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**FACULTY OF GRADUATE AND
POSTDOCTORAL STUDIES**

Vanessa Illing

AUTEUR DE LA THÈSE / AUTHOR OF THESIS

Ph.D. (Psychology)

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School of Psychology

FACULTÉ, ÉCOLE, DÉPARTEMENT / FACULTY, SCHOOL, DEPARTMENT

**The Role of Attachment Insecurity in Symptom Presentation, Treatment Process and Treatment
Outcome in a Clinical Sample of Women with Eating Disorders**

TITRE DE LA THÈSE / TITLE OF THESIS

Biorgio Tasca

DIRECTEUR (DIRECTRICE) DE LA THÈSE / THESIS SUPERVISOR

CO-DIRECTEUR (CO-DIRECTRICE) DE LA THÈSE / THESIS CO-SUPERVISOR

René Weideman

Cary Kogan

Susan Johnson

Louise Balfour

Gary W. Slater

Le Doyen de la Faculté des études supérieures et postdoctorales / Dean of the Faculty of Graduate and Postdoctoral Studies

**The role of attachment insecurity in symptom presentation, treatment process and
treatment outcome in a clinical sample of women with eating disorders**

Vanessa Illing

Supervisor: Dr. Giorgio A. Tasca

Thesis submitted to the Faculty of Graduate and Postdoctoral Studies in partial fulfillment
of the requirements for the Ph.D. degree in Clinical psychology

School of Psychology

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General Abstract

The current state of knowledge makes it necessary to consider other theoretical frameworks to account for symptom presentation and treatment outcomes for women with an eating disorder (ED). Attachment theory is a theoretical framework that could play a central role in our understanding and treatment of EDs. This thesis consists of two studies that examine the role of adult attachment in understanding: (1) ED symptom expression and treatment outcome among a sample of women with anorexia nervosa restricting subtype (ANR), AN binge purge subtype (ANB) or bulimia nervosa (BN), and (2) group treatment processes among women with ANR, ANB, BN and eating disorder not otherwise specified (EDNOS) receiving treatment in day hospital group-based program with rolling admissions. In the first study women diagnosed with ANR, ANB, or BN completed an attachment scale pre-treatment, and ED symptom scales pre-treatment ($N = 243$) and post-treatment ($N = 157$). A comparison sample of 126 non-ED women completed attachment scales on one occasion. Those with EDs had significantly higher attachment insecurity than non-ED. ANB was associated with higher attachment avoidance compared to ANR and BN, and higher attachment anxiety compared to BN. Higher attachment anxiety was significantly related to greater ED symptom severity and poorer treatment outcome across all EDs even after controlling for ED diagnosis. In the second study women ($N = 264$) diagnosed with an ED completed attachment scales pre-treatment, ED symptom scales pre- and post-treatment, and group climate scales weekly during treatment. Engaged group climate increased and Avoidance group climate decreased across weeks of treatment. Engaged group climate growth was associated with improved ED symptoms post-treatment. Higher attachment avoidance at pre-treatment was related to lower Engaged

group climate at week 1, and was related to a greater impact of the group on the individual's experience of group engagement. Overall, attachment dimensions substantially contribute to our understanding of ED symptoms and treatment outcome. Addressing attachment insecurity when treating those with EDs may improve treatment outcomes. Furthermore, clinicians might improve group processes and outcomes by tailoring interventions to individuals' attachment avoidance when treating women for EDs.

Acknowledgments

Completing my Ph.D. in Clinical Psychology has been a long-standing dream of mine. For as long as I can remember, I was always interested in understanding people and how to help them work through their struggles. In my grade six graduation book, next to the question ‘What do you want to be when you are older?’ I wrote ‘Doctor or Counselor’. Somewhere in me, using an eleven-year-old’s vocabulary, I knew that clinical psychology was my passion.

However, having the dream was just the beginning. I believe that at the foundation of my accomplishments you will find my family. I am fortunate to have grown up in a supportive and nurturing environment, one that fostered self-reliance, security, growth and independence. From a young age I was encouraged to pursue my passion and to believe that ‘you can accomplish anything that you put your mind to’. I was taught that motivation, determination, and passion would guide me to success. These were not just words; this was an adage that was modeled. I can say with complete confidence that I could not have done this without my family’s continued support. My mother, father, sister, brother-in law and my two beautiful nieces were there to prop me up when times were tough, to encourage me when I needed a boost, and to celebrate with me – no matter how big or small the occasion. I knew I always had six people with me along this journey, and it helped to know I was never alone. Words will never fully express how thankful I am to my family.

I also had tremendous support from friends along the way: friends I have had since childhood and friends I met over the course of my graduate school journey. Again, I am so grateful for these relationships. My friends were a constant source of support – calling me to check in when I was working all weekend, helping me through big life changes, celebrating with me at every step along the way, acting as a sounding board, and helping

me maintain balance in my life. It's amazing how life manages to provide wonderful people at the most impeccable timing. Finishing my degree was so much easier because of my wonderful friends – many thanks to all of you.

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Introduction

Approximately 1% to 3% of the general population has a diagnosable eating disorder, and 27% of 12-18 year old Canadian women have subclinical eating disorder symptoms placing them at risk for eating disorders (American Psychiatric Association (APA), 1994; Hoek & van Hoeken, 2003; Hoek, 1993; Jones, Bennet, Olmsted, Lawson & Rodin, 2001). Eating disorders are more prevalent in females than males (approximately 10:1 ratio), and more females seek treatment for eating disorder symptoms compared to their male counterparts (APA, 1994; Lewinsohn, Seeley, Moerk, & Striegel-Moore, 2002). Eating disorders can result in serious medical problems such as hyper or hypoglycemia, increased risk of type II diabetes, pulmonary symptoms, electrolyte changes and cardiovascular disease (Goldbloom & Kennedy, 1995; Mitchell, 1995). The average mortality rate for those with anorexia nervosa (AN) is 10%, however, mortality may be as high as 18% (Birmingham, Su, Hlynsky, Goldner, Gao, 2005; Neumarker, 2000).

Those living with eating disorders are frequently socially withdrawn, overwhelmed, depressed, irritable, and obsessed with their weight (Keel, 2005). These individuals often suffer from co-morbid psychiatric disorders, such as depressive disorders, anxiety disorders, obsessive-compulsive disorder, personality disorders, and substance related disorders (APA, 1994; Johnson, Cohen, Kasen & Brook, 2003). Prevalence estimates of personality disorders among women with AN and bulimia nervosa (BN) range from 20% to 80% (Vitousek & Manke, 1994; Vrabel, Ro, Martinsen, Hoffart, & Rosenvinge, 2010).

The medical and health costs of eating disorders are high. For example, the Day Hospital Program at the Toronto General Hospital estimated that it costs \$804.00 per week to treat each patient. With the average length of stay being 12 weeks, the total cost of day treatment per patient amounted to \$9, 648.00 in 1999 Canadian dollars (Zipfel et al., 2002).

Despite enormous costs to the health care system, treatment success is limited and recidivism rates are high (Keel & Mitchell, 1997; Mahon, 2000; Steinhausen, 2002).

The best available treatments only eliminate eating disorder symptoms in approximately 40-60% of individuals with BN and 20-40% of individuals with AN (Wilson, 2005; Wilson, Grilo & Vitousek, 2007). Hence, one can speculate that current eating disorder theories that underlie current treatment models appear to offer an incomplete understanding of eating disorder psychopathology (Wilson, 2005; Wilson, Grilo & Vitousek, 2007). The current state of knowledge makes it necessary to consider other theoretical frameworks to account for symptom presentation and treatment outcomes for women with an eating disorder. Attachment theory is a theoretical framework that could play a central role in our understanding and treatment of eating disorders.

This thesis consists of two studies that examine the role of adult attachment in understanding: (1) eating disorder symptom expression and treatment outcome among a sample of women with AN restricting subtype (ANR), AN binge purge subtype (ANB) or BN, and (2) group treatment processes among women with ANR, ANB, BN and eating disorder not otherwise specified (EDNOS) receiving treatment in day hospital group-based program with rolling admissions. The aims of the first study are to: (1a) examine differences in attachment insecurity among eating disorder diagnostic categories and a non-eating disordered community sample; (1b) evaluate the incremental validity of attachment in accounting for eating disorder symptoms, after controlling for Diagnostic and Statistical Manual, fourth edition (DSM-IV; APA, 1994) diagnosis ; and (1c) examine the predictive validity of attachment in accounting for treatment outcome (i.e., symptom reduction) following the completion of a group-based day hospital treatment program, after controlling for DSM-IV diagnosis. The goals of the second study are to examine: (2a) the

relationship between insecure attachment and initial or overall group climate; (2b) the growth, i.e., weekly rate of change, of group climate in a day hospital group-based treatment program with rolling admissions for eating disorders; (2c) the relationship between growth of group climate and treatment outcome (i.e., symptom reduction) following intensive day treatment; (2d) the relationship between pre-treatment levels of attachment insecurity and the weekly rate of growth of group climate during a day hospital group-based treatment program; (2e) the impact of the group's experience of group climate on the individual's experience of group climate and, (2f) whether individual attachment dimensions are associated with the group's impact on the individual's experiences.

In this introduction, I will begin with a review of attachment theory. Next I will examine research relating to etiology and symptoms of eating disorders. Finally, I will describe the current concerns with DSM-IV diagnostic criteria, and then present research on eating disorder symptoms, treatment outcome and treatment process using an attachment framework.

Key Concepts in Attachment Theory

Bowlby posited that infants have an attachment system comprised of behaviours and cognitions which lead to the development of internal working models and, in turn, emotion regulation strategies, interpersonal behaviours and attachment styles (Bowlby, 1969, 1973, 1980). At the foundation of the attachment system are the attachment behaviours. Attachment behaviours are innate proximity-promoting behaviours to ensure protection and survival (e.g., crying, reaching, and grabbing). Initially, at birth, infants display attachment behaviours towards all caregivers, but quickly the behaviours become focused directly on primary caregivers who are responsive to the infant (Ainsworth, 1989; Bowlby, 1969, 1973). Bowlby argued that the stress-reducing and safety-promoting behaviours of the

infant solidify into an attachment system within the first year of life and serve to aid infants in defining their relationship with their environment to ensure predictable outcomes (i.e. proximity and safety) (Ainsworth, 1969; Bowlby, 1973, 1980; Bretherton, 1992). Bowlby (1969) theorized that there is a 'hierarchy of attachment figures,' meaning that the primary caregiver serves as the first attachment figure for infants, but additional attachment figures evolve in childhood (e.g. other relatives, teachers), adolescence (e.g. coaches, friends), and adulthood (e.g. romantic partners, friends) (Mikulincer & Shaver, 2007).

The behavioural system works collaboratively with the cognitive system, in that as the infant's cognitive system develops their attachment behaviours become more complex (Ainsworth, 1989). Three cognitive operations are involved in the attachment system. The first cognitive operation is processing and monitoring information about the external environment and emotional state; the second is monitoring and evaluating the reactions of the attachment figure to the infant's need for proximity; and, the third cognitive operation is evaluating the usefulness of the infant's proximity behaviours in order to make adjustments, if necessary (Bowlby, 1969, 1973; Bretherton, 1992; Mikulincer & Shaver, 2007). Therefore, the underlying cognitive processes unconsciously guide the selective attention, information processing, and interpretation of new information which in turn influence future thoughts, feelings, and behaviours (Bowlby, 1973, 1980). These thoughts, feelings, and behaviours develop into internal working models which continue to develop throughout the lifespan (Hazan & Shaver, 1987, 1994; Mikulincer & Shaver, 2007).

Internal working models are rules that guide behaviours, affective responses, perceptions, and ability to accurately predict the future behaviour of one's self and others (Ainsworth, 1969; Bowlby, 1969). Internal working models of the self adapt depending on one's attachment relationships throughout the lifespan. After repeated experiences with

attachment figures, a model is internalized, and this enables the infant to act in future familiar environments without having to reorganize their cognitions and behaviours. If the attachment figure is responsive to needs for security, comfort and independence, the infant will develop an internal working model of the self as valuable and worthwhile, and the world as safe, predictable and manageable. If the attachment figure is inconsistent or unresponsive then the infant will develop an internal working model of themselves as unworthy and inept and the world as unpredictable and scary (Bowlby, 1973, 1980). Infants who have an internal working model characterized by a negative view of themselves and/or others engage in secondary attachment behaviours (e.g., proximity seeking then avoiding, resisting contact, overly maintaining close contact) and negative cognitions (e.g., “I can’t trust others”, “I can’t trust myself”). These secondary attachment behaviors and cognitions develop into and become part of an insecure attachment system (Bowlby, 1973, 1980; Pietromonaco & Barrett, 2000).

Researchers posit that early experience with attachment figures, and subsequent development of internal working models, influence emotion regulation strategies and the success of interpersonal relationships (Bowlby, 1973; Main, Kaplan & Cassidy, 1985). Equipped with a model of secure attachment, the three to four year old infant learns to self-soothe, regulate negative emotions, and foster trust in interpersonal relationships; thus creating a positive balance of autonomy with intimacy (Bowlby, 1969; Mikulincer & Shaver, 2007). However, if the caregiver is unresponsive to the infant’s distress, does not provide comfort, and/or does not help reduce the infant’s emotions, the infant’s internal working model of insecure attachment associates distress-related emotions with negative outcomes. This results in an inhibition to learn adaptive emotional regulation strategies and trust in the benefits of interpersonal relationships (Ainsworth, Blehar, Water & Wall, 1978;

Kobak & Sceery, 1988). For example, infants with insecure attachments often experience limited or heightened affect, whereas infants with secure attachments are able to experience and display both positive and negative affect (Cassidy, 1994). Furthermore, Sroufe (1983) found that children with a secure attachment to their caregiver were ranked by their teachers as most socially competent with their peers; whereas those with anxious attachments to their caregiver were ranked as low in social competence.

Adult Attachment

Bowlby believed that attachment develops in infancy but continues to impact interpersonal relationships throughout adulthood (Fonagy, 2001). Attachment styles tend to remain stable over the lifespan, though they may be altered due to significant life events, traumatic experiences, psychotherapy, or significantly positive relationships (Bakermans-Kranenburg & van IJzendoorn, 2009; Kirkpatrick & Hazan, 1994; Thompson, 2000; Travis, Bliwise, Binder, Horne-Moyer, 2001). Waters and colleagues assessed 50 individual's attachment styles at 12 months of age and again at 21-years-old (Waters, Merrick, Treboux, Crowell & Albersheim, 2000). They found that 72% of adults received the same general classification of insecure or secure attachment as they received when assessed during infancy (Waters et al., 2000). Mickelson and colleagues (1997) examined adult attachment in a stratified sample of non-institutionalized Americans across 48 states ($N = 8,098$) (i.e., National Comorbidity Survey; Kessler et al., 1994). Within a non-clinical adult population, approximately 59% of individuals were classified as secure, 25% as avoidant, and 11% as anxious (Mickelson, Kessler & Shaver, 1997).

Similar to the infant attachment system, the adult attachment system is comprised of attachment related behaviours and cognitions, and internal working models which affect emotion regulation and interpersonal behaviours. The attachment system can be triggered

in adulthood by a variety of physical or psychological attachment related threats (e.g. concerns about romantic relationships) or non-attachment related threats (e.g. concerns about war or illnesses) (Mikulincer & Shaver, 2007; Shaver & Mikulincer, 2002). When the attachment system is challenged, adults do not question the actual availability of the caregiver, rather they question whether they are equipped with internal and external attachment resources to cope with the threats (Mikulincer, Shaver & Pereg, 2003). The resulting responses are largely dependent on how adaptive certain attachment related processes are, such as: coping with stress, affect regulation, and interpersonal behaviors. The quality of these attachment related processes define secure versus insecure attachment.

Adults with secure attachments employ security-based strategies to cope with attachment related threats (Mikulincer et al., 2003). They are confident in their personal abilities to manage stress as well as the abilities of others to help, and that these will result in positive outcomes to distressing situations. Therefore, secure adults possess a positive schema of self and others, are able to confront stress, allow themselves to be emotionally vulnerable, seek social support and build close relationships, regulate their emotions, and solve their problems (Ainsworth et al., 1978; Feeney, Noller & Harnahan, 1994; Mikulincer et al., 2003; Sroufe et al., 1999).

Adults with anxious attachments tend to employ hyperactivating strategies to cope with attachment related stress (Mikulincer et al., 2003). Hyperactivating strategies include heightened monitoring of threats to self, negative views of self efficacy, sensitivity to affect, excessive proximity seeking, exaggeration of symptoms to obtain the support of others, and pessimistic view of outcomes (Ainsworth et al., 1978; Feeney et al., 1994; Mikulincer et al., 2003). Therefore, adults with anxious attachments have difficulty

regulating their affect without the support of others, resulting in unhealthy interpersonal behaviours.

Adults with avoidant attachments use deactivating strategies to cope with attachment related threats (Mikulincer et al., 2003). These adults possess a positive schema of self, a negative schema of others, they are less expressive and responsive to affect, and they devalue help from others (Ainsworth et al., 1978; Chassler, 1997; Mikulincer et al., 2003). These deactivating strategies tend to result in thwarted emotions, a tendency to experience psychosomatic symptoms, and a lack of meaningful interpersonal relationships (Ainsworth et al., 1978; Chassler, 1997; Feeney et al., 1994; Mikulincer et al., 2003; Spangler & Zimmerman, 1999; Ward & Gowers, 2003).

With the surge of infant attachment research, adult attachment quickly became an area of interest to many investigators. Researchers argued that individuals' earlier experiences with their primary caregivers become more organized in adulthood and subsequently influence adult functioning (Main, Kaplan & Cassidy, 1985). Researchers extended infant-mother attachment to examine adult attachment, and consequently developed adult attachment interviews (e.g., George, Kaplan, & Main, 1985) and self-report measures (e.g., Hazan & Shaver 1987). Although both interview and self report assessment methods are based on Bowlby's attachment theory, the theoretical orientations of each method differ in many ways and the researchers of each orientation seldom work together (Bartholomew & Shaver, 1998). The interviews, developed by clinical developmental researchers, tend to focus on the coherence of mind when recollecting parent-child relationships and parenting. Self-report questionnaires developed by social psychologists tend to focus on self report of current adult relationships and attachment behaviours.

The most widely accepted adult interview is the Adult Attachment Interview (AAI; George et al., 1985). The AAI assesses early adult mental states of mind associated with mental representations of the caregiver-child relationships using a narrative approach (Mikulincer & Shaver, 2007). The interviewee is asked to describe their parents, childhood relationships with their attachment figures, and experiences of loss, separation and rejection (George et al., 1985). The coherence of these descriptions define attachment security or insecurity. Originally there were three AAI categories of adult attachment: 'Free-Autonomous,' describes adults who are securely attached; 'Dismissing the Attachment,' includes adults with avoidant attachments; and, 'Preoccupied-Enmeshed' describes adults with anxious attachments (George et al., 1985; Main et al., 1985). A fourth category was added, 'Unresolved/Disorganized,' to include adults whose attachment states of mind are affected by trauma and or loss (Main & Hesse, 1990; Slade, 1999; Shaver & Mikulincer, 2002).

Self-report measures of adult attachment were developed initially from examination of adult romantic relationships in social psychology (Mikulincer & Shaver, 2007). However, since then several scales were developed to assess adult attachment styles without the romantic focus. Currently, there is a broad spectrum of self-report measures assessing attachment with parents, peers, and close relationships. In general, self-report measures of attachment assess attachment-related emotions, cognitions, and behaviours (Shaver & Mikulincer, 2002). At first, self-report measures categorized attachment styles; however, categorization of attachment assumes that each style is independent of one another which does not enable researchers to assess how adults vary in magnitude on each of the attachment styles (Fraley & Waller, 1998; Mikulincer & Shaver, 2007). Researchers recommend dimensional measures of assessing attachment (e.g. attachment-related anxiety

versus attachment-related avoidance) that account for a greater amount of variance than categorical approaches when predicting attachment behaviors (Fraley & Waller, 1998; Mikulincer & Shaver, 2007; Shaver & Mikulincer, 2002).

Since the 1980's, researchers have further extended the application of attachment theory to better understand the development of psychopathology in adults (Fonagy, 2001; Shorey & Snyder, 2006). For example, Mickelson and colleagues (1997) found that anxious and avoidant attachments were positively related to psychiatric disorders, whereas secure attachments were negatively related to the disorders. With regards to personality, both types of insecure attachments were positively related to low self-esteem, external locus of control and neuroticism; and, negatively related to openness to experience and extraversion. Mickelson and colleagues concluded that attachment insecurity is a predisposing factor in the development of numerous psychiatric disorders.

In the paragraphs below I argue that emotion regulation and interpersonal behaviours, aspects of the internal working model of the attachment system, are implicated in the expression of eating disorder symptoms. Further, adult attachment concepts may play a role in informing treatment processes and interventions for those with eating disorders.

Etiology of Eating Disorders

The exact etiology of eating disorders remains largely unknown. One prevalent theory is that eating disorders stem from a combination of psychological, social, genetic and physiological risk factors (Connan, Campbell, Katzman, Lightman, & Treasure, 2003; Keel, 2005; Stice, 2001).

An example of an integration of psychosocial risk factors is Stice's dual-pathway model, which includes pressure to be thin, thin-ideal internalization, body dissatisfaction, dieting and negative affect, as predictive components of bulimic symptoms (Stice, 2001).

Recently, attachment styles were considered in this multidimensional model for eating disorders. Connan and colleagues (2003) proposed a model illustrating how genetic factors are subsequently influenced by early childhood attachment experiences, which in turn affects the hypothalamic-pituitary-adrenal (HPA) axis regulation, resulting in maladaptive cognitive, emotional and social behaviours. This process further reduces an individual's ability to cope with stress, and in turn increases vulnerability to developing eating disorders. Similarly, Tasca, Kowal and colleagues (2006) tested a structural equation model in which attachment insecurity was related to body dissatisfaction and negative affect for women with eating disorders. In another study, Tasca, Szadkowski, Illing, Grenon, Demidenko et al., (2009) found that emotional reactivity mediated the relationship between attachment anxiety and eating disorder symptoms, whereas there was a direct relationship between attachment avoidance and eating disorder symptoms (i.e., emotional regulation was not involved).

Overall, the research suggests that attachment insecurity may result in physiological expressions of stress and negative affect, thereby increasing the individual's vulnerability to eating disordered symptoms (Cole-Detke & Koback, 1996; Connan et al., 2003; Tasca, Kowal et al., 2006; Tasca, Szadkowski et al., 2009; Ward, Ramsay & Treasure, 2000). The first study of this proposal, which is described below, will examine further the role of attachment in the expression of eating disorder symptoms, but first I define the eating disorders and discuss issues related to diagnoses.

Eating Disorder Symptoms and Diagnoses

The DSM-IV (APA, 1994) operationally defines disorders based on overt behavioural symptoms. According to the DSM-IV, there are three main categories of eating disorders, anorexia nervosa (AN), bulimia nervosa (BN) and eating disorders not otherwise specified

(EDNOS). AN is characterized by maintaining body weight at or below 15% normal weight for age and height, an intense fear of gaining weight, body image distortion, and amenorrhea for at least three months (APA, 1994). There are two subtypes to AN: Binge-Eating/Purging subtype (ANB), in which the individual regularly engages in binge-eating or purging behavior (i.e. self-induced vomiting or misuse of laxatives); and Restricting subtype (ANR), in which the individual does not engage in binge-eating or purging behavior. Typically AN develops in mid- to late adolescence, and within the first five years individuals who initially have ANR may change to ANB (APA, 1994). BN is characterized by recurrent binge eating, recurrent inappropriate compensatory behaviours (e.g. vomiting), and self-evaluation unduly influenced by body shape or weight (APA, 1994). There are two subtypes to BN: Purging subtype, in which the individual regularly engages in self-induced vomiting or misuse of laxatives, diuretics, or enemas; and Nonpurging subtype, in which the individual uses other inappropriate compensatory behaviours such as fasting or excessive exercise. BN usually occurs in late adolescence or early adulthood (i.e. 17-25 years of age; APA, 1994; Fishman, 2004). Finally, EDNOS is a category for individuals who do not meet criteria for AN or BN, but who exhibit eating disorder symptoms (e.g. less frequent binge eating and inappropriate compensatory behaviours, purging without binge eating, or meet criteria for AN without amenorrhea) (APA, 1994). Refer to Appendix A, B and C for complete DSM-IV criteria of each of these disorders.

Concerns with the Diagnostic and Statistical Manual

Although the DSM-IV is commonly used to diagnose eating disorders, researchers and clinicians are concerned that the criteria are limited by a one-dimensional behavioural approach (Fairburn & Cooper, 2007; Walsh, 2007). Some have argued that the DSM-IV criteria for eating disorders may be improved by addressing additional dimensions that

provide greater validity when predicting eating disorder psychopathology (Westen & Harnden-Fischer, 2001).

Hebebrand and colleagues suggested that the diagnostic criteria be revised in order to encompass more of the biological symptomology of AN, thereby increasing the validity and reliability of the diagnosis (Hebebrand, Casper, Treasure & Schweiger, 2004). In addition to biological dimensions, those with ANR, ANB and BN also vary on psychological and personality dimensions which are not taken into account by the DSM-IV criteria. Westen and Harnden-Fischer (2001) argued that DSM-IV criteria tend to group high functioning individuals, impulsive, and emotionally constricted individuals within the same diagnosis (e.g., ANR & ANB). Westen and Harnden-Fischer's findings suggest heterogeneity within diagnostic classification. That is, the DSM system likely clusters patients within ANR, ANB, and BN diagnoses who otherwise differ on dimensions such as: attachment styles, intellectual and emotional functioning, self-esteem, and other symptoms characteristic of eating disorders (Westen & Harden-Fischer, 2001). Consequently, a number of researchers and clinicians argued for a framework that includes these dimensions in order to better understand, classify, and treat individuals with eating disorders (Fairburn & Cooper, 2007; Tasca, Demidenko et al., 2009; Walsh, 2007; Westen & Harden-Fischer, 2001).

Evidence of incremental and predictive validity of attachment scales would suggest the utility of attachment theory in understanding and treating eating disorders. That is, attachment dimensions may account for meaningful variance in eating disorder symptom expression, and treatment outcomes that is not accounted for by ED diagnosis alone. I address this possibility in Study 1.

Attachment Theory and Eating Disorder Symptoms

The first goal of Study 1 is to determine the differences on attachment dimensions among eating disorder diagnostic categories. The following is a review of the research examining differences in attachment dimensions or categories among clinical samples of eating disorders.

Researchers demonstrated that women with AN and BN self-reported higher anxious and avoidant attachments and lower secure attachment (Candelori & Ciocca 1998; Troisi et al., 2006). These researchers did not find a difference between the two diagnostic categories and there was no control group. Using the Adult Attachment Interview, Ward and colleagues (2001), found that 75% of women with AN (ANB =14, ANR = 6) had dismissing (avoidant) attachment styles, 20% were categorized with preoccupied (anxious) attachments, and 5% were securely attached. Differences in attachment insecurity were also reported between infants with infantile AN ($N = 33$) versus picky eaters ($N = 34$) (Chatoor, Ganiban, Colin, Plummer & Harmon, 1998). Chatoor and colleagues found that 39% of infants with infantile AN versus only 12% of picky eaters were insecurely attached. Armstrong and Roth (1989), found that 96% of in-patient women with AN and BN ($N=27$) were categorized as anxiously attached on the Separation Anxiety Test (SAT; Hansburg, 1980), compared to only 15% classified as anxiously attached in a normative comparison sample. Researchers examined the attachment styles in a sample of women with ANB, ANR and BN using the Adult Attachment Interview, and found that 13% were classified as dismissing, 50% as preoccupied, and 37% as mixed/disorganized (Ringer & McKinsey Crittenden, 2007). Terreno and colleagues (2008) reported females with AN and BN experienced significantly higher levels of anxious and avoidant attachment compared to a control group, however no differences were found between the two clinical samples.

Although the research cited above demonstrates a link between insecure attachment and eating disorders, there are inconsistencies between rates of insecure attachment styles by eating disorder diagnoses, as seen in comparing the research by Ward and colleagues (2001) and Armstrong and Roth (1989). These inconsistencies could be due to using different measures of attachment, using different sampling characteristics, unreliability of results caused by small sample sizes, and/or idiosyncratically combining diagnostic categories. By using a large clinical sample, I will address some of these inconsistencies in Study 1 in which I examine how self-reported attachment dimensions differ among women diagnosed with ANR, ANB and BN versus a non-eating disordered community sample.

The second goal of Study 1 is to determine the incremental validity of attachment dimensions in explaining variance in eating disorder symptoms. Researchers reported a significant positive relationship between insecure attachment and symptoms of bulimia (Evans & Wertheim, 2005). Kenny and Hart (1992) found that positive and supportive parental attachment was negatively related to preoccupation with weight, bulimia, and feelings of inadequacy in a sample of college women. They also reported that reduced attachment security was related to increased symptoms of bulimia and ineffectiveness among an eating disordered inpatient population. Brennan and Shaver (1995) found a positive relationship between attachment avoidance and a bulimia scale, and a positive relationship between anxious attachment and drive for thinness, bulimia and body dissatisfaction scales in a non-clinical sample of adults. Using a clinical sample of women with eating disorders, Tasca, Kowal and colleagues (2006) reported that greater insecure attachment was positively related to body dissatisfaction and negative affect. Similarly, Troisi and colleagues (2006) found a positive relationship between need for approval, a dimension of attachment anxiety, and body dissatisfaction among women with AN and BN.

Overall, the available research suggests that insecure attachment is associated with higher eating disorder symptoms. To further explore the utility of these relationships, I will examine the incremental validity of attachment dimensions in explaining variance in eating disorder symptoms for women with an eating disorder over and above variance explained by DSM-IV diagnostic categorization.

Attachment and Group Treatment Outcomes for Eating Disorders

The third goal of Study 1 is to evaluate the predictive validity of attachment dimensions in relation to eating disorder treatment outcomes. Eating disorders, in particular AN, are extremely difficult to treat (Yager et al., 2000). Those with AN report that gaining weight and changing their maladaptive body image is a challenging process (Gleaves, Miller, Williams & Summers, 2000). In a review, Mahon (2000) found that 5 – 40% of those with eating disorders tend to drop out of treatment. The median drop out rate for BN was 20%, and the median for AN was 50%. Neither personality characteristics nor severity of symptoms were related to drop-out rates; rather, problematic interpersonal skills and difficulties forming relationships were strongly related to dropping out of treatment (Mahon, 2000). Tasca and colleagues conducted two studies to directly examine how attachment styles influence drop-out rates. They found that women with ANB who dropped out of group-based day treatment (Tasca, Taylor, Bissada, Ritchie & Balfour, 2004) and women with binge eating disorder (BED) receiving group cognitive behavioral therapy (Tasca, Ritchie et al., 2006), self reported higher attachment avoidance at pre-treatment. In contrast, those with ANB with higher attachment anxiety tended to remain in group-based day treatment when compared to those with lower attachment anxiety.

Since there is limited research on attachment and treatment outcome among eating disordered individuals, I also reviewed the literature in other clinical populations. Reis and Grenyer (2004) examined attachment as a predictor of treatment response for individuals with major depression. They found that fearful (avoidant) attachment predicted poorer treatment outcome (i.e. depressive symptom reduction) following 16 sessions of psychotherapy; and, preoccupied (anxious) attachment predicted poorer treatment outcome specifically in the final ten sessions of psychotherapy. Examining attachment as a moderator of treatment outcome, McBride and colleagues found that individuals with attachment avoidance had greater reduction of depressive symptoms with cognitive behaviour therapy compared to interpersonal therapy (McBride, Atkinson, Bagby & Quilty, 2006).

So far, research demonstrated that attachment avoidance may be related to poorer treatment outcome for depression and to dropping out of group treatment for BED, ANB, and depression (McBride, et al., 2006; Reis & Grenyer, 2004; Tasca, et al., 2004; Tasca, Ritchie, et al., 2006). However, there is no research assessing the relationship between attachment and eating disorder outcomes (i.e., symptom reduction) for ANB, ANR and BN after completing group treatment. Research on the relationship between attachment and symptom reduction for eating disorders may result in a better understanding of factors that lead to positive outcomes for difficult to treat eating disorders.

Attachment and Group Treatment Process for Eating Disorders

As indicated, the goals of Study 2 are to examine the initial or overall group climate for women with eating disorders attending a day hospital treatment program, the growth, i.e., weekly rate of change, of group climate for women attending the treatment program, the

relationship between growth of group climate and treatment outcome, the relationship between individuals' sensitivity of group climate and other group members' assessment of group climate, and whether attachment dimensions impact these relationship.

Research on group process refers to several components of group atmosphere, including group climate, alliance to the group, group cohesion, and alliance to the group therapist (Johnson, Burlingame, Olsen, Davies, & Gleave, 2005; Kivlighan & Lilly, 1997). Group climate is a multidimensional construct of members' perceptions of group atmosphere (Kivlighan & Lilly, 1997). Specifically, group climate refers to three elements of the group therapeutic environment: members' *engagement* with the group, *avoidance* of important or difficult topics, and *conflict* among group members (MacKenzie, 1983b). Group engagement is similar to group cohesiveness in that engagement measures bonding and the feeling of solidarity among group members (Kivlighan & Lilly, 1997; MacKenzie, 1983b). Cohesiveness is as important to group therapy as therapeutic alliance is to individual therapy (Yalom & Leszcz, 2005).

Similar to findings that therapeutic alliance is essential to successful outcomes in individual therapy (Krupnick et al., 1996; Martin, Garske & David, 2000), group cohesion (i.e. engagement) is critical for positive group psychotherapy outcome. Positive group climate is related to higher attendance, participation, and completion rates (Gillaspy, Wright, Campbell, Stokes & Adinoff, 2002; Joyce, Piper & Ogrodniczuk, 2007; Tasca, Flynn & Bissada, 2002; Tasca, Balfour et al., 2006; Yalom & Leszcz, 2005). Implicit in these conceptualizations of group dynamics is that the group's experience will have an impact on the individual in any given session. For example, Tasca and colleagues (2010) found that a group's alliance ratings affected an individual's experience of the alliance to the group despite changes in group membership.

Previous research tended to assess group climate using static time points, e.g., at pre- or post-treatment, or at an early session or phase in group therapy. For example, Tasca and colleagues compared initial mean group climate scores between an eating disorders and psychiatric hospital group and found that the eating disorder sample experienced significantly more Engaged and Avoidance group climate within their groups compared to the psychiatric sample (Tasca et al., 2002). Using a sample of individuals seeking treatment for complicated grief, Ogrodniczuk and Piper (2003) found that early group engagement, a dimension of group climate, measured at session four was related to decreased symptoms of grief at post-treatment. Braaten (1989) examined early ratings of group climate for individuals receiving group therapy. He found that higher ratings on the Engaged group climate scale and lower rating on the Avoidance group climate scale were correlated with greater therapeutic gain. Another group of researchers examined the relationship among group cohesion, alliance and treatment outcome for individuals receiving group psychotherapy for borderline personality disorder (Marziali, Munroe-Blum & McClear, 1997). Results suggested that higher cohesion and alliance rated at session 3 and session 8 were related to better treatment outcome at 24-month follow-up (e.g., symptom reduction).

Static time point research provided valuable information regarding the role of group climate early in treatment and its relationship to outcome. However, this approach does not capture the development or growth of group process variables, such as group climate, over time. MacKenzie (1983a) theorized that group atmosphere develops in three sequential stages: engagement, differentiation, and individuation. The engagement stage is characterized by cohesion between group members and commitment to the therapeutic tasks (MacKenzie, 1997). During this stage group members begin to self-disclose, find similarities, and form trust among one another. The differentiation stage is characterized by

confrontation and questioning among group members. Members begin to challenge similarities and examine issues pertaining to control, dominance and negative affect (MacKenzie, 1997). Lastly, the individuation stage is characterized by increased introspection and focus on individual problems. Members examine issues pertaining to interpersonal functioning which promotes closeness among group members (MacKenzie, 1997).

Few studies have examined the development of group climate or alliance using growth curve analysis of longitudinal data (Kivlighan & Lilly, 1997; Kivlighan & Shaughnessy, 1995; Tasca, Balfour et al., 2006). Kivlighan and Shaughnessy (1995) examined the development of working alliance in predicting individual outpatient therapeutic outcome. Results demonstrated a linear increase in working alliance across treatment sessions for clients and therapists in individual therapy, and the linear growth in alliance was positively related to outcome (i.e., fewer interpersonal problems). Kivlighan and Lilly (1997) investigated developmental changes in group climate for undergraduates participating in an interpersonal process group for course credit. They found that quadratic growth in Engaged group climate (i.e., high-low-high) and Conflict group climate (low-high-low), and cubic growth in Avoidance group climate (i.e., high-low-high-low) were related to positive treatment outcome (i.e., reduction in target complaints), and the growth trends for engagement and conflict accounted for more variance in outcome than static time point assessments. Kivlighan and Lilly argued that these results emphasize the need to better understand the pattern of group climate growth rather than absolute scores at static time points.

Another group of researchers examined group climate growth for patients receiving group therapy for BED (Tasca, Balfour et al., 2006). When analyzing growth curves for all

patients Tasca, Balfour, and colleagues found that the Engaged group climate scale increased linearly, and the Avoidance and Conflict group climate scales decreased linearly over the course of treatment. In another study, Tasca and colleagues (2007) examined the growth of group therapy alliance across 16 sessions of group therapy for BED and found a linear growth of group alliance across 16 sessions of time limited therapy. No study that we are aware of assesses the change in group climate among those with AN, BN or EDNOS. Hence, one of the goals in the second study is to examine the developmental changes in group climate across weeks in an intensive day hospital group-based treatment program with rolling admissions for women with ANR, ANB, BN or EDNOS, and its relationship to treatment outcome (i.e., symptom reduction) (Morgan-Lopez & Fals-Stewart, 2006; Tasca et al., 2010).

In addition, I argue that maximizing positive group climate for individuals with eating disorders might be facilitated by examining patient variables, such as attachment styles, that may influence group process growth. There is little research examining the influence of attachment dimensions on group process, despite attachment's potential influence on group therapy process and outcomes. Ardovini (2002) posited that therapy processes and outcomes would benefit if therapists were responsive to patient attachments and considered specific attachment patterns that affect patient interpersonal distress and symptom expression. For example, therapists might keep in mind that those with avoidant attachments tend to refuse help, discount the importance of relationships, and protect themselves from being hurt by others by emphasizing their self-sufficiency. Therefore, it is important for the therapist to build a therapeutic alliance and provide additional empathy and responsiveness. On the other hand, therapists need to consider that patients with anxious attachments tend to fear the unpredictable nature of relationships and often believe

that they have to sacrifice their independence to receive help from others. Hence, it may be important for the therapist to demonstrate consistency and clear boundaries, as well as highlight to these individuals that seeking help does not entail lack of control.

Similarly, Marmorosh (2009) suggested that attachment theory helps to understand why some group members struggle with expressing themselves and engaging in the group environment, or are overly sensitive to other group member's expressions of emotions. Marmorosh (2009) reported that although there is evidence to support relationships between attachment style and individual therapy process, few studies have examined the role of attachment within a group psychotherapy context. Therefore, another goal of Study 2 is to examine how attachment is related to group climate growth for individuals with eating disorders. This research may help clinicians determine whether their eating disordered patient's attachment dimensions should be considered when attempting to increase Engaged group climate and, in turn, obtain better treatment outcomes.

A few studies examined the relationship between attachment and its impact on group atmosphere. Using a series of multiple regressions Eames and Roth (2000) demonstrated that, fearful attachment was associated with lower alliance in sessions 3 and 5, secure attachment was associated with higher alliance rating at session 5, and avoidant attachment was associated with improved alliance across the five sessions of individual therapy (Eames & Roth, 2000). Using repeated measure analysis of variance, Kanninen, Salo, and Punamaki (2000) found that alliance changed over time differently depending on attachment patterns for individual and group trauma therapy. Working alliance developed in a positive linear trend for individuals with anxious attachments, whereas alliance developed in a negative linear trend for individuals with avoidant attachment patterns (Kanninen, Salo & Punamaki, 2000).

Using multilevel modeling, Tasca and colleagues (2007) found that higher attachment anxiety and lower attachment avoidance were associated with the growth of group alliance for individuals with BED, but only in Group Psychodynamic Interpersonal Psychotherapy (GPIP; Tasca, Mikail, & Hewitt, 2005) and not in Group Cognitive Behavior Therapy (GCBT; Wilfley, 1996). Tasca and colleagues speculated that the GPIP emphasis on affect expression and interpersonal relationships activated the attachment system in patients resulting in differing perceptions of group alliance between avoidant and anxiously attached individuals. In another study, Tasca, Balfour and colleagues (2006) found that linear growth in engaged group climate mediated the relationship between attachment anxiety and treatment outcome for women with BED (i.e., reduction in days binged). That is, those with high attachment anxiety required a steady growth in Engaged group climate in order to benefit from GPIP (Tasca, Mikail & Hewitt, 2005). The current study furthers this line of research by examining the potential impact of attachment insecurity on the group treatment process (i.e., group climate) for women with ANR, ANB, BN, or EDNOS.

Other goals of this study are to examine whether the group's experiences of group climate has an impact on the individual's experience, and whether attachment dimensions are associated with this relationship. Clinicians have long speculated that positive (e.g., group engagement) and anti-therapeutic (e.g., hostility, dropping out) events have an impact on the group, even after a member associated with these events is no longer part of the group (Rutan & Stone, 1993; Yalom & Leszcz, 2005). In other words, a group with rolling admissions, i.e., changing membership over time, has a history of interactions among group members that affects individuals currently in the group (Morgan-Lopez & Fals-Stewart, 2006). Tasca and colleagues (2010) found a significant relationship between individual ratings of alliance and other group members' ratings of alliance. That is,

individual members were sensitive to how other group members were experiencing the group process. As indicated earlier the perception of and sensitivity to others' experiences might be affected by the type of attachment insecurity. For example, those with attachment anxiety might be highly sensitive to the moods and experiences of others, whereas, those with attachment avoidance might try to maintain an emotional distance from others' experiences. Hence we expect those with higher attachment anxiety to be sensitive to others' experiences of the group climate, and those with attachment avoidance to be less sensitive to, or less aware of, other group members' experience of the group climate. To date there are no studies that have examined these relationships.

To summarize, only a handful of studies examined the relationship between attachment and group climate. Furthermore, no studies have examined the growth of group climate, the relationship between group climate growth and treatment outcome, the relationship between attachment and group climate growth, or the impact of the group's experience of the group climate on the individual's experience of group climate in individuals seeking treatment for ANR, ANB, BN and EDNOS. Study 2 of this dissertation will examine these issues.

Regional Centre for the Treatment of Eating Disorders

The current study is part of a program of research at the Regional Centre for the Treatment of Eating Disorders (RCTED). The RCTED is publicly funded and exists within the Mental Health Program at The Ottawa Hospital. There are several services and treatment programs offered by the RCTED such as a consultation service, a day hospital group-based treatment program, a symptom interruption inpatient program, and outpatient treatment programs. The clinical data from this study originated from the consultation service and the day hospital group-based treatment program. The purpose of the

consultation service is to provide a comprehensive diagnostic assessment by a psychologist and psychiatrist, and to make treatment recommendations. One treatment option could be the day hospital group-based treatment program, depending on diagnosis and severity of symptoms.

The day hospital group-based treatment program at the RCTED is modeled on the Toronto General Hospital eating disorders program (Olmsted, McFarlane, Molleken, & Kaplan, 2001), and shares a number of features with other day hospitals including supervised meals and group therapy for individuals with an eating disorder diagnosis (Zipfel, et al., 2002). The treatment model has remained consistent since it opened in 1997. The program accommodates up to 8 patients with moderate to severe eating disorder pathology at a time who attend four days a week from 9am to 6pm. Program goals include nutritional rehabilitation, reduction in eating disordered attitudes and behaviors, improved interpersonal relationships, and improved mood. The content of the program follows from the goals. Regarding nutritional rehabilitation, patients have two supervised meals and a supervised snack per day, meal planning, grocery shopping, and some meal preparation during the week. Patients are required to consume a minimum caloric intake that is appropriate to their height and stage in the program. Psychological groups include: assertiveness training, family relationships group, interpersonal therapy group, art therapy group, and healthy attitudes group among others. On average, patients remain in the day hospital group-based treatment program for 12 weeks. Those with AN remain in the treatment until their weight is restored and stabilized at a minimum BMI of 20 (approximately 12-14 weeks).

The program staff includes a psychiatrist, three psychologists, a nurse, a dietician, a part time social worker, and a part time occupational therapist. Each staff member has at least

five years experience in the treatment of eating disorders or in partial hospital treatment. Most of the therapy groups within the day hospital program are provided by two staff members. Therefore, new staff members were thoroughly trained by observing the treatment groups being conducted by the more experienced staff member.

Hypotheses

1a. The first goal of study 1 is to determine the relative elevations in attachment insecurity within an eating disorder clinical sample of women compared to a non-eating disordered community sample of women. I hypothesized those diagnosed with ANR, ANB and BN will self-report higher levels of attachment anxiety and avoidance compared to a non-eating disordered community sample. Given current inconsistencies in the literature, no hypotheses were made regarding differences among the eating disorder diagnostic groups on attachment insecurity dimensions.

1b. The second goal of study 1 is to determine if attachment style provides incremental validity, over and above the DSM diagnoses in accounting for variance in symptoms of ANR, ANB and BN. I hypothesized that higher attachment anxiety and avoidance will be associated with greater reporting of eating disorder symptoms even after controlling for variance accounted for by diagnostic category.

1c. The third goal of study 1 is to discern if attachment style predicts treatment outcome among women in a day hospital treatment program for eating disorders after controlling for eating disorder diagnosis. I hypothesized that higher pre-treatment attachment anxiety and attachment avoidance will predict poorer eating disorder treatment outcome at post-treatment, even after controlling for variance in the outcome accounted for by DSM ED diagnostic category.

2a. The first goal of study 2 is to examine the relationship between insecure attachment and initial or overall group climate. I hypothesized that higher pre-treatment attachment anxiety and/or lower attachment avoidance will be associated with higher initial levels of Engaged group climate and with higher overall levels of Engaged group climate across weeks of treatment. I will explore this relationship for Conflict and Avoidance group climate scales, but no hypotheses were made for these scales.

2b. The second goal of study 2 is to examine group therapy climate growth, i.e., weekly rate of change, for women in an eating disorder day hospital treatment program with rolling admissions. I hypothesized a significant positive linear growth in Engaged group climate, and a significant linear decrease in Conflict and Avoidance group climate, over the weeks of the day hospital group-based treatment program after controlling for group effects.

2c. The third goal of study 2 is to examine the relationship between group climate growth and treatment outcome (i.e., reduction of eating disorder symptoms) following the day hospital group-based treatment program, after controlling for group effects. I hypothesized a significant relationship between increased growth of Engaged group climate and greater reduction of eating disorder symptoms following treatment. No hypotheses were made for the Conflict and Avoidance group climate scales.

2d. The fourth goal of study 2 is to examine how insecure attachment dimensions influence the growth of group climate i.e., weekly rate of change for women in a day hospital treatment program for eating disorders with rolling admissions. I hypothesized that higher pre-treatment attachment anxiety and/or lower attachment avoidance will be associated with a positive linear growth in Engaged group climate after controlling for group effects. Given that there is little research, I made no hypotheses regarding the

relationship between attachment anxiety and attachment avoidance and the growth of the Conflict and Avoidance group climate scales.

2e. The fifth goal of study 2 was to examine the impact of the other group members' experience of group climate on the individual among women receiving day hospital group-based treatment with rolling admissions. I hypothesized that the group's experience of the group climate will be positively associated with an individual's experience of the group climate during any given week.

2f. The sixth goal of study 2 was to examine whether individual insecure attachment dimensions would be related to the impact of the group on the individual's experience of the group climate. I hypothesized that higher pre-treatment attachment anxiety and/or lower pre-treatment attachment avoidance will predict a greater association between the group's and the individual's group climate scores.

General Data Cleaning and Statistical Assumptions

All the data was systematically cleaned using the procedures outlined by Tabachnick and Fidell (2007). First, I ensured the data file was entered correctly. I reviewed a 25% random sample of the data from the intensive day hospital group-based treatment program to determine whether it was accurate, and 100% of the weekly group climate data set was reviewed by an individual who was not involved in the original data entry. Both data files were deemed accurate. Second, I reviewed all missing data to determine whether it was missing at random using *t-tests* and *chi-square tests*. Refer to the separate statistical analyses sections in the articles to review how I handled missing data. Third, I examined the presence of extreme scores, i.e., univariate or multivariate outliers. Univariate outliers were corrected by replacing the outlying score with the next highest or lowest score + or - one unit (Tabachnick & Fidell, 2001). No multivariate outliers were detected. Fourth, I

assessed the normality of the distribution, i.e., skewness and kurtosis. Some of the data was minimally skewed and kurtotic, however the distribution was within reason and did not occur across all time points. Fifth, a *Levene's test* was used to determine the homogeneity of variance and *Box's M* was used to assure multivariate homogeneity of variance. Last, I examined the multicollinearity and singularity of the data measuring bivariate correlations (i.e., $r_s \geq .90$). All the data was cleaned and statistical assumptions met prior to conducting the analyses. Note that the second article presents only the multilevel models relevant to the statistically significant results. This was done because of page limitations for a submitted manuscript. A complete annotated presentation of all eight multilevel models used in the second article is included in Appendix D of this dissertation.

Article 1

RUNNING HEAD: ATTACHMENT INSECURITY PREDICTS EATING DISORDER

*Attachment Insecurity Predicts Eating Disorder Symptoms and Treatment Outcomes
in a Clinical Sample of Women*

Vanessa Illing

Abstract

We examined the extent to which attachment insecurity was related to eating disorder (ED) symptoms, and predictive of treatment outcomes. Women diagnosed with anorexia nervosa (AN) restricting subtype (ANR), AN binge purge subtype (ANB), or bulimia nervosa (BN) completed an attachment scale pre-treatment, and ED symptom scales pre-treatment ($N = 243$) and post-treatment ($N = 157$). A comparison sample of 126 non-ED women completed attachment scales on one occasion. Those with EDs had significantly higher attachment insecurity than non-ED. ANB was associated with higher attachment avoidance compared to ANR and BN, and higher attachment anxiety compared to BN. Higher attachment anxiety was significantly related to greater ED symptom severity and poorer treatment outcome across all EDs even after controlling for ED diagnosis. Attachment dimensions substantially contribute to our understanding of ED symptoms and treatment outcome. Addressing attachment insecurity when treating those with EDs may improve treatment outcomes.

*Attachment Insecurity Predicts Eating Disorder Symptoms and Treatment Outcomes
in a Clinical Sample of Women*

Attachment theory is one of the most important conceptual frameworks in the past half century for understanding affect regulation and human relationships (Mikulincer & Shaver, 2007). The link between affect regulation, interpersonal support, and psychopathology is well documented (e.g., Cloitre, et al., 2005). To this end, attachment theory has been applied to advance our understanding of a number of psychological disorders such as depression, post-traumatic stress disorder, and substance abuse (Fonagy, 2001; Shear, 1996; Shorey & Snyder, 2006). However, to date, the application of attachment theory to eating disorders (ED) is limited. Applying an attachment theory framework might result in a better understanding ED symptoms and improved treatment outcomes.

There are three main diagnostic categories of ED, anorexia nervosa (AN), bulimia nervosa (BN) and eating disorders not otherwise specified (EDNOS). AN is characterized by maintaining body weight at or below 15% normal, an intense fear of gaining weight, body image distortion, and amenorrhea for at least three months. In the binge-eating/purging type (ANB), the individual regularly engages in binge-eating and/or purging behavior, whereas in the restricting type (ANR), no binge eating or purging occurs. BN is characterized by recurrent binge eating, followed by inappropriate compensatory behaviours (e.g., vomiting), and self-evaluation unduly influenced by body shape or weight (American Psychiatric Association (APA), 1994). EDNOS is a category for individuals who do not meet specific criteria for AN or BN but who exhibit significant ED symptoms (e.g., purging with no binge eating, binge eating with no purging, AN symptoms in the absence of amenorrhea; APA, 1994). Approximately 1% to 4% of women have a diagnosable ED (APA, 2000). These individuals often suffer from co-morbid psychiatric disorders, such as depressive, anxiety, personality and substance use disorders (APA). ED can

result in serious medical problems, and the average mortality rate for those with AN is 10%, but can be as high as 18% (Birmingham, et al., 2005; Mitchell, 1995).

The medical and health costs of ED are high and well documented (e.g., Striegel-Moore, et al., 2008), however, treatment success is limited and recidivism rates are high (Mahon, 2000; Steinhausen, 2002). The best available treatments eliminate ED symptoms in approximately 40-60% of individuals with BN and 20-40% of those with AN (Wilson, et al., 2007). Hence, one can argue that current theories of ED symptoms and treatments offer an incomplete understanding (Wilson et al., 2007). The present state of knowledge makes it necessary to consider other conceptual frameworks for the EDs, such as attachment theory, to account for symptom presentation and treatment outcomes.

Attachment theory started as a developmental theory of infants and children however since the 1980's researchers have extended attachment theory to understand better the development of psychopathology in adults (Fonagy, 2001; Shorey & Snyder, 2006). Bowlby (1969, 1973, 1980) posited that infants have an attachment behavioural system geared toward gaining proximity to an attachment figure, such as a parent. This is a genetically hard-wired system necessary for infant survival. Repeated interactions with attachment figures lead to the development of internal working models in infants and children, which become the basis by which emotion regulation strategies and interpersonal behavioral styles develop and are maintained. Attachment styles, which reflect internal working models, tend to remain stable over the lifespan, and they are altered only by events such as significant changes in one's life, traumatic experiences, or significant positive relationships (Kirkpatrick & Hazan, 1994; Thompson, 2000). Waters and colleagues (2000) who assessed individual attachment at 1 year of age and again at 21 years of age, found that 72% retained the same classification of insecure or secure attachment.

Attachment security is associated with healthy processes such as adaptive affect regulation and positive interpersonal interactions. Attachment anxiety is characterized by hyperactivating strategies to cope with attachment related stress (Mikulincer, et al., 2003), such as heightened monitoring of threats to self, sensitivity to affect, excessive proximity seeking, and exaggeration of symptoms to obtain the support of others (Ainsworth, et al., 1978; Feeney, et al., 1994). Individuals with high attachment anxiety have difficulty regulating their affect without the support of others, which in turn results in unhealthy interpersonal behaviours, depressive symptoms, and possibly eating disorder symptoms (Tasca, Szadkowski, et al., 2009). On the other hand, attachment avoidance is associated with deactivating strategies to cope with attachment related stress (Mikulincer et al., 2003). Individuals high in attachment avoidance tend to possess a positive view of self accompanied by a negative evaluation of others, they are less expressive and responsive to affect, and they devalue help from others (Ainsworth et al., 1978; Mikulincer et al., 2003). Deactivating strategies are associated with thwarted emotions, few meaningful interpersonal relationships, and perhaps greater eating disorder symptoms (Mikulincer et al., 2003; Tasca, Szadkowski, et al., 2009; Ward & Gowers, 2003).

The first goal of this study is to evaluate the differences on attachment insecurity dimensions among women diagnosed with an ED versus a non-ED community sample. Researchers demonstrated a link between insecure attachment and an ED diagnosis (e.g., Troisi et al., 2006). However, there are inconsistencies in the research as to whether certain attachments styles are more prevalent among specific ED diagnoses (i.e., ANR, ANB, and BN; e.g., Armstrong & Roth, 1989; Troisi et al., 2006; Ward, et al., 2001). These inconsistencies could be due to: researchers using different measures of attachment, researchers not using a non-ED control group, lack of norms for the attachment scales, unreliability of results caused by small sample sizes, and/or idiosyncratically combining diagnostic ED categories. The current study attempts to

rectify these inconsistencies by examining self-reported attachment dimensions among a large clinical sample of women meeting DSM-IV diagnostic criteria for ANR, ANB or BN versus a group of non-ED women.

The second goal of this study is to determine the incremental validity of attachment dimensions in explaining ED symptoms over and above DSM-IV diagnosis (APA, 1994). Although the DSM is commonly used to diagnose an ED, researchers and clinicians are concerned that the criteria are severely limited by a one-dimensional symptom-based approach (Fairburn & Cooper, 2007). Westen and Harnden-Fischer (2001) argued that DSM criteria tend to group high functioning, impulsive, and emotionally constricted ED individuals within the same diagnosis, suggesting heterogeneity within ED diagnoses. Further, a growing number of researchers report a significant relationship between ED symptoms and attachment insecurity scales (Evans & Wertheim, 2005; Kenny & Hart, 1992; Tasca, Kowal, et al., 2006; Tasca, Szadkowski, et al., 2009; Troisi, et al., 2006). No study has yet to assess if attachment dimensions add to our understanding of eating disorder symptoms above and beyond variation already accounted for by DSM ED diagnostic category.

The third goal of this study is to evaluate the predictive validity of attachment dimensions in relation to ED treatment outcomes. Once we determined whether attachment dimensions improve our understanding of symptoms, we turned our attention to assess if these dimensions add to our understanding of ED symptom change at post-treatment. In a randomized controlled trial for women with binge eating disorder (BED), Tasca, Ritchie, et al. (2006) found that women with different attachment styles benefit from different types of psychotherapy. More specifically, those with high attachment anxiety who received group psychodynamic interpersonal psychotherapy (Tasca, et al., 2005), and those with low attachment anxiety who received group cognitive behavior therapy (Wilfley, et al., 1996) achieved the best outcomes in terms of reduced

binge eating. Outside of the ED literature, Reis and Grenyer (2004) predicted treatment response for individuals with major depression, and found that fearful (avoidant) attachment scores predicted poorer treatment outcome in the first six sessions of psychotherapy, whereas preoccupied (anxious) attachment scores predicted poorer treatment outcome in the final ten sessions of therapy. McBride, et al. (2006) found that individuals with attachment avoidance had a greater reduction of depressive symptoms with cognitive behaviour therapy compared to interpersonal therapy. There is no research assessing the relationship between attachment dimensions and ED symptom outcomes for ANB, ANR and BN following group treatment. Further, there is no research that assesses this relationship above and beyond outcome variance accounted for by DSM ED diagnostic category.

Hypotheses

Regarding the first goal of this study, we hypothesized that those diagnosed with ANR, ANB and BN will self-report higher levels of attachment anxiety and avoidance compared to a non-ED community sample. Given current inconsistencies in the literature, no hypotheses were made regarding differences among the ED diagnostic groups on attachment insecurity dimensions. For the second goal of this study, we hypothesized that higher attachment anxiety and avoidance will be associated with greater reporting of ED symptoms even after controlling for variance accounted for by diagnostic category. For the third goal of this study, we hypothesized that higher pre-treatment attachment anxiety and attachment avoidance will predict poorer ED treatment outcome at post-treatment (i.e. last day of treatment), even after controlling for variance in the outcome accounted for by DSM ED diagnostic category.

Method

Participants

The clinical sample was comprised of women diagnosed with ANR ($N = 49$), ANB ($N = 71$) or BN ($N = 123$) who attended an intensive day hospital group-based treatment program for ED at a general hospital between 1997 and 2008. During that period, 326 individuals were admitted to the program. Given the low number of males ($n = 4$) and individuals with BN non purging subtype ($n = 7$), these individuals' data were excluded from the study. Since hypotheses from this study were specifically related to diagnostic category, individuals with EDNOS ($n = 72$) were also excluded due to a lack of specific diagnostic criteria and heterogeneity of symptoms within this diagnosis.

In order to examine the relationship between pre-treatment attachment dimensions and pre- to post-treatment outcome, only participants who completed treatment were included in these analyses (ANR $n = 28$, ANB $n = 40$, and BN $n = 89$). Therefore, $n = 84$ were excluded from the treatment outcome analyses because they did not complete the day hospital program and did not provide post-treatment data. Reasons for non-completion included dropping out of treatment and being asked to leave due to non-compliance with the rules of the program.

The non-ED community sample of women ($N = 126$) was comprised of university students and community volunteers, recruited between 2004 and 2007. Originally, $N = 138$ were screened. Those with significant ED symptoms ($n = 11$) were excluded as was one male. See Table 1 for demographic characteristics of the participants this study.

Measures

Eating Disorder Diagnostic Scale (EDDS; Stice, et al., 2000). The EDDS is a 23-item self-report questionnaire assessing DSM-IV criteria for AN, BN and BED. The EDDS generates an overall symptom score, tentative diagnoses for full and subthreshold AN, BN, BED, and a no

diagnosis category. Stice et al. reported that the 1-week test-retest kappa coefficient was .95 for AN diagnosis, .71 for BN diagnosis, and the overall accuracy rate was .98. Criterion validity was well established by a kappa coefficient of .93 for AN, and .81 for BN, reflecting good agreement with the Eating Disorder Examination (EDE) structured interview (Fairburn & Cooper, 1993; Stice et al.). The EDDS was used to screen for ED symptoms in the non-ED community sample participants.

Attachment Style Questionnaire (ASQ; Feeney et al, 1994). This is a 40-item self-report questionnaire with a 6-point Likert-type scale. The ASQ can be scored as five scales, one of which measures secure attachment (Confidence in Relationships), two of which measure aspects of anxious attachment (Preoccupied, and Need for Approval), and two of which measure aspects of avoidant attachment (Discomfort with Closeness, and Relationships as Secondary) (Feeney et al., 1994). This scale was completed at pre-treatment and was used as a measure of attachment insecurity for the clinical and non-ED community groups. Brennan, et al. (1998) conducted a factor analysis and examined the factor loadings of 60 different attachment scales on two higher-order factors of Avoidance and Anxiety. Of all of the self-report attachment measures, the ASQ Preoccupied and Discomfort with Closeness scales emerged with the first (.86) and second (.90) highest factor loadings on the Anxiety and Avoidance factors, respectively. The Need for Approval scale also had a high loading (.62) on the Anxiety factor, as did the Relationships as Secondary scale on the Avoidance factor (.61). In the current sample ($N = 243$) coefficient alphas ranged from .81 to .95. Higher scores on an ASQ subscale indicated greater amounts of the measured attachment dimension. We only used the scales that assessed attachment anxiety and avoidance in this study.

Eating Disorders Inventory (EDI; Garner & Olmsted, 1984). The EDI is a 64-item, self-report questionnaire with 8 scales that assess ED related behaviors and symptoms, and

personality traits. Each item is rated by the respondent on a 6-point Likert-type scale. This measure was completed at pre- and post-treatment by ED patients. Tasca and colleagues conducted a confirmatory factor analysis and reported that the first three scales made up an ED symptom factor (i.e., Drive for Thinness, Bulimia, and Body Dissatisfaction; Tasca, et al., 2003). The Drive for Thinness scale of the EDI is a 7-item scale with higher scores indicating excessive concern with dieting, pursuit of thinness, and preoccupation with weight and weight gain. The Bulimia scale of the EDI is a 7-item scale with higher scores indicating tendencies to consider and to engage in bouts of uncontrollable overeating (i.e., bingeing). The Body Dissatisfaction scale of the EDI is a 9-item scale with higher scores indicating dissatisfaction with body weight and shape. Coefficient alphas for the three subscales range from .72 to .83, and all demonstrated good construct validity as they correlated highly with the Eating Attitudes Test-26 (EAT-26; Garner, et al., 1982; Garner & Olmsted). For this study a composite score of these three ED symptom-related scales of the EDI was calculated using a principal components analysis with oblique rotation. This ED symptom factor was the dependent variable to assess pre-treatment symptoms and to assess pre- to post-treatment ED outcomes.

Procedure

Adult women with ED symptoms were referred to an ED day treatment program at a general hospital in a medium sized urban centre. The patients received a consultation with a psychologist and psychiatrist who conducted a semi-structured diagnostic interview and, when applicable, provided a formal diagnosis of an ED based on the DSM-IV criteria (APA, 1994). In order to check the reliability of the ED diagnoses, a 10% random sample of the consultation reports were re-evaluated by an independent psychologist who was blind to the original diagnoses and identifying information. The concordance rate was 96.6% leading to a Cohen's κ of .95.

Prior to attending the day hospital program, participants completed a questionnaire package, which included the ASQ and EDI. The day hospital program accommodates up to 8 patients at a time who attend four days a week for approximately 12 weeks. Program goals include nutritional rehabilitation, reduction in ED symptoms, improved interpersonal relationships and improved mood. Patients have two supervised meals and a supervised snack per day, meal planning, and grocery shopping. Psychological therapy groups include: assertiveness training, family relationships group, interpersonal therapy group, art therapy group, and healthy attitudes group among others. When necessary, patients receive pharmacological treatment. This program was developed based on the Toronto Hospital day treatment program for ED (Olmsted, et al., 2001), and shares components common to such programs (Zipfel, et al., 2002). Once patients completed the program, they were given the post-treatment questionnaire package which included the EDI.

The non-ED community sample was recruited from university undergraduate and graduate students, and community volunteers through in-class recruitment and flyers, respectively. They completed questionnaires including the EDDS, ASQ and EDI at one time point. Meeting a cutoff score for a possible ED on the EDDS resulted in 11 participants' data being excluded. All community sample participants were provided with monetary compensation (\$30.00 in Canadian dollars) or class credit for participation. All participants provided signed informed consent. The project was approved by the research ethics boards from each of the institutions involved.

Statistical Analyses

For the first part of the study, a MANOVA with post hoc Tukey's test was performed in order to test mean differences of insecure attachment scale scores among the four comparison groups: ANR, ANB, BN and the non-ED community sample women.

For the second part of the study, principal components analysis (PCA) with oblique rotation was employed as a means of creating an ED symptom factor from the first three scales of the

EDI at pre-treatment (i.e., Drive for Thinness, Bulimia, and Body Dissatisfaction; Tasca et al., 2003). Eigenvalues greater than one and loadings greater than .4 defined the components. Then a hierarchical multiple regression analysis was conducted to test whether attachment scales were associated with the EDI pre-treatment symptom factor over and above variance accounted for by DSM diagnoses among the ED clinical sample. The hierarchical regression included three steps: in the first step the three clinical diagnostic categories (ANR, ANB and BN) were dummy coded and entered; in the second step the four insecure attachment scales from the ASQ were entered; and in the third step, the interactions between diagnosis and ASQ scales were entered.

For the third part of the study, we assessed if day hospital treatment resulted in significant reductions in each of the EDI scale scores. To do so we conducted three dependent samples *t*-tests and evaluated the effect size using an effect size correlation. We conducted a principal components analysis (PCA) with oblique rotation as a means of creating an EDI symptom factor from the first three scales of the EDI at post-treatment. Then a residual change score was calculated from the EDI pre-treatment and post-treatment symptom factors as an index of treatment outcome. Residual change scores are not susceptible to regression to the mean and are more reliable than raw change scores (Cohen, et al., 2003). Lower residual change scores indicated greater than expected change on the ED symptom factor following day treatment. A hierarchical regression analysis was then used to test whether insecure attachment styles predicted treatment outcome (i.e., residual change score of pre- to post-treatment EDI symptom factor) over and above ED DSM diagnoses. In the first step of the hierarchical regression, ED diagnostic category were dummy coded and entered; in the second step, ASQ insecure attachment scales were entered; and in the third step, the interactions between diagnosis and ASQ scales were entered.

Results

All scales were normally distributed, there were no univariate outliers, variances were homogeneous, and the variables were neither singular nor multicollinear. However, two participants' data were removed from the treatment outcome hierarchical regression analysis due to being multivariate outliers, resulting in a final sample size of $N = 157$ for that analysis.

For the first part of the study, a significant multivariate effect among groups on mean ASQ scores was found, $F(12, 958) = 18.09, p < .001, \eta^2 = .17$. Univariate tests showed significant differences between groups on the Discomfort with Closeness scale, $F(3, 368) = 47.01, p < .001, \eta^2 = .28$, Need for Approval scale, $F(3, 368) = 75.62, p < .001, \eta^2 = .38$, Preoccupied scale, $F(3, 368) = 27.99, p < .001, \eta^2 = .19$, and Relationship as Secondary scale, $F(3, 368) = 17.39, p < .001, \eta^2 = .13$. Tukey's post hoc tests demonstrated that the ED clinical groups had higher scores on all insecure attachment scales compared to the non-ED community sample (all $ps < .001$). Significant differences were also found between the ED groups. Those with ANB had significantly higher scores: on the Discomfort with Closeness scale compared to ANR ($p = .026$) and BN ($p = .008$), and on the Need for Approval scale compared to BN ($p = .019$). Means and standard deviations of the ASQ insecurity scales for each group appear in Table 2.

For the second part of the study, a PCA to reduce the three EDI symptom scales for the pre-treatment data resulted in one component being extracted that represented the pre-treatment EDI symptom factor. The one component accounted for 63.29% of the variance, and each of the three EDI symptom scales loaded greater than .5 on that component. This EDI symptom factor was the dependent variable in the regression model. The entire regression model accounted for 31.6% of the variance of the pre-treatment EDI symptom factor. In the first step, ED diagnostic category (ANR, ANB, BN) was significantly associated with the EDI symptom factor, $F(2, 240) = 18.149, p < .001, R^2 = .131$. Specifically, those with ANB, $pr = .229, p < .001$, and BN, $pr =$

.354, $p < .001$ had significantly higher EDI symptom factor scores than ANR. In the second step, there was a significant relationship between the 4 ASQ insecurity scales and the EDI symptom factor over and above variance accounted for by diagnosis, $F(4, 236) = 13.112, p < .001, R^2\Delta = .158$. Specifically, higher Need for Approval scores were significantly related to greater pre-treatment eating disorders symptoms, $r = .262, p < .001$. No significant relationships were found for the Relationships as Secondary, $p = .055$, Preoccupied, $p = .475$ or Discomfort with Closeness scales, $p = .810$. The third step examining the interaction between ED diagnosis and ASQ scales was not significant, $F(8, 228) = 1.122, p = .349, R^2\Delta = .027$.

Prior to evaluating the hypotheses of the third part of the study, we conducted several preliminary analyses. First, we assessed for differences between those who completed treatment ($n = 157$) with non-completers ($n = 84$). There were no significant differences between the two groups on age, chronicity of ED, body mass index (BMI; kg/m^2), ASQ scales, or pre-treatment EDI symptom factor. A greater proportion of those with ANR or ANB did drop out of treatment at a statistically significantly higher rate than those with BN, $\chi^2(2) = 6.44, p = .04$, but the size of that effect was small, $w = .16$. Subsequent analyses were conducted using only data from the women who completed treatment. Second, we found that there was significant pre- to post-treatment positive change in each EDI scale with large effects: Drive for Thinness, $t(156) = 19.91, p < .001, r = 0.68$, Body Dissatisfaction, $t(156) = 13.12, p < .001, r = 0.58$, and Bulimia, $t(156) = 15.39, p < .001, r = 0.54$, indicating that on average, patients benefited from the day treatment. Table 3 provides the pre- and post-treatment EDI scale data. Third, a PCA was performed on the three EDI scales at post-treatment to create the post-treatment EDI symptom factor. One component was extracted, accounting for 62.79% of the variance, and each EDI scale loaded greater than .6. Fourth, an EDI symptom factor residual change score from pre- to post-treatment was created as the dependant outcome variable for the hierarchical regression analyses.

The entire hierarchical regression model to evaluate the hypotheses of the third part of our study accounted for 22.7% of the variance of the EDI symptom factor residual change score. In the first step, ED diagnostic category (ANR, ANB, BN) was significantly associated with the residual change scores, $F(2, 154) = 9.748, p < .001, R^2 = .112$. Specifically, those with ANB had significantly higher scores (i.e., poorer treatment outcome) compared to BN, $pr = .334, p < .001$, and compared to ANR, $pr = .156, p = .05$. In the second step, there was a significant relationship between the 4 ASQ insecurity scales and the EDI symptom factor residual change score, $F(4, 150) = 2.681, p = .034, R^2\Delta = .059$. Specifically, high Need for Approval scale scores were significantly related to higher EDI symptom factor residual change scores (i.e., poorer treatment outcome), over and above variance in the outcome accounted for by the diagnostic categories, $pr = .220, p = .006$. No significant relationships were found for the Relationships as Secondary, $p = .101$, Preoccupied, $p = .099$, or Discomfort with Closeness scales, $p = .483$. The third step examining the interaction between ED diagnosis and ASQ scales was not significant, $F(8, 142) = 1.278, p = .260, R^2\Delta = .056$.

Discussion

Results of the first part of the study indicated that women with an ED diagnosis had higher levels of attachment insecurity than community based women with no ED. The ASQ means for the ED groups in this study are similar to means reported in other ED samples (Troisi et al., 2006). Further, among those with an ED diagnosis, ANB in particular was associated with higher levels of attachment anxiety and avoidance. As suggested by previous researchers, attachment insecurity may result in physiological expressions of stress and in negative affect, thereby increasing the individual's vulnerability to ED symptoms (Cole-Detke & Koback, 1996; Connan, et al., 2003; Tasca, Kowal, et al., 2006; Ward, et al., 2000). Those with ANB, who have symptoms associated with both AN (e.g., low body weight) and BN (e.g., binge eating and/or

purging), in particular may have attachment insecurity vulnerabilities associated with the complex combination of their ED symptoms. Our next step was to examine if attachment insecurity could explain the degree of ED symptoms within the clinical sample beyond what was already explained by an ED diagnosis. That is, is there evidence of the incremental validity of attachment insecurity dimensions?

As a group, the insecure attachment scales accounted for 15.8% of the variance in pre-treatment ED symptoms over and above the variance accounted for by an ED diagnosis. Thus there was evidence of incremental validity. Specifically, higher attachment anxiety (i.e., Need for Approval scale) was related to more severe ED symptoms at pre-treatment in this clinical sample. Individuals with attachment anxiety have difficulty containing and processing emotional information, which affects their ability to adaptively communicate emotions and seek effective social support. Hyperactivating emotion regulation strategies and accompanying interpersonal behaviors may lead to or exacerbate ED symptoms (Tasca, Szadkowski, et al., 2009). If this is the case, then one would expect that higher levels of attachment anxiety would also make it difficult to achieve ED symptom reduction following treatment. The third part of this study addressed this issue.

The results from the third part of this study suggested that attachment insecurity added significantly to our understanding of ED symptom change following intensive treatment. ED patients on average benefited from day treatment, but there were significant differences among ED diagnostic groups on treatment outcome. Women with BN experienced the greatest symptom reduction, and those with ANB had the least symptom reduction. However, as hypothesized, high pre-treatment attachment anxiety (i.e., the Need for Approval scale) predicted poorer outcomes in ED symptoms across groups even after controlling for differences in outcomes among the ED diagnoses. A previous treatment trial for BED also found that the Need for

Approval scale predicted treatment outcomes (Tasca, Ritchie, et al., 2006). Hence, the findings from this study and a previous trial suggest that ED treatment models could be more effective if they specifically target attachment anxiety. Attachment anxiety is associated with a hyperactivation of the emotional system, preoccupation with relationships, and need for approval. Attending to these issues in individual or a group therapy context may allow patients to practice more adaptive emotion regulation and to receive corrective interpersonal feedback.

The results of this study add to a growing number of studies indicating that the uni-dimensional symptom-based approach to classifying EDs is insufficient for understanding the psychopathology associated with ED symptoms (Fairburn & Cooper, 2007; Tasca, Demidenko, et al., 2009; Westen & Harden-Fischer, 2001). Attachment dimensions incrementally accounted for variance in ED symptoms and treatment outcomes over and above diagnostic category. Tasca, Demidenko and colleagues (2009) suggested employing a combination of a dimensional and a categorical approach to classifying EDs in DSM-V. That is, ED patients could be rated by personality dimensions, in addition to the current practice of categorizing by symptom class, as a way to understand better and to treat more effectively individuals with EDs. Results from the current study suggest that attachment dimensions, particularly attachment anxiety, should be accounted for in such a dimensional evaluation.

We acknowledge a number of limitations of this study. First, part one and part two utilized cross-sectional designs and, therefore, it was not possible to examine causal links between attachment and ED diagnosis or symptoms. However, the third part of the study did predict outcomes pre- to post-treatment prospectively. Future researchers could examine predictors of longer term outcomes at six and 12 month post-treatment. Second, attachment insecurity was measured using a self-report questionnaire which may be susceptible to bias if one considers that some aspects of the attachment system are outside of awareness (Steele, et al., 2009). However,

interview-based assessments of attachment, like the Adult Attachment Interview (AAI; George, et al., 1985), are extremely time consuming, and self-report scales, such as the ASQ, are valid measures of consciously available attachment information (Mikulincer & Shaver, 2007). Furthermore, attachment was only measured at pre-treatment. Future research could also examine attachment as a mechanism of change by also measuring attachment at post-treatment (Tasca, et al., 2007). Third, the clinical and non-ED samples were mainly comprised of Caucasian women with a moderate to high socio-economic status. Therefore, these data may not generalize to a more diverse population. Studies that examine attachment and ED using males as well as a more multicultural sample could test the generalizability of these findings. Fourth, treatment outcome was assessed only for women who completed the day hospital program. Therefore, these results may not generalize to those who drop out of treatment, individuals who complete other forms of ED treatments (e.g., individual treatment, inpatient hospitalization), or non-treatment seeking samples. However, baseline differences between completers and non-completers on the variables of interest were either non-significant or small in effect size, suggesting that the data were missing at random thus increasing the likelihood that the results generalize.

Conclusions

This study indicates that examining ED from an attachment theory framework may result in a better understanding of symptom severity and treatment outcomes. Assessing attachment processes during clinical consultations could yield a more complete understanding of a patient's personality dimensions associated with their ED symptoms. That is, clinicians may understand better the emotional regulation strategies and interpersonal problems that underlie ED symptom presentation. In particular, attachment anxiety, which was associated with greater ED symptoms in this study, occurs most severely among those with ANB, and, if not addressed in all ED

patients, may result in poorer treatment outcomes. Treating clinicians may do well to target specifically attachment insecurities and their accompanying affect regulation and interpersonal styles when developing treatment interventions for their ED patients.

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Table 1: *Demographic information of participants.*

	ANR	ANB	BN	NE
	(<i>n</i> = 49)	(<i>n</i> = 71)	(<i>n</i> = 123)	(<i>n</i> = 126)
Mean Age (<i>SD</i>)	24.71 (9.00)	28.31 (10.27)	26.65 (7.76)	23.23 (7.06)
Mean BMI (<i>SD</i>)	15.53 (1.64)	16.69 (1.62)	24.41 (5.92)	23.01 (3.74)
Mean Years of ED (<i>SD</i>)	5.21 (5.95)	10.21 (8.78)	8.29 (7.31)	N/A
Marital Status Percent				
Married or Co-Habiting	15.2	28.8	27.9	21.4
Never Married, Single	84.8	61.0	67.3	77.8
Divorced/Separated	0.0	10.2	4.8	0.8
Highest Education Percent				
Graduate School	8.9	8.5	4.8	9.6
University/College	55.6	62.7	67.3	56.8
High School	35.5	28.8	28.0	33.6
Percent Caucasian	89.8	84.5	87.8	83.3

Notes. ANR = Anorexia Nervosa Restricting subtype, ANB = Anorexia Nervosa Binge and/or Purge subtype, BN = Bulimia Nervosa Purging subtype, NE = non-eating disordered community group, *SD* = standard deviation, N/A = Not Applicable, ED = eating disorders, BMI = body mass index (kg/m²).

Table 2: Means (M) and standard deviations (SD) of Attachment Style Questionnaire insecurity scales.

	ANR		ANB		BN		NE		Multiple Comparisons
	(n = 49)		(n = 71)		(n = 123)		(n = 126)		
	M	SD	M	SD	M	SD	M	SD	Tukey's
Discomfort with									
Closeness	4.28 ^{ad}	0.89	4.73 ^{ac}	0.72	4.31 ^{ad}	0.86	3.36 ^b	0.91	ANB > BN & ANR > NE
Need for Approval	4.07 ^a	0.64	4.24 ^{ac}	0.65	3.93 ^{ad}	0.77	2.91 ^b	0.68	ANB > BN, ANR > NE
Preoccupied	4.11 ^a	0.75	4.24 ^a	0.72	4.08 ^a	0.78	3.40 ^b	0.70	ANB, ANR, BN > NE
Relationships as									
Secondary	2.84 ^a	0.79	3.06 ^a	0.75	2.88 ^a	0.88	2.33 ^b	0.67	ANB, ANR, BN > NE

Notes. ANR = Anorexia Nervosa Restricting subtype, ANB = Anorexia Nervosa Binge and/or Purge subtype, BN = Bulimia Nervosa Purging subtype, NE = non-eating disordered, *SD* = standard deviation. Tukey's test for post-hoc comparisons was applied. ^{a,b} Means within rows with these different subscripts differ at $p < .001$. ^{c,d} Means within rows with these different subscripts differ at $p < .05$.

Table 3: Means (M) and standard deviations (SD) of pre- and post-treatment Eating Disorders Inventory scales for women with an eating disorder who completed day hospital treatment.

	Drive for Thinness				Bulimia				Body Dissatisfaction			
	Pre		Post		Pre		Post		Pre		Post	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
ANR (<i>n</i> = 28)	12.54	6.26	5.46	5.25	0.43	0.88	0.25	0.78	13.57	8.60	6.92	6.84
ANB (<i>n</i> = 40)	6.13	5.76	8.88	7.04	5.03	5.20	1.29	2.25	20.25	7.86	11.32	8.68
BN (<i>n</i> = 89)	15.62	4.47	4.11	4.10	10.79	5.55	0.84	1.08	19.67	7.44	8.08	6.37

Notes: ANR = Anorexia Nervosa Restricting subtype, ANB = Anorexia Nervosa Binge and/or Purge subtype, BN = Bulimia Nervosa Purging subtype. *N* = 157.

Article 2

RUNNING HEAD: ATTACHMENT DIMENSIONS AND GROUP CLIMATE GROWTH

*Attachment Dimensions and Group Climate Growth
in a Sample of Women Seeking Treatment for Eating Disorders*

Vanessa Illing

Abstract

Adult attachment and group process research are emerging areas of research for treating eating disorders. In this study, we examined several aspects of group processes: weekly growth of group therapy climate, the relationship between group climate growth and outcomes, and the impact of the group on individual experiences of group climate. Further, we assessed the relationship between adult attachment dimensions and these group processes. Women ($N = 264$) diagnosed with an eating disorder completed attachment scales pre-treatment, eating disorder symptom scales pre- and post-treatment, and group climate scales weekly during treatment. Treatment consisted of a specialized eating disorders group-based day hospital program with rolling admissions. Engaged group climate increased and Avoidance group climate decreased across weeks of treatment. Engaged group climate growth was associated with improved eating disorder symptoms post-treatment. Higher attachment avoidance at pre-treatment was related to lower Engaged group climate at week 1, and was related to a greater impact of the group on the individual's experience of group engagement. Clinicians might improve group processes and outcomes by tailoring interventions to individuals' attachment avoidance when treating women for eating disorders.

Key Words: Attachment, Group Climate, Group Treatment, Rolling Groups, Eating Disorders.

Attachment Dimensions and Group Climate Growth

in a Sample of Women Seeking Treatment for Eating Disorders

Group therapy processes refer to several components of group atmosphere, including group climate, group alliance, group cohesion, and alliance to the group therapist (Johnson, Burlingame, Olsen, Davies, & Gleave, 2005; Kivlighan & Lilly, 1997). Group climate is a multidimensional construct of members' perceptions of group atmosphere (Kivlighan & Lilly, 1997; MacKenzie, 1983a). Specifically, group climate refers to three elements of the group therapeutic environment: members' *engagement* with the group, *avoidance* of important or difficult topics, and *conflict* among group members (MacKenzie, 1983a).

Group engagement is similar to group cohesion in that engagement refers to bonding and the feeling of solidarity among group members (Kivlighan & Lilly, 1997; MacKenzie, 1983a). Cohesion is as important to group therapy as the therapeutic alliance is to individual therapy (Yalom & Leszcz, 2005). Implicit in these conceptualizations of group dynamics is that the group will have an impact on the individual's experiences. For example, Tasca, Ramsay, Corace, Illing, Bone and colleagues (2010) found that a group's alliance ratings affect an individual's experience of the alliance to the group despite ongoing changes in group membership.

Positive group climate is related to higher attendance rates, participation, and completion rates, and to better therapeutic outcomes (Gillaspy, Wright, Campbell, Stokes & Adinoff, 2002; Joyce, Piper & Ogrodniczuk, 2007; Tasca, Flynn & Bissada, 2002; Tasca, Balfour, Ritchie & Bissada, 2006; Yalom & Leszcz, 2005). Despite the importance of these group dynamic variables, few researchers have examined personality variables that influence or predict the development of positive group process in the treatment of eating disorders. Predictors of group climate might include participant personality factors such as adult attachment dimensions.

Group Climate Research

Previous research tended to assess group climate using static time points, e.g., at pre- or post-treatment, or at an early session or phase in group therapy (e.g., Ogrodniczuk & Piper, 2003; Tasca, et al., 2002). However, MacKenzie (1983b) theorized that group atmosphere develops in sequential stages, thus highlighting the potential changes in members' perception of group climate during group treatment. Few studies have examined the development of group climate or alliance using growth curve modeling of longitudinal data. Tasca, Balfour, and colleagues (2006) found that the Engaged scale increased as a cubic function (low-moderate, moderate-high), and that the Avoidance and the Conflict scales decreased linearly over the course of group treatment for binge eating disorder. In a related study, Tasca and colleagues found a linear growth of overall group alliance across 16 sessions of time limited group therapy for binge eating disorder (Tasca, Balfour, Ritchie & Bissada, 2007). No study that we are aware of has assessed the change in group climate among those with anorexia nervosa, bulimia nervosa or eating disorder not otherwise specified. Hence, one goal of this study was to examine the growth of group climate across weeks in a group-based partial hospital program with rolling admissions for women with anorexia nervosa, bulimia nervosa or eating disorder not otherwise specified.

Attachment and Eating Disorders

Another goal of this study was to examine the relationship between patient variables, such as adult attachment, and group climate for individuals with eating disorders. Bowlby (1969) posited that infants develop an attachment system from their early interaction with caregivers. The attachment system is comprised of behaviours and interactions with caregivers that lead to internal working models which, in turn, result in organized emotion regulation strategies and interpersonal behaviours. These constellations of emotion regulation strategies and interpersonal

behaviours define the different attachment styles (Bowlby, 1969). Bowlby believed that attachment develops in infancy but continues to impact adulthood (Fonagy, 2001). Attachment styles tend to remain stable over the lifespan, and they are altered only due to significant life events, traumatic experiences, or important positive relationships (Bakermans-Kranenburg & van IJzendoorn, 2009; Waters, Merrick, Treboux, Crowell & Albersheim, 2003).

Individuals with adaptive attachment related processes are defined as “secure”, whereas the maladaptive processes, or insecure attachment, can be defined as “anxious” or “avoidant” (Mikulincer, Shaver & Pereg, 2003). Securely attached individuals expect their personal abilities to manage stress, as well as the availability of others, will result in positive outcomes to distressing situations (Mikulincer et al., 2003). Individuals with attachment anxiety tend to employ hyperactivating strategies to cope with attachment related stress (Mikulincer et al., 2003). Hyperactivating strategies include heightened monitoring of threats to self, negative views of self efficacy, sensitivity to affect, preoccupation with loss or abandonment, and a pessimistic view of outcomes (Ainsworth et al., 1978; Feeney, Noller & Hanrahan, 1994; Mikulincer et al., 2003). Individuals with attachment avoidance use deactivating strategies to cope with attachment related threats (Mikulincer et al., 2003). They are less expressive and responsive to affect, and they devalue help from others (Ainsworth et al., 1978; Chassler, 1997; Mikulincer et al., 2003). Their deactivating strategies tend to result in thwarted emotions, a tendency to experience somatic symptoms, and dismissing interpersonal relationships (Ainsworth et al., 1978; Feeney et al., 1994; Mikulincer et al., 2003; Ward & Gowers, 2003).

Ardevini (2002) posited that therapy for eating disordered individuals would benefit from therapists considering specific attachment patterns that affect the patient’s interpersonal distress and symptom expressions in therapy. Concurrently, there is a growing research literature on the

relationship between attachment dimensions and eating disorder symptoms and treatment outcome. A previous study demonstrated that women with eating disorders had significantly higher levels of attachment insecurity (e.g., anxious and avoidant attachment) compared to a sample of non-eating disordered women, and that higher attachment anxiety was significantly related to greater eating disorder symptom severity and poorer treatment outcomes even after controlling variance accounted for by eating disorder diagnosis (Illing, Tasca, Balfour, Bissada, in press). Researchers conducting a randomized controlled trial for women with binge eating disorder (Tasca, Ritchie, Conrad, Balfour, Gayton, et al., 2006) found that high attachment anxiety was associated with better outcomes (i.e., reduced days binged) from Group Psychodynamic Interpersonal Psychotherapy (Tasca, Mikail & Hewitt, 2005), and high attachment avoidance was associated with dropping out of Group Cognitive Behavior Therapy (Wilfley, 1996). Hence, there is emerging evidence for the importance of adult attachment for symptom presentation and treatment outcome in women with an eating disorder.

Attachment and Group Process

There is also recent evidence for the impact of attachment styles on group process for treating eating disorders. Tasca and colleagues (2007) found that higher attachment anxiety and lower attachment avoidance were associated with the growth of group alliance for individuals with binge eating disorder receiving Group Psychodynamic Interpersonal Psychotherapy. Further, Tasca, Balfour and colleagues (2006) found that a linear growth in Engaged group climate mediated the relationship between attachment anxiety and treatment outcome for women with binge eating disorder. That is, those with high attachment anxiety required a steady growth in Engaged group climate in order to benefit from Group Psychodynamic Interpersonal Psychotherapy. In summary, there is emerging evidence that attachment dimensions influence

group climate and group alliance growth in the treatment of binge eating disorder. The current study furthers this line of research by examining the potential impact of attachment anxiety and avoidance on the growth of group climate for women receiving group-based day hospital treatment for anorexia nervosa, bulimia nervosa, or eating disorder not otherwise specified.

Further goals of this study were to examine whether the group's experiences of group climate had an impact on the individual's experience, and if attachment dimensions are associated with this relationship. Clinicians have long argued that positive therapeutic (e.g., group engagement) and anti-therapeutic (e.g., conflict, avoidance) events have an impact on individuals in a group, even after a member associated with these events is no longer part of the group (Rutan & Stone, 1993; Yalom & Leszcz, 2005). Tasca and colleagues (2010) found a significant relationship between individual ratings of group alliance and the rest of the group's ratings of group alliance. That is, individual members were sensitive to how the rest of the group was experiencing the group process. As indicated earlier, the perception of and sensitivity to others' experiences might be related to attachment style.

Hypotheses

We hypothesized that: (1) higher pre-treatment attachment anxiety and/or lower attachment avoidance will be associated with higher initial levels of Engaged group climate (i.e., at week 1) and with higher overall mean levels of Engaged group climate across weeks of treatment; (2) there will be a significant linear increase in Engaged group climate, and a significant linear decrease in Conflict and Avoidance group climate over the weeks of intensive day hospital treatment for women with an eating disorder; (3) there will be a significant relationship between Engaged group climate growth and positive treatment outcome; (4) higher pre-treatment attachment anxiety and/or lower attachment avoidance will be associated with a linear growth in

Engaged group climate; and (5) the group's experience of the group climate will be positively associated with an individual's experience of the group climate during any given week. Although we speculate that attachment anxiety or avoidance will be associated with the group's impact on the individual's rating of the group climate, we made no specific hypotheses.

Method

Participants

The sample ($N = 264$) was comprised of women (≥ 18 years-old) diagnosed with anorexia nervosa restricting subtype ($n = 42$), anorexia nervosa binge purge subtype ($n = 59$), bulimia nervosa ($n = 106$) and eating disorder not otherwise specified ($n = 57$) who attended a group-based day hospital program for eating disorders at a general hospital between 1997 and 2008. During that period, 310 individuals were admitted to the program. Given their low numbers, males ($n = 5$) were excluded from the study. In order to examine the relationship between pre-treatment attachment dimensions and growth of group climate, participants who did not complete the attachment questionnaire at pre-treatment and at least the first week of the group climate questionnaire were excluded from the analyses ($n = 41$). Hence, we retained 264 participants' data for the study. For the treatment outcome analyses, only data from the women who completed the day hospital program and who provided post-treatment data were used ($N = 167$).

The mean age of the sample was 26.62 ($SD=8.79$), mean self reported years with an eating disorder was 8.37 ($SD=7.62$), and mean body mass index ($BMI=kg/m^2$) at intake was 20.45 ($SD=5.48$). Of the total sample, 46.7% had a co-morbid Diagnostic and Statistical Manual, fourth edition (DSM-IV; APA, 1994) Axis I disorder, 94.1% were White, 66.5% were single, 63.9% were employed full time or part-time, and 39.4% were full time or part time students. Median

family income was between \$50,000 and \$59,000 in Canadian dollars, and 71.3% had at least some education beyond high school.

Measures

Attachment Style Questionnaire (ASQ; Feeney et al, 1994). The Attachment Style Questionnaire is a 40-item self-report questionnaire using a 6-point Likert-type scale ranging from 1 (totally disagree) to 6 (totally agree) with higher mean item scores indicating greater amounts of the measured attachment dimension. This questionnaire can be scored as five scales, one of which measures secure attachment (Confidence in Relationships), two of which measure aspects of anxious attachment (Preoccupied, and Need for Approval), and two of which measure aspects of avoidant attachment (Discomfort with Closeness, and Relationships as Secondary). Brennan, Clark and Shaver (1998) conducted a factor analysis and examined the factor loadings of 60 different attachment scales on two higher-order factors of Avoidance and Anxiety. Of all of the self-report attachment measures, the Attachment Style Questionnaire Preoccupied and Discomfort with Closeness scales emerged with the first (.86) and second (.90) highest factor loadings on the Anxiety and Avoidance factors, respectively. The Need for Approval scale also had a high loading (.62) on the Anxiety factor, as did the Relationships as Secondary scale on the Avoidance factor (.61). In the current sample coefficient alphas ranged from .68 to .85. Coefficient alpha is highly sensitive to the number of items in a scale, so Clark and Watson (1995) suggested that the mean inter-time correlation between .15 and .50 is a better indicator of internal consistency. Mean inter-item correlations ranged from .24 to .37 for these scales. We only used the scales that assessed attachment anxiety and avoidance in this study (i.e., Need for Approval, Preoccupied, Relationships as Secondary, and Discomfort with Closeness).

Eating Disorders Inventory (EDI; Garner & Olmsted, 1984). The Eating Disorders Inventory is a self-report questionnaire with 64 items and 8 scales that assess behaviors, symptoms, and personality traits specific to those with an eating disorder. Each item is rated on a 6-point scale, ranging from ‘always true about me’ to ‘never true about me’, and then converted to a three-point scale. A confirmatory factor analysis reported that the Drive for Thinness, Bulimia, and Body Dissatisfaction scales made up an eating disorder symptom factor (Tasca, Illing, Lybannon-Daigle, Bissada & Balfour, 2003). The Drive for Thinness scale is a 7-item scale with higher scores indicating excessive concern with dieting, pursuit of thinness, and preoccupation with weight and weight gain. The Bulimia scale is a 7-item scale with higher scores indicating tendencies to consider and to engage in binge eating. The Body Dissatisfaction scale is a 9-item scale with higher scores indicating dissatisfaction with body weight and shape. Similar to a previous study (Illing et al., in press), we created a composite score of these three symptom-related scales to assess pre- and post-treatment outcomes. To do so, a principal components analysis with oblique rotation was used to generate a symptom factor of pre- and post-treatment Eating Disorders Inventory scales. A residual change score was then calculated from the symptom factors as an index of treatment outcome (Cohen, Cohen, West & Aiken, 2003). Lower residual change scores indicated greater than expected change.

Group Climate Questionnaire (GCQ; MacKenzie, 1983). The Group Climate Questionnaire is a self-report measure used to assess individual group members’ perceptions of the group atmosphere. This questionnaire contains 12 items rated on a 7-point Likert type scale ranging from 0 (not at all) to 6 (extremely), and we used the mean item scores. MacKenzie (1990) reported that the Group Climate Questionnaire is made up of three scales. The Engaged scale (5 items) measures the degree of cohesion and work orientation in the group. The

Avoidance scale (3 items) measures the degree to which individuals avoid important topics in the group. The Conflict scale (4 items) measures interpersonal conflict and distrust. Researchers reported good validity of the Group Climate Questionnaire based on correlations with the Cohesion subscale of the Therapeutic Factors Inventory (Johnson et al., 2005). In the current sample coefficient alphas of Group Climate Questionnaire scales ranged from .59 to .76, and mean inter-item correlations ranged from .32 to .39 indicating adequate internal consistency (Clark & Watson, 1995).

Procedure

Adult women (≥ 18 years) with eating disorder symptoms were referred to a specialized eating disorder treatment program at a general hospital in a medium sized urban centre. A psychologist and psychiatrist conducted a semi-structured diagnostic interview and, when applicable, provided a diagnosis of an eating disorder based on the DSM-IV criteria (APA, 1994). In order to check the reliability of the eating disorder diagnoses, a 10% random sample of the consultation reports were re-evaluated by an independent psychologist who was blind to the original diagnoses and identifying information. The concordance rate was 96.6% leading to a Cohen's κ of .95 indicating near perfect agreement.

Prior to attending the day hospital program, participants completed a questionnaire package, which included the Attachment Style Questionnaire and Eating Disorders Inventory. Each patient completed the Group Climate Questionnaire at the end of each week while attending the day hospital. The day hospital program accommodates up to 8 patients at a time who attend four days a week from 9:00 a.m.-6:00 p.m. for approximately 12 weeks. The composition of the group continuously changes due to a rolling admission structure. That is, if a patient terminates on a

Thursday, a new patient commences on the following Monday. Upon completion of the day hospital program, participants completed the Eating Disorders Inventory.

Day hospital program goals included nutritional rehabilitation, reduction in eating disorder symptoms, improved interpersonal relationships, and improved mood. Patients received two supervised meals and a supervised snack per day. Psychological therapy groups included: assertiveness training, family relationships group, interpersonal therapy group, art therapy group, and body image group, among others. This program was developed based on the Toronto Hospital day treatment program for eating disorders (Olmsted, McFarlane, Mollen, & Kaplan, 2001), and shares components common to such programs (Zipfel, Reas, Thornton, Olmsted, Williamson, Gerlinghoff, et al., 2002). Staff members had at least five years experience in eating disorder treatment or day hospital programs. A separate report, (Illing et al., in press) indicated significant positive change in eating disorder symptoms from pre- to post-treatment with large effects, suggesting that on average, patients benefited from the program. This study was approved by the institution's Research Ethics Board, and participants provided informed consent.

Statistical Analyses

Multilevel modeling was used to model change (i.e., growth) in group climate scale scores across 12 weeks of the group-based day treatment program, and to assess the relationship between attachment scales measured at pre-treatment and group climate growth. Common multilevel modeling-based analyses for nested group treatment data assume that groups are independent (Morgan-Lopez & Fals-Stewart, 2006). However, the grouped data in this study was not independent because of the rolling admissions nature of the day hospital program (Morgan-Lopez & Fals-Stewart, 2007). Tasca and colleagues (2010) recently suggested a method using time varying covariates to model group process data in a rolling admissions group. In this study

the time varying co-variate is an adjusted group mean Group Climate Questionnaire scale score (GrpGCQ_{ij}). This adjusted score was calculated for each group climate scale at each week. Each individual's, i , Group Climate Questionnaire scale score was subtracted from the sum of all Group Climate Questionnaire scores for that week, j , and divided by the group n for that week minus 1, i.e., $([\sum(\text{GCQ}_{ij})] - \text{GCQ}_{ij}) / (n_j - 1)$ (see Tasca, Ramsay, et al., 2010). Hence every participant had a weekly individual Group Climate Questionnaire scale score, and an accompanying adjusted group mean Group Climate Questionnaire scale score (i.e., GrpGCQ_{ij}), the latter representing the rest of the group's assessment of the climate for each week.

Selected multilevel modeling equations used for the analyses appear in the Appendix. The multilevel models were specified in which parameters were added in successive nested model. Model 1 is the *unconditional base multilevel modeling*, which estimates variability in repeated measurements within individuals at level 1 and between individuals at level 2. Model 2 is the *unconditional linear growth multilevel modeling* in which linear change in individual Group Climate Questionnaire weekly scores is modeled at level 1. Model 3 is the *unconditional linear growth multilevel modeling with a covariate*, which estimates and corrects for the effect of other group members' Group Climate Questionnaire scores (GrpGCQ_{ij}) on an individual's Group Climate Questionnaire score at level 1 (see Appendix, Model 3). In Model 4 (see Appendix), the Eating Disorders Inventory residual change score was added at level 2 of Model 3 as a predictor. Models 5 and 6, the *conditional multilevel models*, are several models in which pre-treatment attachment dimensions are added as predictors at level 2 of Models 1, and 3, respectively (see Appendix for Model 6). Error terms were allowed to vary freely at level 2 for all models.

To assess model fit to the data we subtracted deviance statistics from a model that was nested within a subsequent model, (ΔD) and assessed the difference by a chi-square test, with degrees of

freedom as the difference in the number of parameters tested between the two models (Singer & Willett, 2003). The formula to assess the effect size of adding a growth parameter is pseudo- $R^2 = (\sigma^2(\text{base}) - \sigma^2(\text{linear}))/\sigma^2(\text{base})$, in which σ refers to the variance component associated with repeated measurement (level 1) error variances (Singer & Willett, 2003). HLM 6.06 software was used with restricted maximum likelihood estimation (Raudenbush, Bryk, & Congdon, 2007).

Results

Participants attended a mean of 13.68 weeks of the program ($SD = 3.70$), and the total number of weeks of the program from September 1997 to August 2007 was 533. The median number of participants completing Group Climate Questionnaires per week was 7. The mean initial (i.e., week 1) Group Climate Questionnaire scores across participants ($N = 267$) were: Engaged = 4.55 ($SD = 0.89$), Conflict = 1.24 ($SD = 0.97$), and Avoidance = 2.82 ($SD = 1.04$). The mean pre-treatment Attachment Style Questionnaire scores for the eating disorder sample ($N = 267$) were: Discomfort with Closeness = 4.44 ($SD = 0.84$), Need for Approval = 4.09 ($SD = 0.73$), Preoccupied = 4.17 ($SD = 0.78$), and Relationships as Secondary = 2.97 ($SD = 0.86$). The Attachment Style Questionnaire scales were normally distributed and there were no univariate outliers. Univariate outliers occurred in group climate scales at weeks 1, 2, 6, 9 and 10, and these were corrected by replacing the outlying score with the next highest or lowest plus or minus one unit (Tabachnick & Fidell, 2001). Group climate scales were normally distributed.

Initial and Overall Group Climate

As hypothesized, lower pre-treatment Discomfort with Closeness, an index of attachment avoidance, was associated with higher initial Engaged group climate scores (i.e., at week 1), $\beta_{01} = -.63$, $p = .026$, after controlling for other group members' Engaged scores (Model 6). No

significant relationships were found between insecure attachment scales and initial or overall Conflict or Avoidance group climate scores.

Group Climate Growth

Overall, the results supported hypothesis 2 regarding group climate growth. Individual weekly Engaged scores, after controlling for other group member's Engaged scores, increased significantly, $\beta_{10} = .012, p = .008$, and accounted for 17.1% of the variance (Table 1). On average, weekly Avoidance group climate scale scores decreased significantly after controlling for other group members' Avoidance group climate scores, $\beta_{10} = -.009, p = .044$, and this decrease accounted for 7.5% of the variance. However, the average rate of linear growth of the Conflict scale after controlling for other group members' weekly Conflict scale scores was not significant, $\beta_{10} = .008, p = .200$. Since significant change was evident in the Engaged and Avoidance group climate scales, only these scale growths were examined in subsequent analyses. There remained a significant amount of variance in the slope parameters for Engaged, $\chi^2(245) = 552.07, p < .001$, and Avoidance group climate scale growth, $\chi^2(248) = 339.11, p < .001$.

Next, we examined the relationship between linear growth of Engaged and Avoidance group climate, and treatment outcome after controlling for other group members group climate scores (Table 1, Model 4). Consistent with hypothesis 3, we found a significant negative relationship between growth of Engaged group climate scores and the Eating Disorders Inventory symptom factor residual change score, $\beta_{11} = -.01, p = .043$. That is, a greater increase of Engaged group climate was associated with positive treatment outcome. No significant relationship was found between growth of Avoidance group climate and Eating Disorders Inventory residual change score, $\beta_{11} = .001, p = .868$. Since only Engaged group climate growth was associated with treatment outcome, we focused on Engaged group climate growth in the subsequent analysis.

However, no significant relationship was found between pre-treatment attachment dimensions and growth in Engaged group climate scores over the course of day treatment, $ps > .05$ (Table 1). Thus hypothesis 4 was not supported.

Group's Impact on Individual Climate Scores

We found support for hypothesis 5 for all three group climate scales. There was a significant positive relationship between other group members' Engaged scores and an individual's Engaged scores during any given week of the program, $\beta_{20} = .25, p < .001$ (Table 1); a significant positive relationship between other group members' Conflict scores and an individual's Conflict scores during any given week, $\beta_{20} = .50, p < .001$; and a significant positive relationship between other group members' Avoidance group climate scores and an individual's Avoidance group climate scores, $\beta_{20} = .08, p = .013$. In each case, Model 3, was a significantly better fit to the data than the respective Model 2: Engaged $\Delta\chi^2(3) = 104.24, p < .001$, Conflict $\Delta\chi^2(3) = 469.25, p < .001$, and Avoidance $\Delta\chi^2(3) = 44.86, p < .001$ (Table 2). Hence, for all three group climate scales, the group had an impact on the individual, so that greater Engaged, Conflict, or Avoidance in the group was associated with greater Engaged, Conflict, or Avoidance in the individual, respectively.

With regard to the influence of pre-treatment insecure attachment scales on the group's impact on an individual's group climate scores, we found that higher pre-treatment Discomfort with Closeness, an index of attachment avoidance, predicted a greater impact of the group on individual ratings of Engagement, $\beta_{21} = .12, p = .05$ (Table 1). No significant associations were found between attachments scales and the Conflict or Avoidance group climate scales.

Discussion

Initial and Overall Group Climate

The results partially supported the first hypothesis in that pre-treatment attachment avoidance was negatively related to Engaged group climate. As indicated, the attachment avoidant individual tends to deactivate their emotional experiences and dismiss relationships (Ainsworth et al., 1978; Mikulincer et al., 2003). In our sample of eating disordered women, these attachment avoidant strategies likely resulted in a tendency to experience other group members at the outset as less committed to treatment and less connected with each other. Previous studies demonstrated that higher attachment avoidance is related to dropping out of group treatment (Tasca et al., 2004). So this tendency among those with higher attachment avoidance to downplay group engagement in the early stages may impede effective group functioning (Gillaspy et al., 2002; Joyce et al., 2007; Tasca et al., 2002; Tasca et al., 2004).

Clinicians treating those with an eating disorder may need to be sensitive to the initial level of attachment avoidance in some of their patients. Pre-group preparation of the attachment avoidant individual in the form of information on the benefits of self disclosure and on therapeutic group norms, including a discussion of any concerns regarding affective expression (Yalom & Leszcz, 2005), might mitigate their distancing behaviors at the outset. Clinicians can facilitate group engagement by countering the dismissing internal working model by carefully timing empathic responses and by slowly encouraging affective expression between group members so as not to overwhelm the attachment avoidant individual (Wallin, 2007).

Group Climate Growth

The data supported hypothesis 2 in which increasing Engaged and decreasing Avoidance group climate growth was found. Overall, group-based day hospital treatment for eating

disorders resulted in a similar growth in these group processes as was evident in other group treatment populations (Kivlighan & Lily, 1997), and in outpatient group treatment of binge eating disorder (Tasca, Balfour, et al., 2006). Next we examined the relationship between group climate growth and group treatment outcome (hypothesis 3). The results indicated that an increase in group engagement facilitated the reduction in eating disorder symptoms by post-treatment. Hence, a therapist who continually fosters an interpersonal bond among members and the norm of self-disclosure in group treatment for eating disorders will likely promote positive outcomes in their patients. Predicting the growth in group engagement might allow clinicians to enhance positive individual outcomes. We expected, for example, that pre-treatment attachment dimensions would be associated with growth in Engaged group climate (hypothesis 4), however, we did not find such a relationship.

Group's Impact on Individual Climate Scores

Another goal of this study was to elaborate on the interplay between the individual and the group by examining if the group's climate history had an impact on the individual's experience of the group climate. The results supported hypothesis 5 in that we found a significant positive relationship between the group's experience of Engaged, Conflict, and Avoidance group climate and the individual's experience of Engaged, Conflict, and Avoidance group climate, respectively. These findings are consistent with previous research regarding group alliance (Tasca et al., 2010). Together, these results provide evidence for a long held clinical observation that the group's history of interactions has an ongoing impact on individual experiences in the group (Morgan-Lopez & Fals-Stewart, 2006; Rutan & Stone, 1993; Yalom & Leszcz, 2005). Eating disorder group-based day hospital programs with rolling admissions would benefit from clinicians promoting group therapeutic norms of cohesion and self disclosure with the

understanding that these norms will have a positive therapeutic impact on current as well as on future group members. Conversely, clinicians should be sensitive to the ongoing impact of anti-therapeutic events like conflict and avoidance that may have a lingering effect on new members. Group therapists may do well to repair a rupture in the group cohesion before introducing new members, so that the new member is not indirectly affected by an anti-therapeutic climate that preceded their admission to the group.

Individuals with an eating disorder who had higher levels of pre-treatment attachment avoidance were more sensitive to other group members' experience of group engagement. One might interpret this result to mean that although individuals with higher levels of attachment avoidance tend to prefer remaining emotionally and interpersonally disconnected from others, they may nonetheless be more sensitive to and more aware of other group members' levels of cohesion, possibly in order to protect themselves from being vulnerable (Ainsworth, 1978; Park, 2010). These results suggest that clinicians need to be aware that, contrary to outward appearances, the eating disorder patient with high attachment avoidance may be quite sensitive to the group's atmosphere when it comes to expectations of closeness and bonding with others. The exposure to interpersonal closeness and self-disclosure needs to be gradual for the attachment avoidant eating disordered patient (Wallin, 2007). Given that we are the first to examine this relationship, however, these results should be seen as preliminary and require replication.

There are a number of limitations of this study. First, we measured attachment insecurity using a self-report questionnaire which may be susceptible to bias, and which may exclude unconscious information related to the attachment system. Such unconscious information could be measured with methodologies such as the Adult Attachment Interview (George, Kaplan, & Main, 1985; Steele, Steele, & Murphy, 2009). However, the Adult Attachment Interview is very

time consuming, and researchers have demonstrated that self report is a valid way of measuring consciously available attachment information (Mikulincer & Shaver, 2007). Another limitation was that the majority of this eating disorder sample was made up of White women with a moderate to high socio-economic status. Therefore, generalizing the results to more diverse populations may be limited. Future studies could examine group climate and attachment for males as well as more diverse multicultural samples. Lastly, we had outcome data only for those women who completed the group-based day hospital treatment program. Hence the results related to outcomes may not generalize beyond treatment completers.

Conclusions

To date, this is the first study to examine: (1) the growth of group climate for women receiving group treatment for eating disorders in a day hospital program with rolling admissions, (2) the relationship between group climate growth and treatment outcome in such a context, (3) the impact of the group on individual experiences of group climate, and (4) the impact of pre-treatment attachment dimensions on these variables. Clinicians providing group treatment to women with eating disorders would do well to assess for attachment dimensions at pre-treatment. Preparing the attachment avoidant individual on the importance of the group therapy norms of cohesion and self disclosure might reduce the patient's tendency to remain distant and disengaged. Clinicians who encourage a growth of group engagement will likely create a context for more positive treatment outcomes among their eating disordered patients. In addition, this study adds to a small but growing research literature that supports the long held clinical belief among group therapists that the history of the group's interactions has an impact on the individual even as the group composition changes over time. Eating disorder individuals high in attachment avoidance might be particularly sensitive to the rest of the group's engagement, and

this knowledge may help therapists to counter the avoidant individual's tendency to dismiss the importance of cohesion among group members.

Table 1:

Selected output of fixed effects from multilevel models of the Engaged group climate scale

Main Effects and Interactions	Engaged Group Climate			
	Parameter	Coefficient	<i>t</i>	<i>p</i>
Intercept	β_{00}	3.42	19.10	<.001
x Discomfort with Closeness	β_{01}	-0.63	-2.25	.026
x Need for Approval	β_{02}	0.48	1.46	.144
x Preoccupied	β_{03}	0.03	0.09	.929
x Relationships as Secondary	β_{04}	0.41	1.77	.078
Slope	β_{10}	0.01	2.70	.008
x Discomfort with Closeness	β_{11}	-0.004	-0.57	.571
x Need for Approval	β_{12}	-0.007	-0.77	.445
x Preoccupied	β_{13}	0.005	0.75	.454
x Relationships as Secondary	β_{14}	0.003	0.37	.710
Covariate	β_{20}	0.25	6.84	<.001
x Discomfort with Closeness	β_{21}	0.12	1.97	.050
x Need for Approval	β_{22}	-0.08	-1.17	.244
x Preoccupied	β_{23}	-0.01	-0.26	.794
x Relationships as Secondary	β_{24}	-0.09	-1.87	.062

Note. Intercept, Slope, and Covariate refer to main effects of these parameters from Model 3.

Interaction terms (x Discomfort with Closeness, x Need for Approval, x Preoccupied, x Relationships as Secondary) are from Model 6. The Covariate is the other group members' mean adjusted Engaged Group Climate Questionnaire score (GrpGCQ_{ij}). *N* = 264.

Table 2

Random effects variance components from selected multilevel models with deviance statistics (D)

		Engaged	Conflict	Avoidance
Model 1: Intercept	τ_0	.367	.461	.481
Within-person	σ^2	.375	.912	.535
	<i>D</i> (parameter $n = 2$)	5328.80	7444.47	6236.89
Model 2: Intercept	τ_0	.441	.495	.486
Slope	τ_1	.003	.004	.002
Within-person	σ^2	.328	.836	.503
	<i>D</i> (parameter $n = 4$)	5231.70	7386.47	6210.81
Model 3: Intercept	τ_0	2.468	.748	1.011
Slope	τ_1	.003	.003	.001
Covariate	τ_2	.095	.130	.045
Within-person	σ^2	.311	.667	.495
	<i>D</i> (parameter $n = 7$)	5127.46	6917.22	6165.95
Model 6: Intercept	τ_0	2.44	.541	1.031
Slope	τ_1	.002	.003	.001
Covariate	τ_2	.095	.135	.047
Within-person	σ^2	.310	.668	.496
	<i>D</i> (parameter $n = 7$)	5181.28	6963.29	6217.70

Note. $N = 264$.

Appendix

Selected Multilevel Modeling Equations

Model 3: Unconditional linear growth multilevel model with one covariate

$$\text{Level 1: } y_{ij} = \pi_{0i} + \pi_{1i}\text{Week}_{ij} + \pi_{2i}\text{GrpGCQ}_{ij} + e_{ij}$$

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

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

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

Model 4: Conditional linear growth multilevel model with one covariate and EDI outcome

$$\text{Level 1: } y_{ij} = \pi_{0i} + \pi_{1i}\text{Week}_{ij} + \pi_{2i}\text{GrpGCQ}_{ij} + e_{ij}$$

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

$$\pi_{1i} = \beta_{10} + \beta_{11}\text{EDI_residual} + u_{1i}$$

$$\pi_{2i} = \beta_{20} + \beta_{21} + u_{2i}$$

EDI_residual = Eating Disorders Inventory residual change score from the pre- to post-Eating Disorders Inventory factor. EDI_residual was entered as an uncentered predictor.

Model 6: Conditional linear growth multilevel model with one covariate and attachment scales

$$\text{Level 1: } y_{ij} = \pi_{0i} + \pi_{1i}\text{Week}_{ij} + \pi_{2i}\text{GrpGCQ}_{ij} + e_{ij}$$

$$\text{Level 2: } \pi_{0i} = \beta_{00} + \beta_{01}\text{DC} + \beta_{02}\text{NA} + \beta_{03}\text{PRE} + \beta_{04}\text{RS} + u_{0i}$$

$$\pi_{1i} = \beta_{10} + \beta_{11}\text{DC} + \beta_{12}\text{NA} + \beta_{13}\text{PRE} + \beta_{14}\text{RS} + u_{1i}$$

$$\pi_{2i} = \beta_{20} + \beta_{21}\text{DC} + \beta_{22}\text{NA} + \beta_{23}\text{PRE} + \beta_{24}\text{RS} + u_{2i}$$

DC = Discomfort with Closeness scale, NA = Need for Approval scale, PRE = Preoccupation scale, and RS = Relationships as Secondary scale. Attachment scales were entered as uncentered predictors.

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General Discussion

Given an incomplete understanding of various aspects of eating disorder etiology, symptoms and course of treatment, the objective of this thesis was to consider a framework newly applied to eating disorders to better account for and improve our knowledge of symptoms, treatment processes, and treatment outcomes. Specifically, I chose to apply attachment theory, a developmental model of an individual's interpersonal behaviours and emotional regulation strategies. Although this theory has provided valuable information for other clinical disorders (Fonagy, 2001; Mickelson et al., 1997; Shorey & Snyder, 2006), this thesis is one of a handful of studies to apply attachment theory to increase our understanding of symptoms, treatment outcome and treatment process for women with ANR, ANB, BN, and EDNOS.

The first study of this thesis focused on how attachment theory increases our understanding of eating disorder symptoms and treatment outcome for women with ANR, ANB and BN. Women with an eating disorder diagnosis had higher levels of attachment insecurity compared to a community based non-eating disordered sample of women, and those with ANB experienced higher levels of attachment anxiety and avoidance compared to ANR and BN. Further, I found evidence for the incremental validity of insecure attachment dimensions in accounting for variance in eating disorder symptoms even after controlling for DSM-IV eating disorder diagnosis. Specifically, higher attachment anxiety was related to more severe eating disorder symptoms. These results suggest that clinician's can help eating disordered patients with higher attachment anxiety understand how their difficulty coping with, and processing, emotional information affects their ability to adaptively communicate emotions and seek social support.

Also in the first study, I evaluated the predictive validity of attachment dimensions in relation to eating disorder treatment outcomes. The results indicated that on average, eating disordered patients benefited from a group-based intensive day hospital program, but that women with BN experienced the greatest symptom reduction whereas those with ANB had the least symptom reduction. Even after controlling for these differences in outcomes among the diagnostic groups, higher pre-treatment attachment anxiety predicted poorer outcomes in eating disorder symptoms. Therefore, clinicians may find it helpful to specifically target attachment anxiety within their treatment model by attending to the hyperactivation of the emotion system, and the preoccupation with relationships and need for approval. Clinicians could thereby encourage eating disordered patients with high attachment anxiety to practice more adaptive emotion regulation strategies by self reflection and to create more adaptive interpersonal boundaries in order to improve treatment outcome.

After determining that insecure attachment helps to better understand and predict symptom severity and treatment outcome, I examined whether attachment theory could improve our knowledge of group treatment processes for women with eating disorders who attended a group-based intensive day hospital program with rolling admissions. I found that Engaged group climate increased linearly and Avoidance group climate decreased linearly from week to week, and that Engaged group climate growth was significantly related to better outcomes (i.e., symptom reduction) following treatment. These results suggested that clinicians would do well to attend to issues such as group cohesion throughout the life of a group, and to encourage an increase in an individual's engagement with the group to improved eating disorder outcomes. One possible avenue to do so might be to focus on a

patient's attachment style. I found that higher pre-treatment attachment avoidance was associated with lower Engaged group climate at the initial session. Therefore, it might be helpful for clinicians to prepare the attachment avoidant eating disorder patient prior to starting a group to effectively express affect and to engage in the group process from the outset. Such preparation would have to take into account the reticence that an attachment avoidant individual has about interpersonal closeness.

Next, I examined the long held clinical belief that the group's experience of the therapeutic atmosphere has an impact on the individual's experience of the group process. Here I took advantage of the rolling admissions structure of the day hospital program to statistically model the ongoing change in group membership and the group's effect on the individual. There was a significant positive relationship between the other group members' experience of Engaged, Conflict and Avoidance group climate and the individual's experience of Engaged, Conflict and Avoidance group climate, respectively, from week to week. Higher attachment avoidance in the individual resulted in a stronger relationship between group members' and individual's experience of Engaged group climate. This suggests that the attachment avoidant individual with an eating disorder is particularly sensitive to and perhaps vigilant of the level of interpersonal closeness in the group. This is likely part of their tendency to protect themselves from being vulnerable. This vulnerability, and their dismissing internal working model, has been shown to lead to premature termination (Tasca et al., 2004). Clinicians may need to strike a balance between encouraging cohesion in the group and being sensitive to the attachment avoidant individual's need to maintain a comfortable distance. This may be accomplished by helping attachment avoidant eating disordered patients become more aware of their extreme self-

reliance as a way of protecting themselves from being hurt, and by helping them gradually self disclose in the group.

Overall, the results from both studies of this dissertation also have broader implications for our conceptualization, research methodologies, and clinical approach to eating disorders. The results demonstrated that our current understanding of eating disorder symptoms and treatments is incomplete, and that attachment insecurity accounts for significant additional variance in symptom expression and treatment outcomes over and above variance explained by diagnosis alone. This suggests that eating disorders in part may be understood as an expression of attachment insecurity, and that one has to attend to attachment dimensions in order to better understand and treat eating disorders. For example, eating disorder symptoms may reflect an expression of maladaptive emotion regulation and interpersonal behaviours that result from internal working models that have their root in attachment development. Treatment of eating disorders based solely on symptoms may be limited in scope and effectiveness, particularly for those with high levels of attachment avoidance or attachment anxiety.

This thesis also contributed to our approach to group process research in general and to group process research of eating disorders in particular. Traditionally, group treatment research focused on treatment processes and outcomes using static time points. Largely, this was due to statistical approaches based on the general linear model that did not adequately model individual longitudinal data efficiently or flexibly (e.g., repeated ANOVA). These statistical methods limited the types of research questions that could be addressed regarding group process variables. The advent of multilevel modeling has opened up new avenues of research questions and methods for analyzing longitudinal data,

as demonstrated in this thesis. Modeling individual change in group process variables (e.g., group climate), and predicting change in group process based on patient characteristics (e.g., attachment) are some examples of applying this methodology.

Data analysis of group process in this study was complicated by the rolling admissions structure of the treatment program. It is common for hospital- and community-based programs for eating disorders to utilize a rolling admissions structure in their treatment groups. Hence, ecological validity is greatly enhanced if such data can be analysed appropriately. Using a new methodology within a multilevel model (i.e., other group members' mean rating of the group climate as a time varying covariate), I was able to assess and control for group members' experience of group climate to analyze the data. These research methodologies can be applied to group research in general and to eating disorder group research in particular in order to continue to advance our knowledge of clinically informed treatment approaches.

Further, there is currently a dearth of research on group processes among those with an eating disorder. Such research could help to explain and maximize treatment outcomes by suggesting ways of better managing group therapy interactions for this difficult to treat set of conditions. The research presented in this thesis is an example of how group process research can be applied to inform a more effective treatment for eating disordered individuals.

Future directions

In addition to the future research directions described in each of the separate studies, it would be beneficial for researchers to continue to apply attachment theory to improve our understanding of eating disorders. Specific avenues of attachment research might include:

examining how aspects of attachment insecurity is related to the etiology of eating disorders; replicating these studies using an interview-based assessment of attachment states of mind; determining the relationship between disorganized attachment states of mind, trauma and eating disorders; and, investigating how attachment to parents and current romantic relationships influence eating disorder symptom expression and treatment outcome. Future research could also tailor eating disorder treatments for ANR, ANB, BN and EDNOS based on attachment dimensions. For example, GPIP has been suggested for individuals with BED and high attachment anxiety (Tasca et al., 2006). With regard to group process research, it would be interesting to examine attachment over the course of the group therapy for eating disorders and at post-treatment to determine whether attachment insecurity changes as a result of positive group therapeutic interactions.

Conclusions

This doctoral thesis added to an emerging body of research demonstrating the value of attachment theory for understanding eating disorders. The findings suggested that examining eating disorders from an attachment theory framework may result in a better understanding of diagnostic classifications, symptom severity, and treatment outcomes. In addition, this thesis demonstrated: the importance of examining group process variables, such as group climate, longitudinally across the course of treatment; the impact of the group on individual's experience of group climate; and the influence of individual attachment dimensions on group process. Future researchers might continue to improve our understanding of insecure attachment in women suffering from eating disorders by examining treatment outcomes longitudinally, assessing attachment as a mechanism for change in treatment, explaining other variables that impact eating disorders such as trauma

in the context of attachment disorganization, and by evaluating the utility of tailoring treatments to specific attachment insecurities in women with an eating disorder.

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DSM-IV Criteria for Anorexia Nervosa (APA, 1994)

- A. Refusal to maintain body weight at or above a minimally normal weight for age and height (e.g., weight loss leading to maintenance of body weight less than 85% of that expected; or failure to make expected weight gain during period of growth, leading to body weight less than 85% of that expected).
- B. Intense fear of gaining weight or becoming fat, even though underweight.
- C. Disturbance in the way in which one's body weight or shape is experienced, undue influence of body weight or shape on self-evaluation, or denial of the seriousness of the current low body weight.
- D. In postmenarcheal females, amenorrhea, i.e., the absence of at least three consecutive menstrual cycles. (A woman is considered to have amenorrhea if her periods occur only following hormone, e.g., estrogen, administration.)

Specify type:

Restricting Type: during the current episode of Anorexia Nervosa, the person has not regularly engaged in binge-eating or purging behavior (i.e., self-induced vomiting or the misuse of laxatives, diuretics, or enemas)

Binge-Eating/Purging Type: during the current episode of Anorexia Nervosa, the person has regularly engaged in binge-eating or purging behavior (i.e., self-induced vomiting or the misuse of laxatives, diuretics, or enemas)

*Appendix B***DSM-IV Criteria for Bulimia Nervosa (APA, 1994)**

- A. Recurrent episodes of binge eating. An episode of binge eating is characterized by both of the following:
- (1) eating, in a discrete period of time (e.g., within any 2-hour period), an amount of food that is definitely larger than most people would eat during 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. Recurrent inappropriate compensatory behavior in order to prevent weight gain, such as self-induced vomiting; misuse of laxatives, diuretics, enemas, or other medications; fasting; or excessive exercise.
- C. The binge eating and inappropriate compensatory behaviors both occur, on average, at least twice a week for 3 months.
- D. Self-evaluation is unduly influenced by body shape and weight.
- E. The disturbance does not occur exclusively during episodes of Anorexia Nervosa.

Specify type:

Purging Type: during the current episode of Bulimia Nervosa, the person has regularly engaged in self-induced vomiting or the misuse of laxatives, diuretics, or enemas

Nonpurging Type: during the current episode of Bulimia Nervosa, the person has used other inappropriate compensatory behaviors, such as fasting or excessive exercise, but has not regularly engaged in self-induced vomiting or the misuse of laxatives, diuretics, or enemas

*Appendix C***DSM-IV Criteria for Eating Disorder Not Otherwise Specified (APA, 1994)**

The Eating Disorder Not Otherwise Specified category is for disorders of eating that do not meet the criteria for any specific Eating Disorder. Examples include:

1. For females, all the criteria for Anorexia Nervosa are met except that the individual has regular menses.
2. All the criteria for Anorexia Nervosa are met except that, despite significant weight loss, the individual's current weight is in the normal range.
3. All the criteria for Bulimia Nervosa are met except that the binge eating and inappropriate compensatory mechanisms occur at a frequency of less than twice a week or for a duration of less than 3 months.
4. The regular use of inappropriate compensatory behaviour by an individual of normal body weight after eating small amounts of food (e.g., self-induced vomiting after the consumption of two biscuits).
5. Repeatedly chewing and spitting out, but not swallowing, large amounts of food.
6. Binge-eating disorder: recurrent episodes of binge eating in the absence of the regular use of inappropriate compensatory behaviours characteristic of Bulimia Nervosa.

Appendix D

Multilevel Modeling Equations

Model 1: Unconditional Base Model

$$\text{Level-1: } y_{ij} = \pi_{0i} + e_{ij}$$

$$\text{Level-2: } \pi_{0i} = \beta_{00} + u_{0i}$$

In this equation, y_{ij} is the individual GCQ scores measured for individual i at week j , π_{0i} is the intercept for individual i at time 0 (i.e., time 0 was set as the participant's first week in the program), and e_{ij} is the residual or error term. At Level-2 each individual's intercept, π_{0i} , is modeled as the grand mean of GCQ scores, β_{00} , plus each individual's intercept's deviation from the grand mean, u_{0i} .

Model 2: Unconditional Linear Growth Model

$$\text{Level-1: } y_{ij} = \pi_{0i} + \pi_{1i}\text{Week}_{ij} + e_{ij}$$

$$\text{Level-2: } \pi_{0i} = \beta_{00} + u_{0i}$$

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

In this model π_{0i} is the individual GCQ score at time 0, β_{00} is the grand mean GCQ scores at time 0, and u_{0i} is the individual deviation around the grand mean. π_{1i} represents the linear rate of growth for individual i across each week, β_{10} is the average rate of change in GCQ scores for all individuals, and u_{1i} is each individual's slope parameter deviation from the average rate of change.

Model 3: Unconditional Linear Growth Model with One Covariate

$$\text{Level 1: } y_{ij} = \pi_{0i} + \pi_{1i}\text{Week}_{ij} + \pi_{2i}\text{GrpGCQ}_{ij} + e_{ij}$$

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

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

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

An adjusted group mean GCQ score was calculated at each week so that each individual, i , GCQ score was subtracted from the sum of all individual GCQ scores for that week, j , and divided by the group n for that week minus 1, i.e., $([\Sigma(\text{GCQ}_{ij})] - \text{GCQ}_{ij})/(n_j - 1)$ (Tasca, et al., 2010). Hence every participant had a weekly individual GCQ score and accompanying adjusted groups mean GCQ (i.e., GrpGCQ) score for that week. At Level-2, each adjusted group mean GCQ's intercept, π_{2i} , is modeled as the grand mean of all predicted adjusted group mean GCQ scores, β_{20} , plus each adjusted group mean GCQ's intercept's deviation from the grand mean, u_{2i} . β_{10} represents the linear growth in individual GCQ scores after controlling for the effect of the weekly level of other group members' GCQ status, π_{2i} .

Model 4: Unconditional Linear Growth Model with Time Varying-Covariate

$$\text{Level 1: } y_{ij} = \pi_{0i} + \pi_{1i}\text{Week}_{ij} + \pi_{2i}\text{GrpGCQ}_{ij} + \pi_{3i}\text{GrpGCQ}_{ij} \times \text{Week}_{ij} + e_{ij}$$

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

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

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

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

In Level-2 the β_{30} parameter refers to the effect of the interaction of other group members GCQ score change on individual GCQ score change, and u_{3i} is the residual.

Model 5: Linear Growth Model with One Covariate and Treatment Outcome

$$\text{Level 1: } y_{ij} = \pi_{0i} + \pi_{1i}\text{Week}_{ij} + \pi_{2i}\text{GrpGCQ}_{ij} + e_{ij}$$

$$\text{Level 2: } \pi_{0i} = \beta_{00}\text{EDI residual change score} + u_{0i}$$

$$\pi_{1i} = \beta_{10}\text{EDI residual change score} + u_{1i}$$

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

In Level-2 the β_{00} and β_{10} parameters refer to the relationship of the EDI residual change score (i.e., treatment outcome) on individual GCQ scores.

Model 6: Conditional Base Model

$$\text{Level-1: } y_{ij} = \pi_{0i} + e_{ij}$$

$$\text{Level-2: } \pi_{0i} = \beta_{00} + \beta_{01}\text{DC} + \beta_{02}\text{NA} + \beta_{03}\text{PRE} + \beta_{04}\text{RS} + u_{0i}$$

The β_{01} to β_{04} parameters refer to the relationship of the four attachment insecurity scales on individual GCQ scores (DC = Discomfort with Closeness, NA = Need for Approval, PRE = Preoccupied, RS = Relationships as secondary).

Model 7: Conditional Linear Growth Model with One Covariate

$$\text{Level 1: } y_{ij} = \pi_{0i} + \pi_{1i}\text{Week}_{ij} + \pi_{2i}\text{GrpGCQ}_{ij} + e_{ij}$$

$$\text{Level 2: } \pi_{0i} = \beta_{00} + \beta_{01}\text{DC} + \beta_{02}\text{NA} + \beta_{03}\text{PRE} + \beta_{04}\text{RS} + u_{0i}$$

$$\pi_{1i} = \beta_{10} + \beta_{11}\text{DC} + \beta_{12}\text{NA} + \beta_{13}\text{PRE} + \beta_{14}\text{RS} + u_{1i}$$

$$\pi_{2i} = \beta_{20} + \beta_{21}\text{DC} + \beta_{22}\text{NA} + \beta_{23}\text{PRE} + \beta_{24}\text{RS} + u_{2i}$$

The β_{01} to β_{04} parameters assessed the relationship between individual's initial GCQ scores and attachment scores after controlling for the effect of the groups GCQ scores. The β_{21} to β_{24} parameters refer to the effect of the attachment scores on the relationship between the group adjusted mean GCQ scores and the individual GCQ scores.

Model 8: Conditional Linear Growth Model with Time-Varying Covariate

$$\text{Level 1: } y_{ij} = \pi_{0i} + \pi_{1i}\text{Week}_{ij} + \pi_{2i}\text{GrpGCQ}_{ij} + \pi_{3i}\text{GrpGCQ}_{ij} \times \text{Week}_{ij} + e_{ij}$$

$$\text{Level 2: } \pi_{0i} = \beta_{00} + \beta_{01}\text{DC} + \beta_{02}\text{NA} + \beta_{03}\text{PRE} + \beta_{04}\text{RS} + u_{0i}$$

$$\pi_{1i} = \beta_{10} + \beta_{11}\text{DC} + \beta_{12}\text{NA} + \beta_{13}\text{PRE} + \beta_{14}\text{RS} + u_{1i}$$

$$\pi_{2i} = \beta_{20} + \beta_{21}\text{DC} + \beta_{22}\text{NA} + \beta_{23}\text{PRE} + \beta_{24}\text{RS} + u_{2i}$$

$$\pi_{3t} = \beta_{30} + \beta_{31}\text{DC} + \beta_{32}\text{NA} + \beta_{33}\text{PRE} + \beta_{34}\text{RS} + u_{3t}$$

The β_{31} to β_{34} parameters refer to the effect of the attachment scores on the relationship between the group adjusted mean GCQ scores change and the individual GCQ scores over time.