	X
2. I feel attracted toward her.	X	X	X	X	X	X
3. I would like to be in a future group with her.	X	X	X	X	X	X
4. I find it easy to communicate with her.	X	X	X	X	X	X
5. I would like to form a friendship outside the group with her.	X	X	X	X	X	X
6. If she left, I would miss her.	X	X	X	X	X	X
7. I like her.	X	X	X	X	X	X

Note. Each item is scored one (“very little”) to six (“very much”). Item 1 is reverse scored. All items are summed to calculate a single factor score. The group members’ (i.e., the raters) scores were compiled to compute a mean score for each individual (i.e., the target).

General Discussion

As group-based interventions become increasingly common, both group psychotherapy researchers and clinicians have demonstrated an interest in evaluating the effectiveness of group psychotherapy, and in examining attributes that maximize treatment response (Burlingame et al., 2004; Yalom & Leszcz, 2005). The goal of the present dissertation was to explore group process and individual characteristics that may affect treatment outcome in women receiving GPIP for BED. Specifically, I examined two aspects of group process that have been identified as key therapeutic factors in group psychotherapy: Group cohesion and interpersonal learning (Yalom & Leszcz, 2005). These processes have been linked to improved group process, treatment outcomes, the development of more adaptive behaviours, and more coherent views of the self and others (e.g., Burlingame et al., 2011; Castonguay et al., 1998; Yalom & Leszcz, 2005). Group cohesion refers to the positive bond, engagement, or attraction to group members, and was measured using the Engaged Scale from the GCQ in the current dissertation to assess the initial degree of cohesiveness, and growth in cohesion over the course of treatment. Interpersonal learning refers to the process through which individuals challenge their interpersonal distortions by sharing aspects of their experiences (i.e., emotions, thoughts, perceptions) and receiving corrective feedback, leading to improved awareness of the self, of others, and of interpersonal dynamics (Yalom & Leszcz, 2005). In the current dissertation, interpersonal learning was conceptualized as a convergence of the individual's ratings of their own cohesion to the group (CQ-I) and the mean group ratings of the individual's cohesion to the group (mean CQ-G). The CQ-I and CQ-G measures were created for the purpose of assessing multiple perspective of group cohesion. These parallel measures each produced a single factor solution and demonstrated adequate psychometric properties. In combination, these measures provided the

opportunity to monitor changes in multiple perspectives of cohesion, and to monitor convergence in perspectives over the course of treatment.

In the two studies that comprise this dissertation, I examined the relationship between group cohesion, interpersonal learning, level of attachment anxiety (i.e., high vs. low attachment anxiety at pre-treatment), and clinical outcomes associated with BED following a 16-week GPIP trial. These studies evaluated the following clinical outcomes at post-treatment: frequency of binge eating, depressive symptoms, and self-esteem. Although several treatment approaches, including GPIP, have demonstrated clinical effectiveness in the treatment of BED, the aim of the current dissertation was to contribute to the literature in an effort to maximize treatment effectiveness in group-based interventions by exploring the impact of an individual characteristic (level of attachment anxiety) on group processes and clinical outcomes. Both studies employed a growth curve modeling approach which allowed participants to provide ratings of group cohesion on a weekly basis and discrepancy ratings at weeks 4, 8, 12, and 16, thus providing an opportunity to examine change over the course of treatment, rather than comparing static time point measurements (e.g. pre- and post-treatments). This statistical approach also addresses the issue of nested data and the non-independence of observations that may occur in group psychotherapy research.

As discussed in the studies, attachment theory has emerged as an important factor in psychotherapy research, as an individual's attachment style shapes perceptions of self and others, and impacts interpersonal interactions (e.g., Bartholomew & Horowitz, 1991; Chen & Mallinckrodt, 2002; Shorey & Snyder, 2006, Yalom & Leszcz, 2005). Based on theories of the relationship between attachment anxiety and models of self and of others (e.g., Bartholomew & Horowitz, 1991), I predicted that there would be a direct relationship between level of

attachment anxiety (high vs. low attachment anxiety) and cohesion (study 1) and interpersonal learning (study 2). Specifically, compared to those with low attachment anxiety, women with BED and high in attachment anxiety were expected to: (a) report a higher degree of group cohesiveness from the outset of treatment, (b) report a more rapid growth in cohesion over time, (c) provide more negative ratings of themselves, and (d) demonstrate more rapid convergence in their ratings of their own cohesion to the group compared to the ratings provided by fellow group members.

The data supported a significant linear growth in group cohesion over the course of treatment for both high and low attachment anxiety conditions. Contrary to the first predictions, the data did not support a significant relationship between attachment anxiety and initial levels of group cohesion, or growth in cohesion over time. With respect to treatment outcomes, the data did show an interaction between growth in group cohesion and level of attachment anxiety with respect to changes in binge eating such that greater growth in group cohesion was related to significant reductions in the frequency of binge eating for those in the high attachment anxiety condition. This relationship was not significant for those in the low attachment anxiety condition.

These findings support theoretical models of group development that predict that group members experience a growth in emotional attachments to one another and to the group as a whole as therapy progresses (Yalom & Leszcz, 2005). Therapeutic approaches that emphasize the importance of intra-group interactions and foster a high degree of group cohesion, such as GPIP, may optimize a sense of connection between members. This heightened sense of cohesion may promote the experience of inclusion and safety, thus increasing an individual's attachment security. Interventions that foster a heightened sense of cohesion may be beneficial for women seeking treatment for BED to reduce the frequency of binge eating, and may be particularly

important for anxiously attached individuals who demonstrate a stronger desire for highly cohesive group environments. The interpersonal model of BED suggests that a greater sense of affiliation is related to improvements in the frequency of binge eating and the subjective loss of control over eating in women with BED who experience negative affect (Ansell et al., 2012). Consistent with the interpersonal model of BED, it is advisable for group therapists to monitor group cohesion across therapy sessions. Therapists should to attend to the impact that group members' CRPs have on their sense of connection or affiliation, and on binge eating and associated symptoms including depression and negative affect which may contribute to, or maintain binge eating (Tasca et al., 2005).

As predicted, the data demonstrated a significant convergence in ratings of cohesion over the course of treatment, which was conceptualized as an indicator of interpersonal learning. As treatment progressed, individuals provided more positive appraisals of their participation and impact on the group, and these ratings became more consistent with the ratings provided by fellow group members. These findings support theoretical models of group psychotherapy that suggest that the group context allows for interpersonal learning to occur through ongoing interpersonal feedback about behaviours, assumptions, and models of self and of others (Yalom & Leszcz, 2005).

Women in both attachment anxiety conditions consistently provided more negative self-ratings compared to the ratings provided by their fellow group members. However, the data also showed an interaction between level of attachment anxiety and the discrepancy between the individual's rating of the self and the group members' ratings of the individual. Compared to those with low attachment anxiety, those high in attachment anxiety reported greater discrepancies from the group in ratings of their own cohesion to the group at each measurement

point (weeks 4, 8, 12, and 16). These discrepancies were caused by significantly lower ratings of their own cohesion to the group by those with high attachment anxiety. These findings are consistent with Bartholomew and Horowitz's (1991) model of adult attachment that proposes that individuals high in attachment anxiety often hold a negative view of self, and depending on their level of attachment avoidance may hold positive (low avoidance) or negative (high avoidance) views of others. Although the level of attachment anxiety did impact the magnitude of discrepancy between different perspectives of cohesion, the attachment anxiety conditions did not affect the rate of convergence over time. This finding suggests that attachment anxiety does not significantly impact the rate of interpersonal learning that occurs in group psychotherapy. As previously noted, I suspect that the emphasis on the development of group cohesion in GPIP may have mitigated the effects of attachment anxiety, such that the approach's emphasis on group dynamics might reduce the impact of attachment anxiety and resulting behaviours. In group psychotherapy, therapists might improve group functioning and assist individuals to gain more accurate views of the self and others by assessing individual characteristics such as level of attachment anxiety at pre-treatment, by noting discrepancies between one's view of self and how one is viewed by fellow group members, and by implementing interventions that allow group members to explore these discrepancies in session.

With respect to treatment outcomes, the data showed a direct relationship between convergence of multiple ratings of cohesion (i.e., convergence of CQ-I and mean CQ-G ratings) and change in self-esteem, such that greater convergence was related to improvements in self-esteem at post-treatment. Reductions in the discrepancies between one's perception of self and how one is perceived by their fellow group members may occur as individuals internalize the more positive perceptions of the group members, resulting in improved self-esteem. This

process, and resulting convergence of perspectives may result in improved interpersonal interactions both in and outside of the group. The convergence in perspectives through the process of interpersonal learning may be particularly important for women with BED. According to the interpersonal model of BED, interpersonal stressors may serve as a trigger for negative affect, that may result in an increase in BED symptoms, including increasing the frequency of binge eating, and increasing an individual's sense of loss of control (Ansell et al., 2012). Convergence in ratings may reduce interpersonal conflicts, which may lessen negative affect, and as result lessen negative views of judgments of the self that lead to low self-esteem. Group therapists might implement interventions that facilitate interpersonal learning, leading to perceptions of self that are more consistent with how others view the individual, and to improved self-esteem. This may be achieved by encouraging participants to share their views or self and their expectations of others in a setting where they can receive corrective feedback. These interventions may be particularly important for those who are high in attachment anxiety who typically reported more negative perceptions of self compared to those lower in attachment anxiety.

Limitations

Several limitations were noted regarding the studies contained in this dissertation. The treatment sample was relatively homogeneous and was comprised of women who were predominantly White, obese, and educated. Although the homogeneity of this sample may limit generalizability of these findings, the current sample characteristics are consistent with treatment seeing BED population (e.g., Striegel-Moore, Wilson, Wilfley, Elder, & Brownell, 1998). Similarly, the testing of the CQ-I and CQ-G was conducted in a sample that was largely comprised of women with BED. Additional testing would be beneficial to determine whether

these measures yield similar factor structures and psychometric properties in a wider range of treatment groups, including in other psychiatric populations. The current treatment study was designed as a follow-up to the original BED RCT (Tasca et al., 2006), and was conceptualized as a longitudinal quasi-experimental correlational design. Although the correlational design does not yield definitive causal relationships between group process, attachment anxiety, and outcomes, a priori hypotheses based in group psychotherapy theory allowed the correlational results to be framed in the context of existing group psychotherapy research. Based on findings from the original RCT, participants were assigned to groups according to pre-treatment attachment anxiety, thus creating homogeneous high and low attachment anxiety groups. Given that it is highly unlikely that this level of homogeneity will occur in treatment settings, it would be beneficial to replicate the current studies to examine the impact of group processes in heterogeneous treatment groups.

Specific to the second study, the method selected for calculating the discrepancy scores may have underestimated the strength of the findings. In the second study the discrepancy scores were calculated as absolute change scores by subtracting the individual's perception of their participation and impact on the group (CQ-I) from the mean ratings provided by their fellow group members (mean CQ-G). It is possible that discrepancy scores calculated as relative difference scores (i.e., ratio of CQ-I and mean CQ-G) may have strengthened the findings. One could argue that relative difference scores may have more accurately captured convergence of ratings in group members by including the relative difference between those who initially perceived themselves as more positive or more favorable in comparison to the mean ratings provided by their fellow group members. However, for this investigation, the discrepancy scores were calculated as absolute change scores to ensure that the scores would retain their face

validity, and that they could be easily calculated and interpreted in clinical practice. This method of calculation is consistent with procedures used in previous studies of self-other agreement (e.g., Chen & Mallinckrodt, 2002).

Future Directions

Future research might continue to explore the relationships between cohesion, interpersonal learning, attachment anxiety, and clinical outcomes in a wider variety of psychiatric populations to assess the generalizability of these findings. Researchers studying group cohesion have proposed and evaluated several sources of ratings and several targets for cohesion ratings in group psychotherapy (e.g., Burlingame et al., 2011; Johnson et al., 2005). Future research might explore the relationships between attachment anxiety, outcome, and therapists' ratings of group cohesion, or of individual patient's sense of cohesion to the group leader. Therapist ratings of group cohesion may offer an independent observer perspective of group functioning and overall group climate. The current studies employed self-report measures to assess group cohesion and interpersonal learning. It may also be possible to quantify aspects of group cohesion and of interpersonal learning using behavioural ratings of therapy sessions to evaluate session content and interpersonal interaction in the group. Quantifying these interactions may provide objective different view of the interactions and may suggest specific types of interactions and connections that are particularly helpful in fostering cohesion, interpersonal learning, and that lead to improved clinical outcomes.

Conclusion

This doctoral dissertation examined the relationship between group cohesion, interpersonal learning, attachment anxiety, and treatment outcome to add to the growing body of literature evaluating group psychotherapy and the treatment of BED. Consistent with

recommendations made by Ansell and colleagues (2012) in their recent study, this dissertation employed a longitudinal approach to test the interpersonal model of BED in a clinical eating disorder sample, and provides clinically relevant recommendations for the use of interpersonal and psychodynamic interventions in group treatment to foster the growth of group cohesion, to facilitate interpersonal learning, and to moderate the effects of attachment anxiety.

As discussed, participants in both high and low attachment anxiety conditions reported significant improvements in frequency of binge eating, depressive symptoms, and self-esteem at post-treatment (Tasca et al., 2012), which lends further support for the effectiveness of GPIP in the treatment of BED and associated clinical features. The current studies support theories of group dynamics that describe the growth of group cohesion over time, and that describe the interpersonal learning process that occurs in group psychotherapy. Contrary to predictions in the current studies, the growth in group cohesion and the convergence in cohesion ratings (the selected index of interpersonal learning) did not differ significantly based on level of attachment anxiety. However, consistent with attachment theory, individuals high in attachment anxiety did report greater discrepancies in ratings through out treatment. Furthermore, the results of the current studies support the relationship between individual characteristics, group processes, and change in frequency of binge eating and self-esteem. Growth in group cohesion was related to greater reductions in binge eating for those high in attachment anxiety, while interpersonal learning (i.e., the convergence in ratings) was related to improvements in self-esteem for individuals in both attachment anxiety conditions.

These findings support the importance of assessing individuals' level of attachment anxiety, and CRPs prior to beginning group treatment. Assessment of group members' pre-treatment attachment anxiety may allow group therapists to predict discrepancies in individuals'

perception of self and how they are viewed by the group which may lead to interpersonal difficulties. Pre-treatment assessment, as well as manifestations of the CRPs in the group may be used to guide interventions, allowing individuals to explore their interpersonal interactions and assumptions in session. Group therapists are also encouraged to assess group processes such as group cohesion and interpersonal learning on an ongoing basis over the course of treatment. To assess of these factors, therapists may employ multiple measures of group cohesion, and may also explicitly discuss group dynamics in session. By attending to elements of group process, group therapists may implement interventions that allow and encourage group members to provide and receive constructive feedback in a safe and cohesive environment. Attending to these dynamic factors may also allow therapists to address any ruptures in group cohesion or interpersonal difficulties that may arise from discrepancies in perceptions of cohesion to the group as they arise in the group setting.

References

Aiken, L. S. & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions.* London: Sage.

American Psychiatric Association (2000). *Diagnostic and statistical manual of mental disorders* (4th ed Text Revision.). Washington, DC: Author.

Ansell, E. B., Grilo, C., M., & White, M. A. (2012). Examining the interpersonal model of binge eating and loss of control over eating in women. *International Journal of Eating Disorders, 45,* 43-50.

Bartholomew, K. & Horowitz, L. M. (1991). Attachment styles among young adults: A test of a four-category model. *Journal of Personality and Social Psychology, 61(2)*, 226-244.

Beck, A., Steer, R. A., & Brown, G. K. (1996). *The Beck Depression Inventory – II professional manual.* San Antonio: The Psychological Corporation.

Biesanz, J. C., West, S. G., & Millevoi, A. (2007). What do you learn about someone over time? The relationship between length of acquaintance and consensus and self-other agreement in judgments of personality. *Journal of Personality and Social Psychology, 92(1)*. 119-135.

Binford, R. B., Le Grange, D., & Jellar, C. C. (2005). Eating disorders examination versus eating disorders examination-questionnaire in adolescents with full and partial-syndrome bulimia nervosa and anorexia nervosa. *International Journal of Eating Disorders, 37,* 44-49.

Bowlby, J. (1982). *Attachment and loss, vol. 1: Attachment,* 2nd ed. New York: Basic Books.

Boyle, M. H., & Willms, J. D. (2001). Multilevel modelling of hierarchical data in development studies. *Journal of Child Psychology and Psychiatry, 42,* 141-162.

Burlingame, G. M., MacKenzie, K. R., & Strauss, B. (2004). Small group treatment: Evidence for effectiveness and mechanisms of change. In M. J. Lambert (Ed.), *Handbook of psychotherapy and behavior change* (5th ed., pp.647-696). New York: Wiley.

Burlingame, G., McClendon, D. T., & Alonso, J. (2011). Cohesion in group therapy. *Psychotherapy, 48,* 34-42.

Castonguay, L., Pincus, A., Agras, W., & Hines, C. (1998). The role of emotion in group cognitive-behavioral therapy for binge eating disorder: When things have to feel worse before they get better. *Psychotherapy Research, 8(2),* 225-238.

Chambers, J. R., Epley, N., Savitsky, K., & Windschitl, P. D. (2008). Knowing too much: Using private knowledge to predict how one is viewed by others. *Psychological Science, 19(6)*, 542-548.

Chen, E. C., & Mallinckrodt, B. (2002). Attachment, group attraction, and self-other agreement in interpersonal circumplex problems and perceptions of group members. *Group Dynamics: Theory, Research, and Practice, 6,* 311-324.

Clark, L. A., & Watson, D. (1995). Constructing validity: Basic issues in objective scale development. *Psychological Assessment, 7(3),* 309-319.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences.* New York: Guilford Press.

Cohen, J., Cohen, P., Aiken, L. S., & West, S. G. (2002). *Applied multiple regression - correlation analysis for the behavioral sciences* (3rd ed.). Mahwah, NJ: Lawrence Erlbaum.

Connelly, J. L., Piper, W. E., Carufel, F. L., & Debbane, E. G. (1986). Premature termination in

group psychotherapy: Pretherapy and early therapy predictors. *International Journal of Group Psychotherapy, 36(1),* 145-152.

Crowe, T. P., & Grenyer, B. F. S. (2008). Is therapist alliance or whole group cohesion more influential in group psychotherapy outcomes? *Clinical Psychology and Psychotherapy, 15,* 239-246.

de Moura, G. R., Leader, T., Pelletier, J., & Abrams, D. (2008). Prospects for group processes and intergroup relations research: A review of 70 years' progress. *Group Processes and Intergroup Relations, 11(4),* 575-596.

Diez-Roux, A. V. (2000). Multilevel analysis in public health research. *Annual Review of Public Health, 21,* 171-192.

Dingemans, A. E., Martijn, C., Jansen, A. T. M., & van Furth, E. F. (2009). The effect of suppressing negative emotions on eating behavior in binge eating disorder. *Appetite, 52,* 51-57.

Dion, K. L. (2000). Group cohesion: From "field of forces" to multidimensional construct. *Group Dynamics, 4,* 7-26.

Fairburn, C. G., & Belgin, S. J. (1994). Assessment of eating disorders: Interview or self-report questionnaire? *International Journal of Eating Disorders, 16,* 363-370.

Fairburn, C.G., & Cooper, Z. (1993). The Eating Disorder Examination (12th edition). In C.G. Fairburn & G.T. Wilson (Eds.). *Binge eating: Nature, assessment, and treatment.* New York: Guilford Press.

Feeney, J. A., Noller, P., & Hanrahan, M. (1994). Assessing adult attachment. In M. B. Sperling & W.H. Berman (Eds.) *Attachment in adults* (pp.128-151). New York: Guilford.

First, M. B., Spitzer, R. L, Gibbon, M., & Williams, J. B., & MHS Staff (1997). *Computer-assisted SCID – Clinician version*. Toronto, Ontario: Multi-Health Systems.

Gallop, R. & Tasca, G. A. (2009). Multilevel modeling of longitudinal data for psychotherapy researchers: II. The complexities. *Psychotherapy Research, 00(0),* 1-15.

Gelenberg, A. J., & Chesen, C. L., (2000). How fast are antidepressants? *Journal of Clinical Psychiatry, 61,* 712-721.

George, C. Kaplan, N., & Main, M. (1985). *Adult Attachment Interview.* Unpublished Manuscript. University of California, Berkeley.

Gueorguieva, R. & Krystal, J. H. (2004). Move over ANOVA: Progress in analyzing repeated-measures data and its reflection in papers published in the Archives of General Psychiatry. *Archives of General Psychiatry, 61,* 310-317.

Guthrie, E. (2000). Psychotherapy for patients with complex disorders and chronic symptoms: The need for a new research paradigm. *British Journal of Psychiatry, 177*, 131-137.

Hill, R. W., Zrull, M. C., & McIntire, K. (1998). Differences between self- and peer ratings of interpersonal problems. *Assessment, 5,* 67-83.

Hofstra, J., van Oudenhoven, J. P., Buunk, B. P. (2005). Attachment styles and majority members' attitudes toward adaptation strategies of immigrants. *International Journal of Intercultural Relations, 29,* 601-619.

Hudson, J. I., Hiripi, E., Pope, H. G., & Kessler, R. C. (2007). The prevalence and correlates of eating disorders in the National Comorbidity Survey replication. *Biological Psychiatry, 61,* 348-358.

Johnson, S. M. (2009). Attachment theory and emotionally focused therapy for individuals and couples: Perfect partners. In J. H. Obegi & E. Berant (Eds.), *Attachment theory and research in clinical work with adults* (pp. 410-433). New York: The Guilford Press.

Johnson, J. E., Burlingame, G. M., Olson, J. A., Davies, D. R., & Gleave, R. (2005). Group climate, cohesion, alliance, and empathy in group psychotherapy: Multilevel structural equation models. *Journal of Counseling Psychology, 52,* 310-321.

Johnson, C. & Connors, M. E. (1987). *The etiology and treatment of bulimia nervosa: A biopsychosocial perspective*. New York: Basic.

Johnson, J. E., Pulsipher, D., Ferrin, S. L., Burlingame, G. M., Davies, D. R., & Gleave, R. (2006). Measuring group processes: A comparison of the GCQ and CCI. *Group Dynamics: Theory, Research, and Practice, 10(2),* 136-145.

Joyce, A. S., Piper, W. E., & Ogrodniczuk, J. S. (2007). Therapeutic alliance and cohesion variables as predictors of outcome in short-term group psychotherapy. *International Journal of Group Psychotherapy, 57(3),* 269-296.

Kaplan, A. S., Olmsted, M. P., Carter, J. C., & Woodside, B. (2001). Matching patient variables to treatment intensity: The continuum of care. *Psychiatric Clinics of North America, 24*, 281-292.

Kenny, D. A., Kashy, D., & Bolger, N. (1998). Data analysis in social psychology. In D. Gilbert, S. Fiske, and D. Lindzey (Eds.), *Handbook of social psychology* (4th ed., pp. 233-265). New York: McGraw-Hill.

Kivlighan, D. M., & Goldfine, D. C. (1991). Endorsement of therapeutic factors as a function of stage of group development and participant interpersonal attitudes. *Journal of Counseling Psychology, 38(2),* 150-158.

Kivlighan, D. M., & Lilly, R. (1997). Developmental changes in group climate as they relate to therapeutic gain. *Group Dynamics, 3,* 208-221.

Levy, K. N., Ellison, W. D., Scott, L. N., & Bernecker, S. L. (2011). Attachment style. *Journal of Clinical Psychology: In Session, 67,* 193-203.

MacKenzie, K. R. (1983a). A developmental model for brief group therapy. In R. R. Dies & K. R. MacKenzie (Eds.), *Advances in group psychotherapy: Integrating research and practice* (pp. 101-116). Madisson, CT: International University Press.

MacKenzie, K. R. (1983b). The clinical application of a group climate measure. In R. R. Dies, & K. R. MacKenzie (Ed.), *Advances in group psychotherapy: Integrating research and practice* (pp.159-170). New York: International University Press.

MacKenzie, K. R. (1997). Clinical application of group development ideas. *Group Dynamics: Theory, Research, and Practice, 1*, 275-287.

Main, M., Kaplan, N., & Cassidy, J. (1985). Security in infancy, childhood, and adulthood: A move to the level of representation. *Monographs of the Society for Research in Child Development, 50*, 66-107.

Marcus, M. D. (1997). Adapting treatment for patients with binge eating disorder. In D. M. Garner & P. E. Garfinkel (Eds.), *Handbook of treatments for eating disorders* (pp. 484-493). New York: Guilford Press.

Marcus, D.K. (1998). Studying group dynamics with the social relations model. *Group Dynamics: Theory, Research, and Practice, 2(4),* 230-240.

Marcus, D. K. (2006). Interpersonal feedback: A social relations perspective. *International Journal of Group Psychotherapy, 56,* 173-189.

McCallum, M., Joyce, A. S., Piper, W. E., & Ogrodniczuk, J. S. (2002). Early process and dropping out from short-term group therapy for complicated grief. *Group Dynamics, Theory, Research, and Practice, 6(3),* 243-254.

McCallum, M., Piper, W.E., Ogrodniczuk, J. S., & Joyce, A. S. (2002). Early process and dropping out from short-term group therapy for complicated grief. *Group Dynamics, 6*, 243-254.

McKisack, C., & Waller, G. (1997). Factors influencing the outcome of group psychotherapy for bulimia nervosa. *The International Journal of Eating Disorders, 22,* 1-13.

McRoberts, C., Burlingame, G. M., & Hoag, M. J. (1998). Comparative efficacy of individual and group psychotherapy: A meta-analytic perspective. *Group Dynamics: Theory, Research, and Practice, 2(2),* 101-117.

Olmsted, M. P., Isaacs, P., Bemis, K., & Garner, D. M. (1988). *Tape rating instrument for psychotherapy of eating disorders (TRIPED)*. Unpublished manuscript.

Piper, W. E., Ogrodniczuk, J. S., Joyce, A. S., Weideman, R., & Rosie, J. S. (2007). Group Composition and group therapy for complicated grief. *Journal of Consulting and Clinical Psychology, 75,* 116-125.

Piper, W. E., Ogrodniczuk, J. S., Lamarche, C., & Joyce, A. S. (2006). Use of the social relations model by group therapists: Application and commentary. *International Journal of Group Psychotherapy, 56,* 191-209.

Piper, W. E., Marache, M., Lacroix, R., Richardsen, A. M., & Jones, B. D. (1983). Cohesion as a basic bond in groups. *Human Relations, 36*, 93-108.

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models* (2nd Ed.). Newbury Park, London: Sage.

Raudenbush, S. W., & Liu, X. (2000). Statistical power and optimal design for multisite randomized trials. *Psychological Methods, 5*, 199-213.

Rom, E. & Mikulincer, M. (2003). Attachment theory and group processes: The association between attachment style and group-related representations, goals, memories, and functioning. *Journal of Personality and Social Psychology, 84(6)*, 1220-1235.

Rosen, J. C., Vara, L., Wendt, S., & Leitenberg, H. (1990). Validity studies of the eating disorder examination. *International Journal of Eating Disorders, 9,* 519-528.

Rosenberg, M. (1979). *Conceiving the self.* New York: Basic Books.

Shaffer, J. P. (1995). Multiple hypothesis testing. *Annual Review of Psychology, 46,* 561-584.

Shorey, H. S., & Snyder, C. R. (2006). The role of adult attachment styles in psychopathology and psychotherapy outcomes. *Review of General Psychology, 10,* 1-20.

Singer, J. D. & Willett, J. B. (2003). *Applied longitudinal data analysis: Modeling change and event occurrence*. New York: Oxford University Press.

Smith, E. R., Murphy, J., & Coats, S. (1999). Attachment to groups: Theory and measurement. *Journal of Personality and Social Psychology, 77(1)*, 94-110.

Soldz, S., Budman, S., Demby, A., & Merry, J. (1995). A short form of the Inventory of Interpersonal Problems Circumplex scales. *Assessment, 2,* 53-63.

Steer, R. A., Kumar, G., Ranieri, W. F., & Beck, A. T. (1998). Use of the Beck Depression Inventory-II with adolescent psychiatric outpatients. *Journal of Psychopathology and Behavioral Assessment, 20,* 127-137.

Stevens, J. P. (2002). *Applied multivariate statistics for the social sciences* (4th ed). Mahwah, NJ: Erlbaum.

Stice, E. (1999). Clinical implications of psychosocial research on bulimia nervosa and binge eating disorder. *Psychotherapy in Practice, 55,* 675-683.

Strupp, H. H. & Binder, J. L. (1984). *Psychotherapy in a new key: A guide to time-limited dynamic psychotherapy*. New York: Basic Books, Inc.

Tabachnick, B. G. & Fidell, L. S. (2001). *Using multivariate statistics* (4th ed.). New York: Harper Collins.

Tasca, G. A., Balfour, L., Ritchie, K., & Bissada, H. (2006). Developmental changes in group climate in two types of group therapy for Binge Eating Disorder: A growth curve analysis. *Psychotherapy Research, 16*, 499-514.

Tasca, G. A., Balfour, L., Ritchie, K., & Bissada, H. (2007). The relationship between attachment scales and group therapy alliance growth differs by treatment type for women with binge-eating disorder. *Group Dynamics: Theory, Research, and Practice, 11*, 1-14.

Tasca, G. A., Illing, V., Joyce, A. S., & Ogrodniczuk, J. S. (2009). Three-level multilevel growth models for nested change data: A guide for group researchers. *Psychotherapy Research, 19,* 453-461.

Tasca, G. A., Krysanski, V., Demidenko, N., & Bissada, H. (2009). Binge eating and purging. In D. B. Allison & M. L. Baskin (Eds.), *Handbook of assessment methods for eating behaviors and weight related problems: Measures, theory, and research* (2nd edition). Los Angeles; Sage Publications.

Tasca, G., Mikail, S., & Hewitt, P. (2002). *Group psychodynamic interpersonal psychotherapy: A manual for time limited treatment of Binge Eating Disorder.* Unpublished manuscript.

Tasca, G. A., Mikail, S., & Hewitt, P. (2005). Group psychodynamic interpersonal psychotherapy: Summary of a treatment model and outcomes for depressive symptoms. In M.E. Abelian (Ed.) *Focus on psychotherapy research* (pp. 159-188). New York: Nova.

Tasca, G. A., Ritchie, K., Conrad, G., Balfour, L., Gayton, J., Daigle, V., & Bissada, H. (2006). Attachment scales predict outcome in a randomized controlled trial of two group therapies for Binge Eating Disorder: An aptitude by treatment interaction. *Psychotherapy Research, 16*, 106-121.

Tasca, G. A., Ritchie, K., Demidenko, N., Balfour, L., Krysanski, V., Weeks, K.,… Bissada, H. (2012). Matching women with binge eating disorder to group treatment based on attachment anxiety: outcomes and moderating effects. *Psychotherapy Research*.

Tschuschke, V., & Dies, R. R. (1994). Intensive analysis of therapeutic factors and outcome in long-term inpatient groups. *International Journal of Group Psychotherapy, 44(2),* 185-208.

Vazire, S. & Mehl, M. R. (2008). Knowing me, knowing you: The accuracy and unique predictive validity of self-ratings and other-ratings of daily behavior. *Personal Processes and Individual Differences, 95(5),* 1202-1216.

Vocks, S., Tuschen-Caffer, B., Pietrowsky, R., Rustenbach, S. J., Kersting, A., & Herpertz, S. (2010). Meta-analysis of effectiveness of psychological and pharmacological treatments for binge eating disorder. *International Journal of Eating Disorders, 43,* 205-217.

Wallin, D. J. (2007). *Attachment in Psychotherapy*. New York: The Guilford Press.

Walters, G. D. (2002). Lessons Learned From Project MATCH. *Addictive Disorders & Their Treatment, 1*, 135–139.

Westen, D., Novotny, C. M., & Thompson-Brenner, H. (2004). The empirical status of

empirically supported psychotherapies; Assumptions, findings, and reporting in controlled clinical trials. *Psychological Bulletin, 30,* 631-663.

Wilfley, D. E., Bishop, M. E., Wilson, G. T., & Agras, W. S. (2007). Classification of eating disorders: Toward DSM-V. The International Journal of Eating Disorders, 40, S123-129.

Wifley, D. E., Stein, R. I., Friedman, M. A., Beren, S. A., & Wiseman, C. V. (1996). Group cognitive-behavioral therapy for Binge Eating Disorder. Unpublished manuscript.

Wilfley, D. E., Welch, R. R., Stein, R. I., Spurrell, E. B., Cohen, L. R., Saelens, B. E.,…Matt, G. E. (2002). A randomized comparison of group cognitive-behavioral therapy and group interpersonal psychotherapy for the treatment of overweight individuals with binge eating disorder. *Archives of General Psychiatry, 59,* 713-721.

Williamson, D. A., Anderson, D. A., Jackman, L. P., & Jackson, S. R. (1995). Assessment of eating disordered thoughts, feelings, and behaviors. In D. B. Allison (Ed.). *Handbook of assessment methods for eating behaviors and weight related problems: Measures, theory, and research* (pp. 347-386). Thousand Oaks, CA: Sage.

Yalom, I. D. (1995). *The theory and practice of group psychotherapy* (4th Ed.). New York: Basic Books.

Yalom, I. D. & Leszcz, M. (2005). *The theory and practice of group psychotherapy* (5th ed.). New York: Basic Books.

Appendix A: DSM-IV-TR Criteria for Binge Eating Disorder (APA, 2000)

A. Recurrent episodes of binge eating. An episode of binge eating is characterized by both of the following:

1) eating, in a discrete amount 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
5) feeling disgusted with oneself, depressed, or very guilty after over eating

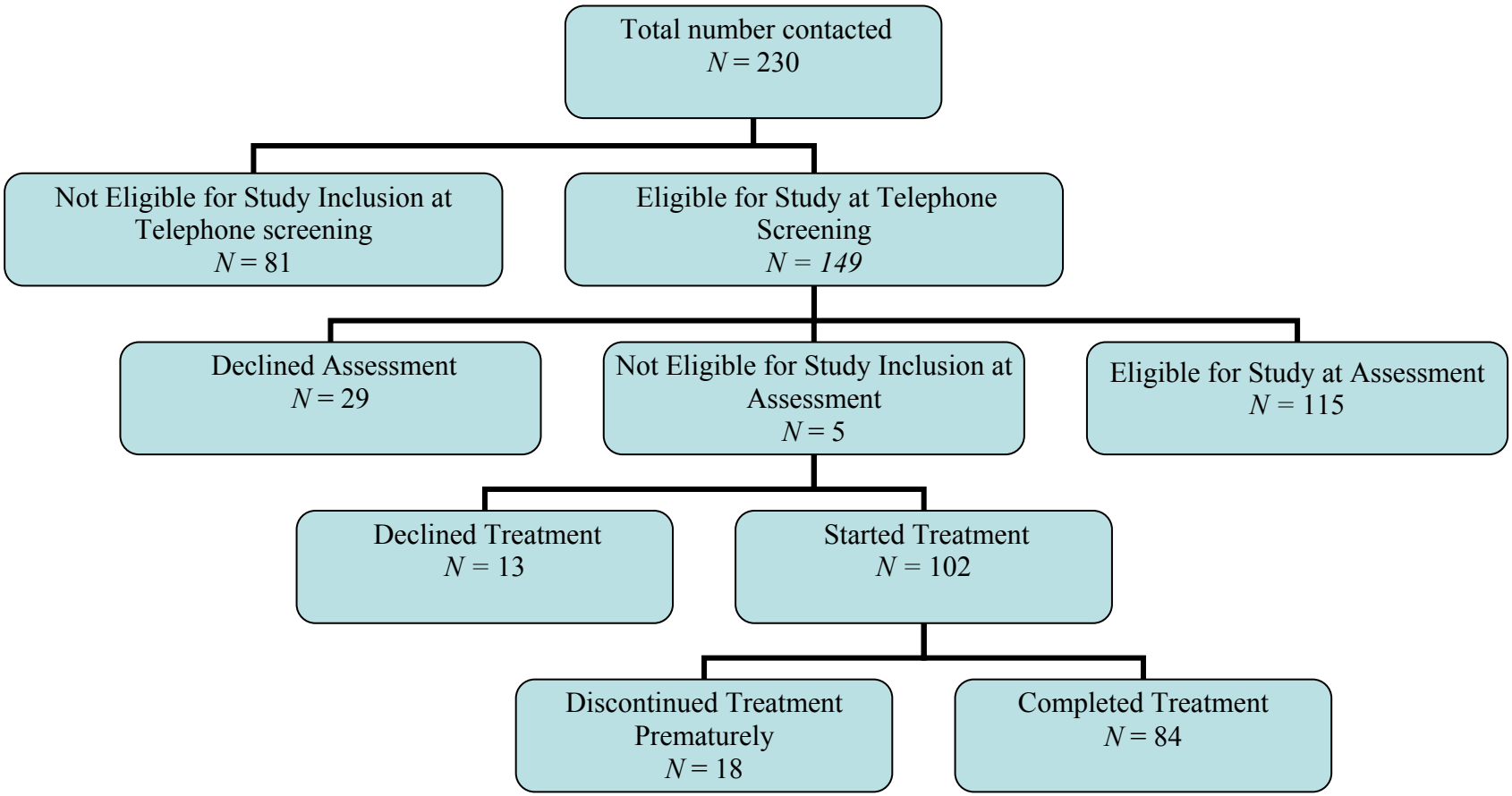
C. Marked distress regarding binge eating is present.

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: BED Study Recruitment and Attrition



Appendix C: Modified Cohesion Questionnaire Items

CQ Items	CQ-I Items
------- (does not) irritate or annoy me.	I irritate or annoy the group members.
I feel attracted toward -------.	The group members feel attracted toward me.
I would like to be in a future group with -------.	The group members would like to be in a future group with me.
I find it easy to communicated with -------.	The group members find it easy to communicated with me.
I would like to form a friendship outside the group with -------.	The group members would like to form a friendship outside the group with me.
If ------- left I would miss him/her.	If I left, the group members would miss me.
I like -------.	The group members like me.
I am similar to (share things in common with) -------.*	The group members are similar to (share things in common with) me.*

Note: * = Item did not demonstrate adequate loading on the single factor and was deleted form the analyses. CQ = Cohesion Questionnaire, CQ-S = Cohesion Questionnaire- Individual Version.

Appendix D: Study 1 Equations

Equation Used to Calculate the Intraclass Correlation Coefficients (ICC)

$\rho = \tau_{10j}(\text{conditional})/ (\tau_{10j}[\text{unconditional}] + \tau_{1ij})$

Three-Level Growth Model Used to Calculate Intraclass Correlation Coefficients

Level 1: $Y_{tij} = \pi_{0ij} + \pi_{1ij}(\text{week}) + e_{tij}$

Level 2: $\pi_{0ij} = \beta_{00j} + \beta_{01j}(\text{individual engaged score week } 1_{ij}) + r_{0ij}$

$\pi_{1ij} = \beta_{10j} + \beta_{11j}(\text{individual engaged score week } 1_{ij}) + r_{1ij}$

Level 3: $\beta_{00j} = \gamma_{000} + \gamma_{001}(\text{group engaged score week } 1_j) + \gamma_{002}(\text{level 3 nesting variable}_j)$

$+ u_{00j}$

$\beta_{01j} = \gamma_{010} + u_{01j}$

$\beta_{10j} = \gamma_{100} + \gamma_{101}(\text{group engaged score week } 1_j) + \gamma_{102}(\text{level 3 nesting variable}_j)$

$+ u_{10j}$

$\beta_{11j} = \gamma_{110} + u_{11j}$

Note. "Level 3 nesting variable" refers to either the condition or therapist that were assessed in two different models.

Two-Level Random Effects Model Used to Assess Difference in Engaged Scale Scores Between Conditions

Level 1: $Y_{ti} = \beta_{0i} + r_{ti}$

Level 2: $\beta_{0i} = \gamma_{00} + u_{0i}$

Level 1: $Y_{ti} = \beta_{0i} + r_{ti}$

Level 2: $\beta_{0i} = \gamma_{00} + \gamma_{01}(\text{condition}_i) + u_{0i}$

Two-Level Conditional Growth Model Used to Assess the Effect of Condition

Level 1: $Y_{ti} = \pi_{0i} + e_{ti}$

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

Level 1: $Y_{ti} = \pi_{0i} + \pi_{1i}(week_{ti}) + e_{ti}$

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

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

Level 1: $Y_{ti} = \pi_{0i} + \pi_{1i}(week_{ti}) + e_{ti}$

Level 2: $\pi_{0i} = \beta_{00} + \beta_{01}(\text{individual engaged score time } 1_i) + r_{0i}$

$\pi_{1i} = \beta_{10} + \beta_{11}(\text{individual engaged score time } 1_i) + r_{1i}$

Level 1: $Y_{ti} = \pi_{0i} + \pi_{1i}(week_{ti}) + e_{ti}$

Level 2: $\pi_{0i} = \beta_{00} + \beta_{01}(\text{individual engaged score time } 1_i) + \beta_{02}(condition_i) + r_{0i}$

$\pi_{1i} = \beta_{10} + \beta_{11}(\text{individual engaged score time } 1_i) + \beta_{12}(condition_i) + r_{1i}$

Note. For the preceding models, Y= Engaged score. The pre scores and predictors were grand mean centered, time and condition were not centered.

Two-Level Growth Model Used to Calculate Intraclass Correlation Coefficients for Outcome Measures

Level 1: $Y_{tij} = \beta_{0j} + \beta_{1j}(\text{measure pre-treatment score}_{ij}) + r_{ij}$

Level 2: $\beta_{0j} = \gamma_{00} + \gamma_{01}(condition_j) + u_{0j}$

$\beta_{1j} = \gamma_{10} + u_{1j}$

Note. This model was used to assess interclass correlations for outcome measures in which Y = depressive symptoms, interpersonal problems, self-esteem, and binge eating in the past 28 days. In all analyses pre scores were grand mean centered, condition were not centered.

Two-Level Models to Assess Change in Outcome

Level 1: $Y_{ti} = \pi_{0i} + e_{ti}$

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

Level 1: $Y_{ti} = \pi_{0i} + \pi_{1i}(week_{ti}) + e_{ti}$

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

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

Level 1: $Y_{ti} = \pi_{0i} + \pi_{1i}(week_{ti}) + e_{ti}$

Level 2: $\pi_{0i} = \beta_{00} + \beta_{01}(\text{outcome measure pre score}_i) + r_{0i}$

$\pi_{1i} = \beta_{10} + \beta_{11}(\text{outcome measure pre score}_i)$

Level 1: $Y_{ti} = \pi_{0i} + \pi_{1i}(week_{ti}) + e_{ti}$

Level 2: $\pi_{0i} = \beta_{00} + \beta_{01}(\text{outcome measure pre score}_i) + \beta_{02}(\text{Engaged growth parameter}_i) + r_{0i}$

$\pi_{1i} = \beta_{10} + \beta_{11}(\text{outcome measure pre score}_i) + \beta_{12}(\text{Engaged growth parameter}_i)$

Level 1: $Y_{ti} = \pi_{0i} + \pi_{1i}(week_{ti}) + e_{ti}$

Level 2: $\pi_{0i} = \beta_{00} + \beta_{01}(\text{outcome measure pre score}_i) + \beta_{02}(\text{Engaged growth parameter}_i)$

$+ \beta_{03}(\text{condition}_i) + \beta_{04}(\text{Engaged x condition}_i) + r_{0i}$

$\pi_{1i} = \beta_{10} + \beta_{11}(\text{outcome measure pre score}_i) + \beta_{12}(\text{Engaged growth parameter}_i)$

$$+ \beta_{13}(\text{condition}_i) + \beta_{14}(\text{Engaged x condition}_i)$$

Note. The preceding models were used to assess change in which Y = depressive symptoms, interpersonal problems, self-esteem, and binge eating in the past 28 days. In all analyses pre scores and predictors were grand mean centered, time and condition were not centered.

Appendix E: Study 2 Equations

Equation Used to Calculate the Intraclass Correlation Coefficients (ICC)

$\rho = \tau_{10j}(\text{conditional})/ (\tau_{10j}[\text{unconditional}] + \tau_{1ij})$

Three-Level Growth Model Used to Calculate Intraclass Correlation Coefficients

Level 1: $Y_{tij} = \pi_{0ij} + \pi_{1ij}(\text{week}) + e_{tij}$

Level 2: $\pi_{0ij} = \beta_{00j} + \beta_{01j}(\text{individual discrepancy score week } 1_{ij}) + r_{0ij}$

$\pi_{1ij} = \beta_{10j} + \beta_{11j}(\text{individual discrepancy score week } 1_{ij}) + r_{1ij}$

Level 3: $\beta_{00j} = \gamma_{000} + \gamma_{001}(\text{group discrepancy score week } 1_j) + \gamma_{002}(\text{level 3 nesting variable}_j)$

$+ u_{00j}$

$\beta_{01j} = \gamma_{010} + u_{01j}$

$\beta_{10j} = \gamma_{100} + \gamma_{101}(\text{group discrepancy score week } 1_j) + \gamma_{102}(\text{level 3 nesting variable}_j)$

$+ u_{10j}$

$\beta_{11j} = \gamma_{110} + u_{11j}$

Note. "Level 3 nesting variable" refers to either the condition or therapist that were assessed in two different models.

Two-Level Random Effects Model Used to Assess Difference in Discrepancy Scores Between Conditions

Level 1: $Y_{ti} = \beta_{0i} + r_{ti}$

Level 2: $\beta_{0i} = \gamma_{00} + u_{0i}$

Level 1: $Y_{ti} = \beta_{0i} + r_{ti}$

Level 2: $\beta_{0i} = \gamma_{00} + \gamma_{01}(\text{condition}_i) + u_{0i}$

Two-Level Conditional Growth Model Used to Assess the Effect of Condition

Level 1: $Y_{ti} = \pi_{0i} + e_{ti}$

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

Level 1: $Y_{ti} = \pi_{0i} + \pi_{1i}(week_{ti}) + e_{ti}$

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

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

Level 1: $Y_{ti} = \pi_{0i} + \pi_{1i}(week_{ti}) + e_{ti}$

Level 2: $\pi_{0i} = \beta_{00} + \beta_{01}(\text{individual discrepancy score time } 1_i) + r_{0i}$

$\pi_{1i} = \beta_{10} + \beta_{11}(\text{individual discrepancy score time } 1_i) + r_{1i}$

Level 1: $Y_{ti} = \pi_{0i} + \pi_{1i}(week_{ti}) + e_{ti}$

Level 2: $\pi_{0i} = \beta_{00} + \beta_{01}(\text{individual discrepancy score time } 1_i) + \beta_{02}(condition_i) + r_{0i}$

$\pi_{1i} = \beta_{10} + \beta_{11}(\text{individual discrepancy score time } 1_i) + \beta_{12}(condition_i) + r_{1i}$

Note. For the preceding models, Y= Discrepancy score. The pre scores and predictors were grand mean centered, time and condition were not centered.

Two-Level Growth Model Used to Calculate Intraclass Correlation Coefficients for Outcome Measures

Level 1: $Y_{tij} = \beta_{0j} + \beta_{1j}(\text{measure pre-treatment score}_{ij}) + r_{ij}$

Level 2: $\beta_{0j} = \gamma_{00} + \gamma_{01}(condition_j) + u_{0j}$

$\beta_{1j} = \gamma_{10} + u_{1j}$

Note. This model was used to assess interclass correlations for outcome measures in which Y = depressive symptoms, interpersonal problems, self-esteem, and binge eating in the past 28 days. In all analyses pre scores were grand mean centered, condition were not centered.

Two-Level Models to Assess Change in Outcome

Level 1: $Y_{ti} = \pi_{0i} + e_{ti}$

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

Level 1: $Y_{ti} = \pi_{0i} + \pi_{1i}(week_{ti}) + e_{ti}$

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

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

Level 1: $Y_{ti} = \pi_{0i} + \pi_{1i}(week_{ti}) + e_{ti}$

Level 2: $\pi_{0i} = \beta_{00} + \beta_{01}(\text{outcome measure pre score}_i) + r_{0i}$

$\pi_{1i} = \beta_{10} + \beta_{11}(\text{outcome measure pre score}_i)$

Level 1: $Y_{ti} = \pi_{0i} + \pi_{1i}(week_{ti}) + e_{ti}$

Level 2: $\pi_{0i} = \beta_{00} + \beta_{01}(\text{outcome measure pre score}_i) + \beta_{02}(\text{Discrepancy growth parameter}) + r_{0i}$

$\pi_{1i} = \beta_{10} + \beta_{11}(\text{outcome measure pre score}_i) + \beta_{12}(\text{Discrepancy growth parameter}_i)$

Level 1: $Y_{ti} = \pi_{0i} + \pi_{1i}(week_{ti}) + e_{ti}$

Level 2: $\pi_{0i} = \beta_{00} + \beta_{01}(\text{outcome measure pre score}_i) + \beta_{02}(\text{Discrepancy growth parameter}_i)$

$+ \beta_{03}(\text{condition}_i) + \beta_{04}(\text{Discrepancy x condition}_i) + r_{0i}$

$\pi_{1i} = \beta_{10} + \beta_{11}(\text{outcome measure pre score}_i) + \beta_{12}(\text{Discrepancy growth parameter}_i)$

$$+ \beta_{13}(\text{condition}_i) + \beta_{14}(\text{Discrepancy x condition}_i)$$

Note. The preceding models were used to assess change in which Y = depressive symptoms, interpersonal problems, self-esteem, and binge eating in the past 28 days. In all analyses pre scores and predictors were grand mean centered, time and condition were not centered.