WORKING ALLIANCE IN THE TREATMENT OF ANOREXIA NERVOSA:

BASELINE PREDICTORS, MOTIVATION TO CHANGE, AND

RELATIONSHIP TO TREATMENT OUTCOME

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A dissertation submitted to the

School of Graduate Studies in partial fulfillment of the

requirements for the degree of:

Doctorate of Psychology, Department of Psychology, Faculty of Science

Memorial University of Newfoundland

October 2018

St. John's, Newfoundland and Labrador

Abstract

Background: Anorexia Nervosa (AN) is a severe and potentially deadly disorder that is often found to be resistant to treatment, especially in adult populations. Patients commonly present a strong ambivalence towards recovery and high rates of premature treatment termination. The working alliance has been found to be a strong predictor of treatment outcome across an array of psychological disorders and treatment approaches; however, little research has been conducted to understand its role in the treatment of AN and its relation to motivation for treatment or outcome in this population. The present pilot study sought to investigate primarily the associations between reports of working alliance, measurements of motivation for treatment, and AN treatment outcome. This is the first study to examine the relation between motivation and working alliance in AN patients. **Method**: The present study was a secondary analysis of data obtained from a sample of 53 adult AN patients who were admitted to a specialized inpatient/day-hospital eating disorder treatment program. The patients completed self-report questionnaires measuring autonomous and controlled motivation for treatment at baseline and at week four, self-report questionnaires regarding working alliance at week four, and clinical symptomatology and BMI were measured at baseline, week four, and discharge. **Results**: Changes in Autonomous motivation for treatment from baseline to week four were found to predict working alliance scores at week four. No association was found between measures of motivation for treatment or working alliance with treatment outcome or rates of premature treatment termination. In exploratory analyses, AN subtype (i.e., restricting vs. binge-purge) was significantly associated with working alliance scores, measures of

treatment outcome, and rates of premature treatment termination. **Conclusions**: The results of this study point to the importance of early measurements of working alliance in this population and brings into question the validity of early self-reports of motivation in AN treatment. On balance, the present findings do not align with previous findings in the literature. Limitations of the current study related to high attrition and low statistical power are discussed. The differences observed between AN subtypes in their response to treatment add to a growing body of clinical knowledge that may suggest a need for researchers and clinicians to reformulate how these clinical subtypes are conceptualized.

Acknowledgements

I would like to acknowledge my gratitude for all the people who had direct involvement in helping me through the process of writing the present work: Dr. Jacqueline Carter-Major, whose constant support and encouragement was instrumental in this process; the members of my Thesis Committee, Dr. Ken Fowler, and Dr. Olga Heath, for agreeing to taking the time to look at my writing and offering their counsel; Dr. Julie Gosselin for her feedback; and the faculty members of the Psychology Department at Memorial University of Newfoundland, for providing heaps of knowledge in research design, statistics, and academic writing.

I would also like to acknowledge my gratitude for all the people who may not have had direct involvement in the production of this work, but whose contribution paved the path that led to this realisation: my parents, siblings, and family, who shaped my interest in psychology; kindergarten and preschool teachers, elementary and high school teachers, principals and vice-principals too numerous to name fairly; professors at Universidad de Buenos Aires, Concordia University, and Université Paris 5; Dr. Christine Arlett, of Memorial University of Newfoundland, who was brave enough to be my research supervisor during a difficult time in my life; and Dr. Lesley Graff of University of Manitoba and Mrs. Tiina Lehtonen-Cordell of Southern Health-Santé Sud, for their support, encouragement, and patience.

Finally, this is to acknowledge that this work could never have been completed without the skill and support of Ms. Adrienne Titcombe-Pratt who, as far as this writer is concerned, has earned a doctorate of her own.

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Introduction

The working alliance in psychotherapy has been the subject of considerable research over the past two decades, particularly in terms of its role as a predictor of treatment outcome for an array of different clinical populations and treatment approaches. A growing number of studies indicate that, when considering the large majority of psychotherapy approaches, the working alliance between patient and therapist is one of the strongest predictors of treatment outcome (Falkenström, Granström, & Holmqvist, 2014; Horvath, Del Re, Fluckiger, & Symonds, 2011; Martin, Garske, & Davis, 2000). However, data suggests that this association could be influenced by factors such as the perspective of the rater, time at which measures of the working alliance are taken, improvements in presenting symptoms, as well as characteristics of the patient and the therapist (Elvins & Green, 2008; Horvath & Bedi, 2002; Martin, Garske, & Davis, 2000).

Working alliance may play a particularly key role in the treatment of eating disorders, and specifically anorexia nervosa (AN), as this population often demonstrates ambivalence about change and treatment non-adherence, likely due to the disorder's egosyntonic features (Hay, Touyz, & Sud, 2012; Starzomska, 2009). Current understanding of the nature of the working alliance and its relationship with AN treatment outcome is hindered by the very limited number of studies conducted on this topic to date (Zaitsoff, Pullmer, Cyr, & Aime, 2015). In addition, the subject is presently a source of debate amongst researchers (Zaitsoff, et al., 2015). Given the severe health risks inherent to AN and the frequently poor treatment outcomes associated with the disorder, particularly in adult populations, it is imperative to improve the effectiveness of

existing treatment approaches. One way to achieve this may be to increase clinical understanding of the function of the working alliance within an adult population with AN receiving specialized treatment. An improved understanding of the factors associated with the working alliance as well as its relationship with treatment outcome can inform the development of more effective evidence-based, best-practice interventions for AN. The present dissertation attempts to shed light on this matter by analyzing data pertaining to these treatment factors gathered in a hospital-based specialized hybrid inpatient/day-treatment program for adults with AN.

Review of the Literature

Theoretical and Historical Background of the Working Alliance

The Working Alliance is a summary term that describes the relationship bond that can develop between the patient and therapist through mutual trust and collaborative work in establishing and reaching treatment goals (Constantino, Arnow, Blasey, & Agras, 2005). The working alliance is also known throughout the literature as "working relationship", "therapeutic alliance", and "therapeutic relationship" (Horvath, et al., 2011; Oyer, 2014). The concept of the relationship between patient and therapist being an active therapeutic ingredient in the treatment process has been a theme of psychology as a discipline for over a century (Elvins & Green, 2008; Horvath et al., 2011). For instance, Freud (1912) described transference and countertransference as important elements for change to occur in psychoanalysis and believed that the supportive stance of the therapist allows for positive transference. From a humanistic psychology perspective, Rogers (1965) highlighted the therapist's empathy as experienced from the perspective of the

patient. Greenson (1965) endorsed the concept that the relationship between therapist and patient was an essential aspect of successful treatment, emphasising and elaborating on the active aspect of this collaboration. However, the working alliance is commonly understood in the literature as a construct that was crystallized in the work of Bordin (1979) and much of the current research on alliance is based on the framework he proposed.

Bordin (1979) described the concept of working alliance as composed of three main elements: agreement on the goals of therapy, agreement in the tasks of therapy, and the bond that develops between the therapist and the patient. For the first two elements, agreement on goals and tasks, the important characteristic is agreement, which is the understanding that both parties agree to work collaboratively, and in harmony, on agreed upon tasks and goals, providing a mutual motivation to work through the challenges of change. According to Bordin, the third element of the working alliance – the bond between therapist and patient – is developed through a congruence in pre-existing biases and expectations from each member of the dyad. Trust, liking, and attachment are developed over time as the psychotherapist and patient experience each other in session, thereby developing the quality and depth of the relationship. According to Bordin's (1979) model, it could be hypothesized that deficiencies in the working alliance between patient and therapist would result in lower rates of treatment success and patient satisfaction as well as a higher risk of premature treatment termination.

Bordin (1979) argued that the psychoanalytic concept of working alliance in therapy could be generalized to all psychotherapies in one way or another and that the

strength of the working alliance, not the theoretical model of treatment, is one of the most important elements impacting the effectiveness of therapy. In addition, Bordin proposed that the development and impact of the working alliance occurs independently of the theoretical orientation in which a given psychological treatment is based. However, the particular treatment approach that is used will shape the way in which the working alliance forms and grows. Put differently, therapeutic objectives and procedures are variables which are based on the particular training orientation of the professional and the preferences of the patient. As such, they would be expected to change from dyad to dyad.

While the early formulations of the working alliance concept are rooted in psychoanalytic therapy, it has become an intricate element of the very diverse forms of psychotherapies currently available. For example, within the paradigm of CBT, the original authors of the approach emphasized the importance of working collaboratively with the patient to generate goals, plans, and conceptualizations (Beck et al., 1979). One of the key elements in CBT is the idea of practicing cognitive and behavioral changes. This allows the individual the experience of alternatives to pathological patterns of thinking and behaving. This practice, however, can only be undertaken by the patient through effort and patience. The individual is much more likely to make these efforts if the actions and goals are understood and accepted. Agreement on goals and tasks in CBT is developed through what authors call "collaborative empiricism" (Dobson & Dobson, 2013; Kazantzis, Tee, Dattilio, & Dobson, 2013). This term refers to the partnership between clinician and patient in the development of the topics and possible experiences that will be part of a given therapeutic process. Dobson and Dobson (2013) further argue

that therapeutic techniques need to be adapted and tailored to the cultural background and particular preferences of the individual patient in order to maximize patient engagement and adherence to therapy, and that this process is facilitated by the inclusion of the patient in the generation of therapy themes. Wong (2013) demonstrated this point by discussing the need to adjust the language and delivery of information and techniques working with Chinese patients. For example, the author mentions drawing parallels between the teachings of Confucius and the idea of empiricism to increase the working alliance in his work with patients from this population.

Working Alliance Measures

Numerous psychometric instruments have been developed in an effort to measure the construct of working alliance with varying underlying theoretical conceptualizations being used to create different scales (Elvins & Green, 2008). Over 30 different working alliance measures have been developed to date and, due to the diverse theoretical models on which these measures have been based, many scales share certain common elements, but lack a singular point of reference (Horvath et al., 2011) with different instruments emphasizing different aspects of the working alliance (Horvath & Bedi, 2002). However,

The measures most frequently employed to assess working alliance in the research literature include the Helping Alliance Questionnaires (HAq; Luborsky, McLellan, Woody, O'Brien, & Auerbach, 1985), the Vanderbilt Psychotherapy Process scales (VPPS/VTAS; Suh, Strupp, & O'Malley, 1986), the California Psychotherapy Alliance Scale (CALPAS; Gaston & Marmar, 1994), and the Working Alliance Inventories (WAI; Horvath, 1981, Horvath & Greenberg, 1989). Tichenor and Hill

(1989) found that these measures had strong internal consistency, with the exception of the HAq, which was not included in their analysis. Horvath et al. (2011) reported that these four measures were utilized in 2/3 of all the data they collected in their meta-analysis of the relationship between working alliance and treatment outcome. In an analysis of common instruments employed to assess the working alliance it was found that instrument effects had little statistical impact on the relationship between working alliance and treatment outcome overall (Horvath, 2001). However, of the available measures, the WAI has been used in the greatest number of studies that assessed the working alliance and outcome (Elvins & Green, 2008; Martin et al., 2000). The WAI is based on the tripartite model proposed by Bordin including agreement on tasks, goals, and therapeutic bond and, unlike many other psychometric instruments, the WAI evolved from a transtheoretical perspective and was developed specifically to allow for measurement of the working alliance in any form of therapy for any disorder (Castonguay, Constantino, Holtforth, & Grosse, 2006). Of all working alliance measures, the WAI is one of two scales to have received the greatest amount of construct validation (Elvins & Green, 2008) and it has three versions, which allow for measures of the working alliance to be taken from different perspectives; patient, therapist, and/or independent observer.

Tichenor and Hill (1989) demonstrated that WAI scores obtained from the three types of raters may not correlate with each other, although the authors noted that these results were found in a rather small sample (N=8). While all three types of rater have demonstrated reliability in predicting treatment outcome (Martin et al., 2000), studies

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suggest that, regardless of therapeutic approach, scores in the patient version of measures such as the WAI show a higher correlation with scores on outcome measures than either clinician versions (Elvins & Green, 2008; Horvath & Symonds, 1991; Horvath & Luborsky, 1993) or independent observer reports (Martin et al., 2000). A possible explanation for these differences could be that reports by clinicians and independent observers are unable to directly account for the inner experiences and motivations of the patients that influence the working alliance. Horvath and Symonds (1991) suggested that a clinician's inaccurate estimation of the working alliance could lead to ill-timed interventions, which can have a negative impact on the course of therapy. The authors argue that the patient's rating of working alliance could be a more valid construct than its therapist counterpart. These observations suggest that, while the working alliance is developed and experienced by two individuals (or more, in the case of treatment teams), the perception of the patient may be most important in predicting treatment outcome.

Given that the working alliance has the potential to fluctuate throughout the course of treatment, even from session to session, the stage of treatment in which the measure is taken could have an effect on the results (Martin et al., 2000). One meta-analysis found that late-treatment measures of the working alliance may be a better predictor of treatment outcome, although the authors noted that these results should be considered with caution as they could be influenced by later improvements in symptomatology rather than gains in working alliance (Horvath, 2001). Other studies have indicated that measures taken as early as the first session are more indicative of treatment outcome (Martin et al., 2000). Horvath (2001) concluded that early measures of

alliance (in the first third of treatment or between sessions 1 through 5) where slightly more predictive of treatment outcome than mid-session measures. This suggests that developing a strong working alliance early on in the therapeutic process may therefore be important in order to ensure better treatment outcome.

Working Alliance and Treatment Outcome

The role of working alliance in the therapeutic process and its relationship with treatment outcome have been the focus of substantial research. Numerous large-scale clinical trials have been undertaken to assess the relationship between the two and a large body of work supports the hypothesis that the working alliance predicts treatment outcome (Castonguay et al., 2006). For example, Krupnick et al. (1996) found that the working alliance was strongly predictive of outcome in 225 participants diagnosed with major depressive disorder who received either interpersonal psychotherapy, cognitive-behaviour therapy, pharmacotherapy, or placebo with clinical management. Moreover, the relationship between working alliance and treatment outcome was constant across modalities and a greater percentage of the variance in outcome was attributable to alliance than to treatment approach (Krupnick et al., 1996).

A number of meta-analyses have examined the relationship between working alliance and treatment outcome across different clinical populations and treatments. For example, in their meta-analysis of the relationship between working alliance and treatment outcome across a variety of disorders and treatment approaches, Martin et al. (2000) reported that the effect of working alliance on outcome showed a moderate effect size. They also found that the strength of this relationship remained stable even after

controlling for other hypothesised confounding variables, including variability in outcome measures and type of rater used. In another meta-analysis that identified over 200 relevant studies, Horvath et al. (2011) similarly found that working alliance had a moderate positive association with diverse measures of outcome across different disorders, acting as one of the strongest predictors of successful therapeutic outcome. In addition, one meta-analysis of 11 studies of adult psychotherapy found a moderately strong correlation between lower levels of working alliance and increased likelihood of treatment attrition (Sharf, Primavera, & Diener, 2010).

While research indicates that the working alliance plays an important role in the therapeutic process and is consistently predictive of treatment outcome, some theorists suggest that other aspects of psychotherapy, such as early symptom change, may have a greater direct influence on treatment outcome than working alliance (Feeley, DeRubeis, & Gelfland, 1999). However, a number of studies have also indicated that working alliance remains a significant predictor of treatment outcome after factoring out these confounding variables (Flückiger, Del Re, Wampold, Symonds, & Horvath, 2012; Klein et al., 2003). For example, in a large study of working alliance and primary care in the treatment of a number of different psychological disorders including anxiety and depression, Falkenstrom, Granstrom, and Holmqvist (2014) found that early symptom changes did not predict subsequent improvements in working alliance measures. Other investigations of the working alliance, early symptom improvement, and the role these factors play in predicting treatment outcome have suggested that another type of interaction could be at play. For example, Xu and Tracey (2015) examined working

alliance and early symptom improvement in the treatment of 638 community patients treated for a variety of mental health issues. Through a longitudinal assessment, the researchers found that working alliance and symptomatic recovery might in fact work reciprocally over the course of therapy, and that their interaction appeared to be a stronger predictor of overall treatment outcome than either factor by itself. However, other studies have reported contradictory findings. For example, in an investigation of the working alliance and outcome in binge-eating disorder, Tasca, Compare, Zarbo, and Brugnera (2016) found that increases in working alliance predicted subsequent decreases in binge-eating episodes, but that decreases in binge-eating symptoms did not predict improvements in working alliance.

Some studies suggest that certain pre-treatment factors may influence the development of the working alliance, although results have been varied. Patterson, Uhlin, and Anderson (2008) conducted an analysis of patient baseline characteristics as predictors of working alliance ratings by the third session of treatment in a sample of 57 university counselling patients. The authors found that presenting a personal commitment to therapy at baseline was highly correlated with all three aspects of the working alliance (goals, tasks, and bond) and that this predicted alliance ratings three sessions into therapy as measured by a revised, short form of the WAI (Patterson, Uhlin, & Anderson, 2008). Similarly, Castonguay et al. (2006) highlighted in their literature review that a patient's optimistic expectation for change is positively correlated with working alliance ratings, while patient avoidance and interpersonal difficulties are negatively correlated with working alliance. More recently, it has been suggested that the patient's ability to create

positive relationships could also be a factor that contributes to the development of the working alliance (Zilcha-Mano, 2017). Therefore, development of the working alliance and subsequent treatment outcome could be at least partly dependent on the patient's self-motivated decision to dedicate the required effort throughout the therapy process as well as their own interpersonal skills. Other researchers have investigated whether or not pre-treatment severity of symptoms impedes the ability of individuals to develop a healthy working alliance, however this relationship has not been clearly established as there have been inconsistent findings. Some studies have found that greater baseline symptom severity is not associated with weaker working alliance (Joyce and Piper, 1998), while other studies have found that greater symptom severity predicts lower levels of working alliance (Zaitsoff, Doyle, Hoste, &, le Grange, 2008).

In addition, although patients might possess certain traits that could affect the formation of the working alliance, characteristics of the therapist likely also impact its development (Castonguay et al., 2006). Elvins and Green (2008) reported that particular therapist attributes and techniques, such as the ability to adapt easily and the possession of a warm demeanor, contribute to the formation of a strong working alliance. The therapist's ability to address ruptures in the alliance and to use these occasions to explore negative emotions that the patient experiences could also lead to positive gains in the working alliance while therapist avoidance would have a negative impact (Rainer & Campbell, 2001).

In summary, considerable research has been conducted on the working alliance developed between patient and therapist and its role as a predictor of treatment outcome.

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There is some evidence that certain factors, such as patient and therapist traits, improvements in presenting symptoms, as well as the time point during therapy at which working alliance is measured may influence the relationship between working alliance and treatment outcome. Nevertheless, the working alliance remains one of the strongest predictors of treatment outcome across a diverse range of clinical populations and psychological treatment approaches. Thus, it is perhaps surprising that few studies to date have examined the relationship between working alliance and treatment outcomes in the treatment of anorexia nervosa (AN) particularly considering that treatment outcome in AN is often poor, with high rates of treatment drop-out and relapse. To address this gap, the relationship between working alliance and treatment outcome in adults with AN will be the focus of the current investigation. In the next sections, a description of the clinical features of AN will be presented followed by a summary of the treatment outcome research on AN to date, as well as the research thus far on the relationship between working alliance and treatment outcome in AN.

Anorexia Nervosa

Anorexia Nervosa (AN) is an eating disorder characterized by obsessive concern about weight, low body weight, a strong desire to be thin and/or fear of gaining weight despite being underweight, and behaviours aimed at decreasing body weight (American Psychiatric Association [APA], 2013). The 5th Edition of the Diagnostic and Statistical Manual (APA, 2013) outlines three main criteria for a diagnosis of AN that describe behavioural, cognitive, and perceptual factors that deviate from healthy food consumption and self-appraisal: Criterion A: "Restriction of energy intake relative to

requirements, leading to a significantly low body weight in the context of age, sex, developmental trajectory, and physical health". The DSM 5 clarifies that significantly low weight for adults refers to "weight that is less than minimally normal"; Criterion B: "Intense fear of gaining weight or of becoming fat, or persistent behavior that interferes with weight gain, even though at a significant low weight"; and Criterion 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 persistent lack of recognition of the seriousness of the current low body weight" (APA, 2013).

The diagnosis is conceptualized with four possible levels of severity, based on the individual's Body Mass Index (BMI), which is calculated by dividing the individual's weight in kilograms by the square of their height in meters. A healthy BMI ranges between 18.5 and 24.9 kg/m^2. Therefore, a BMI of less than 18.54 or below is required to meet Criterion A of the DSM 5. The ranges of severity for AN are mild, with a BMI between 17 and 18.49 kg/m^2; moderate, with a BMI between 16 and 16.99 kg/m^2; severe, with a BMI between 15 and 15.99 kg/m^2; and Extreme, with a BMI lower than 15 kg/m^2 (APA 2013). Using the BMI as a sole measurement of AN severity has been questioned given that BMI calculations within several populations, such as bodybuilders, pregnant or lactating mothers, and the elderly, might not yield valid results. The severity of the disorder can therefore also be impacted by the number and severity of clinical symptomatology or the extent to which these symptoms impair the individual's normal functioning.

Two distinct subtypes of AN, restricting subtype (AN-R) and binge-eating/purging subtype (AN-BP), have been repeatedly observed by clinicians and researchers. The two subtypes are classified in the DSM 5 within the AN diagnosis and are defined by differences in the behavioural presentation in Criterion A. Individuals diagnosed with the restricting subtype focus on minimizing or controlling food intake through dieting or fasting in order to achieve weight loss. Individuals within this subtype may also engage in a disproportionate amount of exercise in relation to the amount of food consumed in order to achieve an energy deficit. In the binge-eating/purging subtype, in addition to the above symptoms, individuals also experience episodes of binge-eating and/or compensatory purging behaviour such as self-induced vomiting or the inappropriate use of diuretics or laxatives.

The initial development of AN can be influenced or triggered by a multitude of different factors including cultural, biological, and psychological components. Sociocultural norms and pressures to conform to societal expectations of beauty and attractiveness in western culture, which praises slim bodies and thinness over other body types and endorses often unattainable body shapes (e.g., large breasts in combination with thin a body shape for women), could have an influence (Thompson & Heinberg, 1999; Vitousek, Watson, & Wilson, 1998). Reports have also indicated that AN might entail biopsychosocial roots, pointing at familial or hereditary components (Kaye, Strober, Stein, & Gendall, 1999). The risk of developing AN is significantly increased in individuals who have a family member with AN (Machado, Gonçalves, Martins, Hoek, & Machado, 2014) and heritability estimates of AN range from 56-70% (Guarda, 2008).

Furthermore, certain personality traits seem common among individuals with AN and include perfectionism and rigidity, body shape-related anxiety, elevated harm avoidance (Kaye et al., 1999), and low self-esteem (Cervera et al., 2003).

The age of onset of AN peaks between mid- to later-adolescence, although new cases can still develop much later in life (APA, 2013; Lapid et al., 2010). The disorder is most often seen in females rather than males and in Caucasian individuals more often than in other ethnicities (APA, 2013; Hoek, 2006; Hudson, Hiripi, Pope, & Kessler, 2007; Smink, van Hoeken, & Hoek, 2012). The prevalence of AN in the United States has been estimated to be .9% for women and .3% for men (Hudson et al., 2007), though higher rates have been recorded in an Australian study of female twins, with lifetime prevalence of AN estimated at 1.9% (Smink et al., 2012). Since the publication of the DSM 5 in 2013, estimates of the lifetime prevalence of AN has increased to up to 1.3% of the general population. This could be attributed to the redefinition of the diagnostic criteria as presented by the DSM 5, which is less stringent than those of its predecessor. For instance, the DSM 5 no longer requires the presence of amenorrhea in women for a diagnosis of AN (APA, 2013).

AN is the only psychiatric diagnosis that can lead to death by its very nature, often as a result of medical complications brought about by extreme weight loss if untreated (APA, 2013; Arcelus, Mitchell, Wales, & Nielsen, 2011). Of all mental disorders, AN has the highest mortality rate (Steinhausen, 2002) with estimates of 10% mortality rate per decade of illness (Sullivan, 2002). Other serious medical consequences have been observed in adult individuals presenting significantly low weight, such as liver

damage (Gaudiani, Sabel, Mascolo, & Mehler, 2012), bone density loss and osteoporosis (Baker, Roberts, & Towell, 2000; Gaudiani et al., 2012), renal failure (Takakura et al., 2006), cardiac complications (Caseiro & Frishman, 2006), electrolyte imbalances (Turner & Shapiro, 1992), constipation, hypothermia, lethargy and, among female patients, amenorrhea at times associated with infertility (APA, 2013). Many more physical complications might arise, primarily as a consequence of acute or chronic starvation. Having a diagnosis of AN has also been associated with a high rate of suicidality and death by suicide, especially among men. In 2005, Birmingham, Su, Hlynsky, Goldner, and Gao conducted a cross-sectional study of patients referred to an adult tertiary care eating disorders program in British Columbia. The researchers reported that, out of 954 patients, 25 had died. Of these 25, 17 were diagnosed with AN (68%), while seven had received a diagnosis of Bulimia Nervosa (BN) and one had received a diagnosis of EDNOS. Out of the 17 deceased AN patients, 16 were male (94.1%) and the researchers reported the causes of death were suicide (n=7), pneumonia (n=2), hypoglycemia (n=2), liver disease (n=2), cancer (n=2), alcohol poisoning (n=1) and subdural hemorrhage (n=1). Thus, developing effective treatments for AN is extremely important.

Treatment Studies on Anorexia Nervosa

Due to the complex and diverse array of AN symptoms, treatment programs for the disorder are typically comprised of teams made up of both medical and psychological professionals that target several multidisciplinary factors, including medical stabilisation, weight increase to a healthy level, and psychotherapy (Olmsted et al., 2007). Treatment can occur in an inpatient setting or through day-treatment, outpatient treatment or through

a combination of the three (Fairburn, 2005). However, despite the negative consequences of the disorder and risk of death, research has shown that AN demonstrates a resistance to treatment (Hay et al., 2012). In a meta-analysis of 119 studies that included outcome statistics for AN treatment programs, Steinhausen (2002) found that, following specialized treatment, on average only 46.9% of patients showed full recovery. Similarly, Berkman, Lorne, and Bulik (2007) conducted a review that analyzed data from 56 studies on eating disorders, including AN, and reported that, at 6-12-year follow-up, as few as 27-58% of individuals treated for AN showed a good outcome.

While individuals who complete treatment for AN have the best chance of obtaining significant symptom reduction (DeJong, Broadbent, & Schmidt, 2012), research also indicates that individuals with AN who have good outcomes at the end of treatment are still liable to relapse (Guarda, 2008), and susceptible to developing a chronic form of the disorder (Hay et al., 2012). One review article noted that, on average, relapse rates after successful weight restoration in AN patients following intensive treatment were as high as 30-50% within the first year of discharge (Guarda, 2008). Another literature review of treatment programs for AN (Steinhausen, 2002) reported that as many as 20.8% of individuals affected by AN who receive treatment develop a chronic form of the disorder.

High rates of attrition have also been observed in treatment settings of AN (Guarda, 2008; Kaye et al., 1999; Woodside, Carter, & Blackmore, 2004). Guarda (2008) found that as many as 30-50% of patients admitted to specialty programs drop out prematurely. In a review article, Watson and Bulik (2013) stated that attrition rates in

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treatment settings for the disorder are "inordinately high compared with many psychological conditions". Similarly, Kahn and Pike (2001) found evidence that in the earliest stages a considerable percentage of individuals with AN do not successfully complete inpatient treatment. In an analysis of 26 studies of Eating Disorders, Fassino, Pierò, Tomba, and Abbate-Daga (2009) found that dropout rates ranged from 20.2-51% for inpatient treatment and 29-73% for outpatient treatment. Predictors of dropout in individuals with AN have been difficult to establish with only very limited research undertaken on the topic and, to date, data has generally been inconclusive or contradictory (Fassino et al., 2009; Kahn & Pike, 2001). Some research suggests that the AN binge-purge subtype is predictive of premature treatment termination (Bandini et al., 2006; Elbaky et al., 2014; Fassino et al., 2009; Wallier et al., 2009; Surgenor, Maguire, & Beumont, 2004; Woodside et al., 2004) and the requirement of a relatively longer course of treatment (van Son, van Hoeken, van Furth, Donker, & Hoek, 2010). Repeated hospitalisation for AN may also decrease the likelihood that individuals with AN will complete treatment (Kahn & Pike, 2001), and older age at detection as well as a longer duration of illness may negatively impact the ability of individuals with AN to achieve a full recovery (Berkman et al., 2007; van Son et al., 2010). However, other studies have failed to find a correlation between drop-out and severity of AN (Sly, Morgan, Mountford, & Lacey, 2013).

As reviewed above, treatment studies on AN have been characterized by high rates of treatment drop-out, low rates of recovery, as well as high rates of relapse pointing to the need to identify novel ways of improving treatment outcome. Research conducted

thus far has evaluated a variety of treatment approaches including nutritional counseling, medication, different types of individual treatment such as cognitive behavior therapy (CBT) or interpersonal therapy, as well as multifaceted specialized inpatient and outpatient settings. However, only a limited number of randomized control trials (RCTs), the gold standard in treatment research, have been undertaken to study and compare the effectiveness of different forms of treatment for AN in adults and findings have been mixed. In a review of the literature on RCTs designed specifically for AN between 1980 and 2011, Watson and Bulik (2013) found a total of 48 RCTs that studied different treatments. Twenty-nine of these RCTs were pharmacological trials, while only 19 looked at different psychological treatments. Of these, three studies examined maintenance therapies instead of acute treatment, eight focused on family based therapy (FBT) for adolescents with AN, four focused on FBT for both adolescents and young adults, two looked at other therapies for both adolescents and adults, and only two studies focused on the treatment of adults only. Of the 19 studies that focused on psychological treatments, only two adolescent studies had 100 participants or more at start of trial. Two other review articles have since been published (Hay, 2013; Zipfel Giel, Bulik, Hay, & Schmidt, 2015), which identified seven additional RCTs with adults participants. However, research on AN treatment remains limited and continues to face a number of challenges.

The issues associated with AN treatment, namely treatment non-adherence and attrition, also have a negative impact on RCTs. Notably, the recruitment and engagement of individuals affected by AN in treatment studies has consistently been found to be

problematic (Guarda, 2008, Wilson, Grilo, & Vitousek, 2007). For example, in one of the earliest RCTs to study AN treatment for adults, Channon, de Silva, Hemsley, and Perkins (1989) only succeeded in recruiting a total of 24 participants, reduced to 21 after attrition. This has led to significant adverse effects on research; small sample sizes are often exacerbated by high attrition rates during treatment (Watson & Bulik, 2013) diminishing the results of findings. For example, in another early RCT, Treasure et al. (1995) sought to assess the effectiveness of cognitive analytical therapy (CAT) and educational behaviour therapy (EBT) for AN. However, the results were uninterpretable due to small sample size compounded by high attrition. Likewise, Serfaty, Turkington, Heap, Ledsham, and Jolley (1999) failed to successfully assess the effectiveness of cognitive therapy (CT) in an outpatient treatment for AN in adults with dietary counselling as a control group due to a 100% attrition rate from this latter group by the third month of trial. In a review article, Fairburn (2005) suggested that further comparison of different forms of AN treatment was barely possible until the issues of sampling and attrition have been addressed. In their recent overview of AN treatment, Zipfel et al. (2015) were more optimistic and highlighted a few new studies that focused on particular ED subgroups and contained larger sample sizes. However, the authors noted that considerable research was still needed in the field.

Certain design limitations and variances also present particular challenges to the study of AN treatment and impede the successful comparison of different research findings. For example, participation criteria and duration of treatment intervention varies from study to study (Wilson et al., 2007) and researchers in the field have yet to agree

upon a common definition of successful AN remission and positive outcome (Guarda, 2008), which can vary from measuring gains in weight, percent of ideal body weight, and/or a combination of weight and presentation of eating disorder symptomatology. Moreover, studies often employ different instruments to assess treatment outcome, including body mass index (BMI) which calculates an individual's ideal body weight by dividing their weight in kilograms by the square of their height in meters (Keys, Fidanza, Karvonen, Kimura, & Taylor, 1972); scores in the Eating Disorder Examination (EDE) and its self-report questionnaire variant (EDE-Q), which assesses eating disorder psychopathology and behaviour over the previous 28 days (Cooper & Fairburn, 1987; Fairburn & Cooper, 1993; Fairburn & Beglin, 1994); or the Morgan-Russell Assessment, which evaluates the clinical state over the previous 6 months using 5 clinician-rated subscales and gives both an average outcome score and a general outcome category, the latter based on weight and menstruation, and resulting in three outcome options; good, intermediate, and poor (Morgan & Hayward, 1988).

Additionally, the core rationale of RCTs involves the inclusion of control groups or alternative treatment models, however, this approach seems problematic in the AN literature. As Watson and Bulik, (2013) highlight, including a control group for proper research design poses ethical concerns inherent to assigning severely ill patients to a no-treatment control group or assigning them to a treatment that might not be of their preference. Groups assigned to a no-treatment control protocol may also be affected by attrition as they seek treatment elsewhere (Crisp et al, 1991). It is of note that no-

treatment control groups are absent in randomized controlled studies of psychological treatments for this population published since 1991.

To date, cognitive behavioural therapy (CBT) has been the focus of more studies than any other psychological approach in the treatment of adults affected by AN (Wilson, et al., 2007). However, as previously discussed regarding RCTs of AN treatment, dropout was an issue in the majority of studies to assess CBT over the past two decades, with attrition rates ranging from 30% to 65% and full sustained recovery, defined as BMI restored to within a normal range and a significant decrease in AN symptomatology, varying from 30% to as little as 8% of participants (Ball & Mitchell, 2004; Byrne, Fursland, Allen, & Watson, 2011; McIntosh et al., 2005; Zipfel et al., 2014). While one RCT on CBT reported a higher rate of retention at 87% (Touyz et al., 2013), only 17.4% of all the participants from this study attained full recovery by 12-month follow-up. Overall, findings from RCTs on CBT do not suggest that it is significantly superior to other treatment approaches. For example, McIntosh et al. (2005) measured the effectiveness of CBT therapy compared to interpersonal therapy with a nonspecific approach as an active control condition in 56 adolescent and adult patients with AN. However, contrary to the authors' main hypothesis, participants who completed the nonspecific treatment group showed the most significant improvement in symptomatology, with the interpersonal therapy group showing the least improvement.

Studies that have assessed treatment approaches other than CBT for adults with AN have also generally reported poor outcomes and high rates of attrition. For example, Dare, Eisler, Russell, Treasure, and Dodge (2001) recruited 82 adult participants with AN

symptoms to compare three different therapy approaches (outpatient Family Therapy, Focal Psychodynamic Psychotherapy, Cognitive-Analytic Therapy, and a Treatment-As-Usual (TAU) control group), but reported that only 65.8% of individuals (54 participants) completed treatment. Further, only 32% of 21 individuals across all three psychotherapies (8 in Family Therapy, 7 in Focal Psychodynamic Psychotherapy, and 6 in Cognitive-Analytic Therapy) no longer met criteria for AN at one-year follow-up, while this was the case for only 5% of the TAU group (one participant). Two recent studies have attempted to compare the efficacy of the Maudsley Model of Anorexia Nervosa Treatment for Adults (MANTRA) and that of a specialist supportive clinical management treatment (SSCM; Schmidt et al., 2012; Schmidt et al., 2015). High rates of attrition were reported in the 2012 RCT (26% of the MANTRA group and 37% of the SSCM group) while the 2015 RCT reported better retention. However, both studies reported that neither therapy approach provided significantly superior results and full symptomatic recovery was only achieved in a minority of participants.

While Family Based Therapy (FBT) is the leading evidence based approach for the treatment of AN in adolescents (le Grange & Lock, 2005; Winston, Paul, & Juanola-Borrat, 2011; Zipfel et al., 2015), part of the relative success of this method may lie in the fact that it requires parents to take control over the adolescent's problem behaviours (Guarda, 2008; Wilson et al., 2007). Lower reported treatment attrition rates and better outcome from this population could partially be a result of parents possessing the authority to compel their child to attend sessions and complete treatment, which could act in part to circumvent the patient's own drive to refuse treatment and override their lack of

motivation (Guarda, 2008; Halmi, 2008; Wilson et al., 2007). Statistical data do not suggest that FBT is a more effective therapeutic approach than other treatment types for adults, individuals with an older age at onset, or longer history of AN (Fairburn, 2005; Whitney et al., 2012; Wilson et al., 2007).

Elsewhere, statistics are inconclusive on whether or not inpatient or outpatient treatment is more effective. In a review of the literature investigating the strengths and weaknesses of inpatient versus outpatient treatment of AN, Meads, Golds, and Burls (2001) concluded that too few studies have been completed on the topic and the limited number of studies available suffer from underpowered analyses and bias, making it impossible to come to any definitive conclusions on the subject. No RCTs have conducted a comparison of inpatient versus outpatient treatment for adults with AN, though two RCTs studied the topic in adolescent populations (Crisp et al., 1991; Herpertz-Dahlmann et al., 2014). However, neither of these studies found one treatment setting to be superior to the other and both studies suffered from relatively high attrition rates and, overall, a significant percentage of participants still scored a poor outcome at follow-up, regardless of treatment setting.

Further, pharmacological treatments have not proven to have a clear and significant effect on weight gain or on reduction of eating disorder symptomatology in individuals with AN. For example, fluoxatine does not appear to decrease symptoms of obsessive-compulsiveness nor assist in weight restoration (Watson & Bulik, 2013) and antipsychotics have not been found to have an impact on AN symptomatology (Kishi, Kafantaris, Sunday, Sheridan, & Correl, 2012; Lebow, Sim, Erwin, & Murad, 2013). This

has led the medical field to conclude that antipsychotics should not be used in the treatment of AN until more compelling data is available (Zipfel et al., 2015).

In summary, treatment studies on AN have been characterized by relatively poor outcomes, with high rates of treatment refusal, attrition, and relapse. A significant proportion of patients with AN end up developing a chronic form of the disorder. Thus, there is a clear need to develop more effective therapeutic approaches that will better engage individuals with AN in treatment and improve treatment outcomes.

Motivation to Change in Anorexia Nervosa

Anorexia nervosa (AN) has a reputation for being "difficult to treat" among clinicians and individuals with this disorder are often viewed as lacking motivation to change (Vitousek et al., 1998). Further, in the eating-disorder literature, a discrepancy between the individual's readiness for change and the behavioral requirements of various treatments have been associated with a higher likelihood noncompliance, attrition, and relapse (Geller, Cockell, & Drab, 2001). A key element responsible for the challenges faced in engaging and successfully treating individuals with AN may lie in the disorder's largely egosyntonic nature (Guarda, 2008; Tan, Hope, & Stewart, 2003; Vitousek et al., 1998). Tan et al. (2003) describe this phenomenon as a state in which many individuals with AN perceive the disorder to be a core part of their identity. Any steps taken that are aimed at increasing weight or reducing weight control behaviors in individuals with AN can therefore become viewed as a threat to the self-concept and an attack on their identity (Espindola & Blay, 2009, Virousek et al., 1998). In a qualitative study of patients' perceptions of AN, Nordbø, Espeset, Gulliksen, Skårderud, and Holte (2006) reported

that, for many individuals with the disorder, the associated behavioural symptoms are seen as psychologically purposeful, detailing that it provides self-confidence, mental strength, and a sense of security and structure. Participants in another qualitative study articulated the belief that AN provides them with a sense of success when they might feel lacking in other areas of their life such as school, work, or social settings (Nordbø et al., 2012). It has also been theorized that AN can act as a useful strategy for many individuals in order to avoid undesirable emotions or the stressors of interpersonal relations (Arkell & Robinson, 2008).

The harmful behaviour of individuals with AN (e.g., food restriction, abuse of diuretics, over exercising) are often interpreted by them as positively supporting their needs, sense of safety, and goals to be their ideal self, with weight control a positive, desirable end (Serpell, Treasure, Teasdale, & Sullivan, 1999), and they can struggle to conceive life without the disorder (Espindola & Blay, 2009). For instance, individuals with AN tend to deny the presence of problem behaviours, consequences of food restriction, and severity of weight loss (Nordbø et al., 2012; Vitousek et al., 1998; Vitousek, Daly, & Heiser, 1991). Studies also suggest that relative to other eating disorders, individuals with AN may be the least likely to seek out treatment (Abbate-Daga, Amianto, Delsedime, De-Bacco, & Fassino, 2013) and it is possible that close to 50% of individuals living with AN go undetected (Keski-Rahkonen et al., 2007). Those who pursue treatment are unlikely to do so entirely of their own volition, but rather at the request of concerned friends or family members (Vitousek et al., 1998). In addition, the egosyntonic features of AN often have negative effects on interactions between

healthcare providers and individuals affected by the disorder. For example, clinicians have reported that AN patients frequently have difficulties trusting their care providers and difficulty being willing to openly share power in these relationships (Warren, Crowley, Olivardia, & Schoen, 2009). Individuals with AN often present as socially inhibited and guarded, which may also impact their relationships with the therapists (Carter, Kelly, & Norwood, 2012). In addition, qualitative research indicates that adult AN patients in various settings report a preference for clinical interactions that combine collaboration, expert knowledge, patience, acceptance of the client, and challenge to their behaviours - a delicate balance that is often difficult for clinicians to achieve and maintain (Gulliksen, Espeset, Nordbø, Skårderud, Geller, Holte, 2012). Consequently, healthcare workers often report feeling frustrated and burnt out working with this population (Golan, Yaroslavski, & Stein, 2009; Warren et al., 2009).

Ultimately, the egosyntoncity that AN patients often experience can be associated with a lack of motivation to engage in therapeutic work, as well as strong ambivalence or outright refusal to undertake the necessary steps to create lasting change (Starzomska, 2009). High levels of ambivalence towards treatment and recovery have been consistently reported in individuals with AN (Colton & Pistrang, 2004; Marzola, Abbate-Daga, Gramaglia, Amianto, & Fassino, 2015; Reid, Burr, Williams, & Hammersely, 2008; Serpell et al., 1999; Williams & Reid, 2010) and have been shown to impact motivation for change and treatment outcome, resulting in a consistently poor prognosis (Carter, Mercer-Lynn, et al., 2012; Carter & Kelly, 2015; Vitousek et al., 1998).

Wade, Frayne, Edwards, Robertson, and Gilchrist (2009) have posited that motivation is correlated with symptom changes in individuals with AN. On this premise, the authors stated that an important course of study in AN treatment research should include the examination of ways in which motivation to change can be enhanced in individuals affected by the disorder. Supporting this argument, Geller, Brown, Zaitsoff, Goodrich, & Hastings (2003) report that eating-disorder patients are more amenable to treatments that take the individual's readiness for change into account and consider these types of treatment to be more effective. Similarly, in a 2008 study, Bewell and Carter suggested that readiness to change "is the mechanism by which eating disorder symptomatology predicts success in a treatment program." A recent RCT supports the association between patient motivation and outcome in individuals with an ED (Carter & Kelly, 2015). In this study, the authors reported that a quicker decrease in global eating disorder pathology was correlated to higher baseline levels of autonomous motivation, defined as motivation initiated from within the self and theorized to encourage more long-lasting change. In addition, the authors did not find an association between controlled motivation and outcome, defined as motivation occurring due to external forces and theorized to negatively interact with change.

Given the high level of ambivalence and lack of motivation towards treatment reported in individuals with AN and the associated difficulties in engaging and retaining patients in the treatment process, it is crucial that researchers identify novel ways to enhance motivation for treatment in this population. Further, there is a need to identify methods to promote the development of better working relationships with care providers

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in order to successfully engage patients with AN in the treatment process and improve treatment outcomes.

Working Alliance and Anorexia Nervosa

The working alliance may be a factor that contributes to the relatively poor treatment outcomes and high rates of attrition found in individuals affected by AN. As previously discussed, the working alliance has been identified as one of the strongest predictors of treatment outcome across a diverse range of disorders (Horvath et al., 2011; Martin et al., 2000) and low levels of working alliance have been correlated to treatment attrition (Sharf et al., 2010). An extrapolation of the results observed in other diagnoses would therefore suggest that a strong working relationship should likewise be associated with better treatment outcomes in the AN population. It has also been noted that in the treatment of AN, individuals with the disorder and clinicians working in the field often place significant importance on the working alliance (Brown, 2015; Graves et al., 2017). For example, in a qualitative study of eight patients with AN, Sly, et al. (2014) reported that developing a positive working relationship with their care provider was identified as key to the treatment process for most participants, and that having a negative working relationship was perceived by some to adversely impact their motivation for recovery. The authors also suggested that the importance of the working alliance could potentially be observed as early as the first session. Thus, having a clear understanding of the relationship between working alliance, motivation, treatment compliance, and outcome in individuals with AN may potentially lead to the development of clinical strategies that target this relationship to maximize treatment outcome.

However, perhaps surprisingly, very little research has been undertaken to study the working alliance and its relationship to motivation and treatment outcome in individuals with AN to date, and therefore the role of the working alliance in the treatment of eating disorders remains poorly understood. In a recent literature review on the working alliance and eating disorders, Zaitsoff et al. (2015) found that of the 19 relevant studies they identified, only eight assessed the working alliance specifically in the treatment of individuals with AN. Of these eight studies, five focused on adolescents and the remaining three assessed an adult population. The authors stressed the importance of conducting additional research on the topic as the role of the working alliance in the treatment of eating disorders is not yet clearly defined and researchers have yet to identify an effective course of treatment for AN in adults affected by the disorder. Likewise, Brown (2015) underlined the limited amount of research so far undertaken on the working alliance in the treatment of AN, identifying the subject as a relevant field of study especially in the case of adults affected by the disorder, and posited that a longitudinal research approach would be most effective for future research. In addition, the particular characteristics of individuals with AN that affect the development of a working alliance in the AN population have not yet been clearly identified. Thus, shedding further light on the relationship between working alliance, motivation to change, and treatment outcome in the adult AN population is a necessary research endeavour.

To date, research would suggest a positive correlation between working alliance and treatment outcome in AN in early and mid-adolescents. In a recent meta-analysis,

Graves et al. (2017) reviewed 20 articles that reported measures of the working alliance in eating disorder treatment, nine of which analysed AN populations. The authors reported that the working alliance was significantly associated with a more positive treatment outcome in younger adolescents and in those treated for AN in contrast to other EDs. However, this was not found to be significant in older adolescents and adults with an ED. At present, six studies have examined the relationship between working alliance and either premature treatment termination or treatment outcome in adults with AN, one of which also assessed motivation. In the first, Gallop, Kennedy, and Stern (1994) found that patients who completed an inpatient treatment program (N=21) reported a better working alliance at week three of treatment than those who terminated treatment prematurely (N=10). In addition, they reported that the working alliance continued to improve during the course of treatment for those who completed the clinical program. While the results of this study must be viewed with caution due to the relatively small sample size (N=31), the authors suggested that premature discharge could be linked to a poor working alliance.

In the second study, Sly et al. (2013) examined the roles of the working alliance and motivation to change in predicting premature treatment termination in adults with AN participating in a specialized hospital inpatient treatment program (N=90). The authors found that the working alliance, as measured using the Working Alliance Inventory (WAI) during the first seven days of treatment reliably predicted patient completion of treatment. In their study, participants who had higher scores on the WAI were subsequently more likely to successfully complete treatment compared to those who

prematurely terminated treatment. Sly et al. (2013) reported that levels of motivation did not differ significantly between treatment completers and non-completers. In addition, no correlation was found between measures of motivation taken at admission or at week four and treatment outcome. These findings seem to be in contrast to those reported in another 2013 study that assessed the relationship between motivation and working alliance in individuals with AN. Mander, Teufel, Keifenheim, Zipfel, and Giel (2013) found that being in the contemplation stage of change was significantly correlated with higher ratings of working alliance on all scales later on in treatment whereas being in the pre-contemplation stage was significantly correlated to lower levels of working alliance. However, Sly et al. (2013) suggested that their results may have been affected by the chronic nature of their sample and the significantly low levels of motivation reported in almost all participants.

In the third study, Stiles-Shields et al. (2013) assessed the working alliance in two different treatment approaches for individuals with "enduring AN", defined by meeting AN criteria for at least seven years (N=63). The authors reported that early working alliance, measured during the second week of treatment, was a strong predictor of residual ED symptomatology at 12-month follow-up suggesting that a weak initial working alliance may predict an increased probability of relapse. It was also found that late measures of working alliance taken at the end of treatment significantly predicted changes in AN and depressive symptomatology as well as weight gain at end of treatment and 12-month follow-up more so than type of treatment. The authors hypothesised that their results may have been influenced by the chronic nature of the disorder in their

sample, which could have required greater time for benefits of the working alliance on outcome to develop.

In contrast, Brown, Mountford, and Waller (2013a; 2013b) have proposed that, while a good working alliance is necessary in the therapeutic process, a re-evaluation of assumptions pertaining to the significance of the working alliance in the treatment of AN should be reconsidered. The authors caution that therapists might be overestimating the influence of the working alliance in AN treatment to the detriment of other, more significant contributing factors such as changes in eating habits. Brown and colleagues (2013a) conducted a study of 65 adults and adolescents in outpatient CBT treatment of AN. The researchers reported that early weight gain predicted subsequent measures of working alliance, and that working alliance was not associated with weight gain at time of discharge or with the probability of early treatment termination. In fact, the authors report that, among treatment completers, higher working alliance scores predicted lower weight gain during treatment. In their publication, Brown et al. hypothesize that these results, contrasting with others in the literature, may be due to the differences in treatment settings and modalities (outpatient vs. inpatient, individual therapist vs. treatment teams). In their follow-up study, Brown, Mountford, and Waller (2014) found that in a survey of clinicians (N=100) who used CBT in the treatment of individuals with AN, adherence to treatment manuals and a focus on weight gain in the early stages of treatment was more predictive of a positive outcome than when attention was focused on the development of the working alliance. The authors remarked though that the self-report nature of their study may have introduced bias and had an impact on the accuracy of reporting by

clinicians and suggested that future studies in this area should use more direct data from AN patients.

Most recently, however, Jordan et al. (2017) assessed the working alliance using the Vanderbilt Psychotherapy Process Scale (VPPS) in an RCT with 56 AN patients and reported findings that suggest low levels of early patient alliance, when measured in sessions one through five, might be correlated to premature treatment termination in adults with AN. It is important to note, however, that this research used an observer-based instrument to assess working alliance, while the norm in the AN literature has so far been the use of client ratings.

In summary, the limited research presently available on the relationship between working alliance and treatment outcome in adults with AN has produced inconsistent results and we do not yet clearly understand what this relationship might resemble or entail. Further, no study has yet to examine the potential relationship between working alliance, motivation, and treatment outcome. Considering the high rates of ambivalence towards treatment, high rates of dropout, and generally pour outcomes reported in adults with AN, it is essential that research clarify the relationship between working alliance, motivation, and treatment outcome in order to develop better treatment approaches that will improve outcomes in adults affected by AN.

Rationale for the Current Study

To date, there have been only a handful of studies that have examined the working alliance in the treatment of adults who present with AN and its association with treatment outcome in this population. Additional research is required to better delineate

the relationship between the working alliance, treatment adherence, and treatment outcome in AN. The working alliance has, in general, been established as a strong predictor of treatment outcome across numerous mental health disorders and psychological treatment approaches, with early development of the working alliance particularly predictive of outcome (Horvath et al., 2011). However, AN is a disorder that is often referred to as treatment-resistant (Hay et al., 2012) with significant rates of treatment attrition (Watson & Bulik, 2013) and poor outcomes reported across studies (Steinhausen, 2002). In addition, the established features of AN, specifically its ego-syntonic nature as well as the high degree of ambivalence about recovery present in this population, could hinder the development of the working alliance during treatment. This has led some researchers to theorize that it may be more beneficial to focus on other factors in the treatment of AN, such as early gains in weight and motivation for treatment rather than working alliance (Brown et al., 2013b; Carter & Kelly, 2015).

However, research that has considered the role of the working alliance in the treatment of adolescents affected by AN has generally found a positive correlation between early working alliance and outcome (Graves et al., 2017) while investigations into working alliance and EDs in an adult population have produced contradictory findings (Zaitsoff et al., 2015; Brown, 2015). Some studies of adults with AN suggest that early gains in weight, not working alliance, are a stronger predictor of outcome, and that treatment should prioritize increasing food intake and weight at start of treatment rather than focusing on enhancing the working alliance (Brown et al., 2014). Other studies propose that early weight gain is not predictive of outcome after the fourth week

of treatment and that working alliance is a stronger predictor of outcome when measured during the first week of treatment (Sly et al., 2013). However, it is not clear whether methodological differences in studies, notably the time at which measures of the working alliance were taken and the perspective from which the working alliance was measured (client, therapist, or observer), might account for the discrepant findings between studies. In addition, while the low levels of motivation reported in individuals with AN have been consistently shown to predict a poorer treatment outcome (Carter, Mercer-Lynn, et al., 2012; Carter & Kelly, 2015; Vitousek et al., 1998), the relationship between motivation to change and working alliance in this population is poorly understood and, to date, no study has investigated this association. Thus, the present study seeks to add to the literature by examining the relationship between working alliance, motivation to change, and treatment outcome in adults with AN receiving treatment in a specialized inpatient/day-patient program.

Study Aims

The main purpose of the present study was to examine the association between working alliance, motivation to change, and treatment outcome in the treatment of AN through a secondary analysis of data collected in an inpatient/day-patient treatment program at the Toronto General Hospital between 2010 and 2014. In addition, the current study aims to better understand the factors that influence motivation to change by exploring its association with baseline measures of illness severity, AN subtype (i.e., binge/purge versus restricting types), and age.

Hypothesis 1: It was hypothesized that changes in levels of autonomous motivation for treatment, measured using the Autonomous subscale of the Autonomous and Controlled Motivation for Treatment Questionnaire (ACMTQ), would predict levels of working alliance between patients and treatment team, measured as WAI Total scores, at week four. Specifically, it was expected that increases in autonomous motivation for treatment at baseline would be positively associated with working alliance at week four. In contrast, changes in controlled motivation for treatment, measured using the Controlled subscale of the Autonomous and Controlled Motivation for Treatment Questionnaire (ACMTQ) would not act as predictors of working alliance at week four.

Hypothesis 2: The second hypothesis was that levels of baseline autonomous motivation for treatment, as measured by the Autonomous subscale of the ACMTQ, would predict outcome (i.e., increases in BMI, and decreases in scores on the EDE-Q from baseline to discharge from the treatment program). Baseline controlled motivation for treatment, as measures by the Controlled subscale of the ACMTQ, would not show this association.

Hypothesis 3: It was hypothesized that levels of working alliance between the patients and the treatment team, measured by the Working Alliance Inventory (WAI) during the fourth week of treatment, would positively predict treatment outcome (i.e., treatment completion; increases in BMI, and decreases in scores on the Eating Disorder Examination Questionnaire (EDE-Q), a measure of eating disorder symptoms, from baseline to discharge from the treatment program). In particular, it was expected that higher working alliance would be: a) positively associated with larger BMI increases

during the treatment period; and b) positively associated with greater reductions in eating disorder symptoms during the treatment period. In addition, it was hypothesized that higher working alliance (WAI) scores would predict treatment completion, defined as discharge that occurs after 16 weeks of treatment and with BMI and EDE-Q Global scores at non-clinical levels, while lower Total WAI scores would predict early treatment termination.

Finally, the current study also aimed to explore the associations between working alliance, early weight change in the first four weeks of treatment, and treatment outcome. However, given the conflicting nature of the research findings in this latter area, no definite hypotheses were made in this regard.

Method

Research Design

The current study made use of secondary data originally collected for program evaluation purposes at the Inpatient/Day Treatment Eating Disorders Program at the Toronto General Hospital between 2010 and 2014. The UHN Research Ethics Board approved this study.

Patients

Between 2010 and 2014, 108 patients agreed to take part in the research study, gave informed consent, and completed a baseline assessment. All patients had a BMI ≤ 17.5 at baseline and met the *Diagnostic and Statistical Manual of Mental Disorders*, *Fourth Edition, Text Revision* (DSM-IV-TR) criteria for Anorexia Nervosa (AN) when admitted to the program. This diagnosis was made by a psychiatrist or clinical

psychologist. See Tables 1 through 3 for demographic and clinical characteristics of the sample.

Out of the original 108 patients, 55 patients dropped out before the fourth week of treatment and were therefore unable to complete the Working Alliance Inventory (WAI), which was administered in week four. The remaining 53 patients were included in the present study. For a summary of changes in sample size, see Figure 1.

All 53 patients were females diagnosed with AN with a mean age of 30 years (range=18 to 63 years). They spent an average of 15.7 weeks in the treatment program, with a range of 5 to 25 weeks. The average baseline BMI was 15 kg/m^2, with a range of 11-17.4 kg/m^2, and the average BMI at discharge was 19.6 kg/m^2, with a range of 15-22.9 kg/m^2. Overall, 40 out of the 53 patients (75.5%) completed the sixteen-week treatment program at TGH; representing a rate of treatment completion that is higher than commonly found in the AN literature. However, when accounting for the initial 108 patients, the majority of which withdrew before measures of working alliance were taken at week four, the treatment completion rate drops to 37%. Regarding AN subtypes, 29 patients received a diagnosis of AN Bingeing and Purging subtype (AN-BP), with the remaining 24 patients receiving a diagnosis of AN, Restricting subtype (AN-R). Regarding relationship status, 12 patients (22.7%) reported being in a stable relationship at intake (10 married, 2 common-law), while the remaining 77.3% reported being single (37 patients), separated (2 patients), or divorced (1 participant). In terms of living situation, 24 patients (45.3%) reported living with their parents, 12 patients (22.6%) reported living with their spouse and/or children, 11 patients (20.8%) reported living

alone, 5 patients (9.4%) reported living with roommates or other family, while living

situation data was missing for one participant (1.9%). Regarding employment, 25 patients

(47.2%) reported being unemployed or students, with 26 patients (49.1%) reporting

various forms of employment and 2 responding "Not Applicable". In relation to ethnicity,

48 patients (90.5%) indicated a European/white cultural background, while 3 patients

indicated other ethnicities (East Indian, West Indian, and Oriental) and 2 other patients

had missing ethnical background data.

Treatment

The Toronto General Hospital program is a specialized hospital-based, intensive

treatment program for serious eating disorder cases with voluntary admission. The

program takes referrals from family doctors and all prospective patients are assessed by a

psychologist or psychiatrist before baseline. To be admitted into this program,

prospective patients are required to demonstrate an understanding of the need to

participate in treatment and acceptance of the program's norms (e.g., staff-supported

meals). The program is operated by an interdisciplinary team of psychiatrists,

psychologists, nurses, dietitians, social workers, and occupational therapists. The

program has space for up to 12 concurrent patients who participate in specialized

programming for 30-40 hours per week. The main goals include medical stabilization,

weight restoration (as needed), nutritional rehabilitation with staff-supported meals, and

the elimination of disordered behaviours such as binge eating, purging, and

disproportionate physical exercise. The main treatment orientation is cognitive-

behavioural, although patients participate in several groups addressing interpersonal

relationships, sexuality, expressive arts, anxiety management, and dialectical behaviour therapy. When patients reach a BMI of approximately 18.5 and are medically stable, they are transferred to day patient status and continue to attend the program Monday to Friday 9-5. Patients are discharged from the program, and begin follow-up care, when they reach a BMI of 20, with a combined average stay of 16 weeks in the inpatient and day hospital components.

Procedure

During a pre-admission orientation session, a member of the clinical team asked patients if they wished to be contacted by the research team. If so, patients in the current study were assessed using the diagnostic items of the Eating Disorder Examination (EDE) interview (APA, 2000; Fairburn & Cooper, 1993) and met the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR) criteria for Anorexia Nervosa (AN) when admitted to the program. The diagnostic items of the EDE interview (Fairburn & Cooper, 1993) were administered by a trained interviewer. On commencing the treatment program, patients completed the Eating Disorder Examination Questionnaire (EDE-Q) and the Brief Symptom Inventory (BSI). Objective weight and height were measured at baseline, at week four, and at discharge. Delivery of the treatment program was conducted as usual. The Working Alliance Inventory (WAI) was administered after four weeks of treatment. At time of discharge, the EDE-Q was re-administered.

Measures

Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 1994). The Eating Disorder Examination Questionnaire (EDE-Q) is based on the EDE interview (Fairburn, & Beglin, 1993), which is considered to be the gold standard eating disorder assessment measure. Similar to the EDE, the EDE-Q assess eating disorder psychopathology, including key behavioural problems, severity of eating pathology, and associated disturbances over the prior 28 days. The EDE-Q is comprised of 36 items and four subscales; Shape Concern, Weight Concern, Eating Concern, and Dietary Restraint. Items found in the Shape Concern subscale include: "Have you had a definite desire to have a totally flat stomach?" and "How dissatisfied have you been with your shape?'; the Eating Concern subscale includes: "Have you had a definite fear of losing control over eating?"; the Weight Concern subscale contains items such as: "Have you had a definite fear that you might gain weight?" and "Have you had a strong desire to lose weight?"; and the Dietary Restraint subscale includes: "Have you had a definite desire to have an empty stomach with the aim of influencing your shape or weight?" Frequency of disordered behaviors is measured by number of days on which symptoms occur and the number of individual episodes. The four subscales load into a Global score ranging from 0 (low) to 6 (high), which is the average of the four subscales, with a clinical cut-off point of 4. Higher scores reflect greater pathology. The test-retest reliability and validity of the EDE-Q have been well-established; internal consistency of the four subscales have been found to yield Cronbach alpha values ranging from .81 to .92 and their test-retest reliability has been found to yield Person r values ranging from .81 to .94 (Luce & Crowther, 1999). Internal consistency was high for the sample in the present study,

yielding Cronbach's Alpha values ranging from .83 to .90 for each of the EDE-Q subscales at time of admission.

Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983). The Brief Symptom Inventory (BSI) is a shortened form of the revised version of the Symptom Checklist-90 (SCL-90-R) and is a self-report symptom scale that assess levels of psychological distress in several domains over the previous week. Fifty-three items are rated on a 5-point likert scale to reflect different levels of distress from 0 (not at all distressed) to 4 (extremely distressed). The BSI produces nine primary psychological symptom dimensions: Somatization, Obsessive-Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobia Anxiety, Paranoid Ideation, and Psychosis. Additionally, a global score can be calculated from the raw scores of the 53 items - the Global Severity Index (GSI), a weighted frequency score obtained from the sum of the rates the individual assigns each item. The nine subscales of BSI have demonstrated good internal consistency with Cronbach's coefficient alpha ranging from .71 (psychoticism) to .85 (depression; Derogatis & Melisaratos, 1983). Strong test-retest reliability has been established with a range of .68 to .91 (Derogatis & Melisaratos, 1983). In the present study, internal consistency for the sample was high, yielding Cronbach's Alphas ranging from .70 to .89 at intake.

Working Alliance Inventory, client version (WAI; Horvath & Greenberg, 1989). The Working Alliance Inventory, client version (WAI) was designed to measure the quality of the working alliance between therapist and client as conceptualized by Bordin's (1979) tripartite model including agreement on Goals and Tasks, and the

strength of the therapeutic Bond. The WAI is a self-report questionnaire measure and consists of 12 statements regarding the client's perception of the therapeutic relationship (e.g., "[the therapist] *and I understand each other*", "[the therapist] *perceived accurately what my goals were*"). The 12 items are divided equally between three subscales: Goals, Tasks, and Bond. Answers are rated on a 5-point Likert scale from 1 (never) to 5 (always). The space in the sentence where the name of the therapist would appear is intentionally left blank for the client to complete with their own therapist's name. In the data collected for the present research project, this space was completed with "*The treatment team*". Each WAI subscale is scored individually and scores can range from 4 to 20. Scores are summed to attain a total score ranging from 12 to 60. Higher scores indicate a more positive rating of the working alliance. The WAI-C has been found to have strong internal consistency with a Cronbach's alpha coefficient of .93 (Tichenor & Hill, 1989), and an inter-rater reliability ranging between .85 and .88 for all subscales (Horvath & Greenberg, 1989). Internal consistency was high for the sample in the present study, yielding Cronbach's Alphas ranging from .84 to .85 at week four.

Autonomous and Controlled Motivation for Treatment Questionnaire (ACMTQ; Zuroff et al., 2007). The Autonomous and Controlled Motivation for Treatment Questionnaire (ACMTQ) is a self-report questionnaire adapted from the Treatment Self-Regulation Questionnaire (TSRQ; Williams, Freedman, & Deci, 1998). For the present study, the word "depression" was replaced with "eating disorder". The questionnaire is comprised of two six-item subscales: autonomous motivation for treatment (AMTQ) and controlled motivation for treatment (CMTQ). The AMTQ

subscale measures motivation initiated from within the self, while the CMTQ subscale measures motivation occurring due to external forces and pressures. Items are rated from 1 (strongly disagree) to 7 (strongly agree) and address a variety of reasons why patients may choose to seek treatment. Sample items for the AMTQ subscale include: "Managing my eating disorder allows me to participate in other important aspects of my life" and "I have carefully thought about treatment for my eating disorder and I believe it is the most important thing I can do to get better", while items for the CMTQ subscale include: "I would be ashamed of myself if I didn't" and "Other people would be upset with me if I didn't". Strong internal consistency has been reported with a Crobach's alpha coefficient of .83 for the AMTQ subscale and .77 for the CMTQ subscale (Carter & Kelly, 2015). Internal consistency was high for the sample in the present study, yielding Cronbach's coefficient alphas of .86 for AMTQ and .74 for CMTQ at baseline.

Data Analysis

IBM SPSS software was used for all data analyses and significance was determined at $\alpha = .05$. The database was first inspected for missing or incorrect data using visual scanning and preliminary descriptive reports. Independent samples *t*-tests were conducted to examine baseline differences between the sample used for further analyses in the current study and patients whose data were excluded due to attrition before week 4 when measures of working alliance were administered. The two groups were compared in demographic and clinical variables including age, and duration of illness, as well as baseline variables including BMI and scores in the BSI, EDEQ, and ACMTQ. To compare the two groups in their proportions of AN subtypes, a Chi-Square

analysis of independence was conducted. Next, descriptive statistics were calculated for the variables measured at each time point (baseline, 4 weeks and post-treatment). Paired sample *t*-tests were used to examine differences in these mean score changes over time and Pearson correlations between all the main study variables. Independent samples *t*-tests were used to examine differences between AN subtypes in relevant variables including baseline BMI and scores in the BSI, EDEQ, and ACMTQ; BMI and WAI scores at week four; discharge BMI; and changes in BMI from baseline to week four, and from baseline to discharge. Post hoc power analyses were conducted to evaluate the probabilities of capturing various effect sizes with the given sample.

To examine Hypothesis 1, hierarchical multiple regressions were conducted to determine whether changes in AMTQ and CMTQ scores from baseline to week four would act as significant predictors of working alliance measured at week four, after controlling for the effects of early weight change. Week four Total WAI score was entered as the criterion, with early weight gain entered as a covariate in step 1, and the difference between AMTQ and CMTQ scores from baseline to week four as the predictors (in two separate models) were entered in step 2. Early changes in motivation were selected as the predictor variable since previous research has shown that changes in motivation during the first four weeks of treatment were a better predictor of outcome than baseline levels of motivation (Carter et al., 2012). Early weight change was selected as co-variate to control for the psychological effects of weight gain. Due to missing values at different time points in total among these variables, the number of cases available for these regression analyses was 51.

Next, to examine Hypothesis 2, hierarchical multiple regressions were conducted to determine whether baseline AMTQ and CMTQ scores would predict changes in BMI and EDE-Q Global scores from baseline to discharge. To control for the possible effects of AN subtype, this variable was entered as a covariate on step one; this variable was selected as a covariate in all regression analyses with outcome markers as criteria because AN subtypes have been shown to have differential outcomes in the literature. Of note, EDE-Q Global scores at discharge were only obtained for 36 patients; therefore, this analysis and subsequent regression analyses that included this variable were conducted using only these 36 entries. Similar post hoc analyses were also conducted with baseline-to-week-four changes in AMTQ and CMTQ scores as predictor variables.

Then, to examine Hypothesis 3, hierarchical multiple regressions were conducted to determine whether Total WAI scores at week four would act as significant predictors of behavioural and symptomatic change during treatment, calculated as change in BMI and EDE-Q Global scores from baseline to discharge. To control for the possible effects of AN subtype, this variable was entered as a covariate in step one. The predictor was entered in step two, with pre-to-post treatment change in BMI and EDE-Q Global scores entered as the criteria. Discharge EDE-Q Global scores were available for 36 patients. A univariate logistic regression was conducted to determine whether working alliance measured at week four would act as a predictor of treatment completion. AN subtype was entered as a covariate on step one and week four WAI Total score was entered as a predictor on step two, using treatment completion as the criterion.

In addition, hierarchical multiple regressions were also conducted to determine whether the change in baseline-to-week-four BMI would act as a significant predictor of behavioural and symptomatic change during treatment, calculated as change scores in BMI and Global EDE-Q from baseline to discharge. To control for the possible effects of AN subtype, this variable was entered as a covariate on step one. The predictor variable was entered in step two, with pre-to-post treatment change in BMI and EDE-Q Global scores entered as the criteria. Discharge EDE-Q Global scores were available for 36 patients. A univariate logistic regression was conducted to determine whether early weight change would act as a predictor of treatment completion. AN subtype was entered as a covariate on step one and weight change from baseline to week four was entered as a predictor on step two, using treatment completion as the criterion.

Additional analyses were conducted to examine potential baseline predictors of the variables of interest. Separate hierarchical multiple regression analyses were conducted to identify significant baseline predictors of AMTQ and CMTQ scores at week four. The baseline measure of each criterion variable was entered in step 1 to control for their effects. In both cases, early weight gain (baseline to week four) was also entered as a covariate to control for the possible psychological effects of weight change. The variables examined as potential predictors were entered in step two; these included baseline BMI, AN subtype, duration of illness (in years), age, baseline EDE-Q Global scores, and baseline BSI Total scores.

A hierarchical multiple regression analysis was also conducted to identify significant baseline predictors of Total WAI scores at week four. Early weight gain

(baseline to week four) was entered as a covariate in step 1 to control for its psychological effects. The variables considered as potential predictors were entered in step two; these included baseline BMI, AN subtype, duration of illness (in years), age, baseline EDE-Q Global scores, and baseline BSI Total scores.

Results

Baseline Descriptives and Clinical Characteristics

At baseline, the sample had an average BMI below the minimum required for AN diagnosis ($M = 15$, $SD = 1.3$), an increased average BMI at week four ($M = 16$, $SD = 1.4$), and an average BMI above the clinical cut-off of 18.5 at discharge ($M = 19.7$, $SD = 1.6$). A paired-sample *t*-test indicated that, on average, the sample experienced an improvement throughout the treatment, showing a statistically significant increase in BMI from baseline to week four, $t(52)=-8.394$, $p<.001$, representing a moderate-to-large effect size and from baseline to discharge, $t(52)=-20.052$, $p<.001$, representing a large effect size. At baseline, the sample presented an average EDE-Q Global score above the clinical cut-off ($M = 4.4$, $SD = 1.5$), which decreased below the cut-off by discharge among the 36 (67.9%) patients whose EDE-Q data was collected at the end of treatment ($M = 2.9$, $SD = 1.5$). A paired-samples t-test revealed that this change in EDE-Q Global scores was statistically significant, $t(35)=7.052$, $p<.001$, representing a large effect size. At baseline, the sample presented a moderate mean BSI Global score ($M = 2.2$, $SD = .8$) indicating that, on average, the patients started their treatment experiencing moderate levels of psychological distress. Regarding working alliance, at week four, the sample reported moderate mean WAI total scores ($M = 38.7$, $SD = 10.2$), indicating that patients

reported experiencing only moderate levels of working alliance with the treatment team. At baseline, the sample reported relatively high mean autonomous motivation scores on the ACMTQ ($M = 36.7$, $SD = 6.1$), with no significant change at week four ($M = 36.3$, $SD = 5.7$) among the 53 patients who remained in the program for at least 4 weeks, and a moderate mean score on the controlled motivation for change scale of the ACMTQ ($M = 31.3$, $SD = 7.2$), with no significant change at week four ($M = 31.9$, $SD = 6.6$). This indicates that the sample reported high levels of controlled motivation on average during the first 4 weeks of treatment. More importantly, it indicates that the sample reported an unexpectedly high level of autonomous motivation for this population during the same period. For a summary of these results, see Table 4.

Independent samples t-tests revealed no significant differences between the analyzed group (N=53) and the individuals whose data were not included in the analysis due to attrition (N=55) in baseline and demographic variables. Furthermore, the effect sizes for these differences were small. For a summary of these results, see Table 5. Similarly, a Chi-Square analysis of independence found no association between early attrition and AN subtype ($X^2(2)=1.595$, $p=.45$).

Correlations Between Study Variables

Pearson correlations between the study variables revealed several statistically significant correlations. BMI at week four was positively correlated with AMTQ scores at baseline ($r=.290$, $p<.05$) and with the change in AMTQ scores from baseline to week four ($r=.289$, $p<.05$), suggesting that patients who reported higher autonomous motivation for treatment at baseline and patients who reported larger gains in autonomous

motivation during the first four weeks of treatment had a higher BMI at week four. Change in BMI from baseline to week four was positively correlated with AMTQ scores at baseline (r=.316, p<.05) and at week four (r=.300, p<.05) suggesting that individuals who reported higher autonomous motivation at start of treatment and those who reported higher autonomous motivation at week four showed a higher BMI increase in the first four weeks of treatment. Total WAI scores at week four were positively correlated with AMTQ scores at baseline (r=.373, p<.01), AMTQ scores at week four (r=.715, p<.001), and with the change in AMTQ scores from baseline to week four (r=-.407, p<.001) suggesting that those who reported higher autonomous motivation at start of treatment and at week four, as well as those who reported a larger increase in autonomous motivation during the first four weeks of treatment, reported a higher degree of working alliance at week four. Total WAI scores at week four were negatively correlated with BSI Global scores at baseline (r=-.377, p<.01), EDE-Q Global scores at baseline (r=-.397, p<.01), and EDE-Q Global scores at discharge (r=-.485, p<.01) suggesting that patients who presented as more highly distressed and those who reported more severe eating disorder symptomatology at discharge, reported lower levels of working alliance with the treatment team at week four. BSI Global scores at baseline were positively correlated with EDE-Q Global scores at baseline (r=.828, p<.001) and at discharge (r=.764, p<.001) suggesting that patients who were more highly distressed at the start of treatment also reported more severe eating disorder symptomatology both at baseline and at discharge. Finally, age was negatively correlated with discharge EDE-Q Global scores (r=-.472

p<.01) suggesting that younger patients presented more severe eating disorder symptomatology at discharge.

Pearson correlations between AMTQ and CMTQ at baseline and at week four were calculated. This analysis revealed that the two variables were not correlated at either time, providing evidence that these scores represent measures of two different constructs.

Did Motivation for Treatment Predict Working Alliance?

The first goal of the current study was to examine the association between motivation for treatment and working alliance. Hypothesis 1 stated that changes in levels of autonomous motivation for treatment from baseline to week four, measured by the Autonomous subscale of the ACMTQ would predict level of working alliance at week four, as measured by the WAI, but that early changes in controlled motivation would not. This hypothesis was investigated using two multiple regression analyses with WAI Total scores at week four as the dependent variable, either changes in AMTQ or CMTQ scores from baseline to week four as the predictor variables, and changes in BMI from baseline to week four entered as the covariate in the first step. Results of these analyses indicated that, after controlling for the effects of early weight gain, baseline-to-week-four increases in AMTQ scores were a significant predictor of Total WAI scores at week four, $b = -.820$, $t = -3.101$, $p<.01$. The prediction model was significant ($F(2,48)=7.32$, $p<.01$) with an R^2 of .234, meaning that 23.4% of the variability in working alliance at week four was explained by changes in autonomous motivation from baseline to week four. This means that greater changes in autonomous motivation for treatment was associated with a better working alliance during the fourth week of treatment. In contrast, baseline-to-week-four

changes in CMTQ did not represent significant predictor of Total WAI scores in week

four, b = -.38, t = -1.472. Details of these results can be found in Table 6.

Did Baseline Motivation for Treatment Predict Treatment Outcome?

Due to the high levels of ambivalence toward treatment and recovery consistently

reported in individuals with AN (Colton & Pistrang, 2004; Marzola et al., 2015; Reid et

al., 2008; Serpell et al., 1999; Williams & Reid, 2010), the present study sought to

examine whether autonomous or controlled motivation to change were associated with

treatment outcome. Hypothesis 2 stated that baseline levels of autonomous motivation for

treatment would be associated with a better treatment outcome whereas controlled

motivation would not. This hypothesis was investigated using two multiple regression

analyses with changes in BMI and EDE-Q Global scores from baseline to discharge as

the dependent variables. The results of these analyses indicated that, after controlling for

the effect of AN Subtype, baseline AMTQ scores were not a significant predictor of

change in BMI from baseline to discharge, nor of change in EDE-Q Global scores from

baseline to discharge. In addition, baseline CMTQ scores were not a significant predictor

of change in BMI from baseline to discharge, nor of change in EDE-Q Global scores

from baseline to discharge. Further, post hoc analyses indicated that baseline-to-week-

four changes in AMTQ were not a significant predictor of change in BMI from baseline

to discharge, nor of change in EDE-Q Global scores from baseline to discharge. Finally,

baseline-to-week-four changes in CMTQ scores were not a significant predictor of

change in BMI from baseline to discharge, nor of change in EDE-Q Global scores from

baseline to discharge. This suggests that neither autonomous or controlled motivation for

treatment at baseline, nor changes in these variables over the first four weeks of treatment, were predictive of changes in weight or symptomatology from admission to discharge, once AN subtype was accounted for. Details of these results are presented in Tables 7 and 8.

Did Working Alliance Predict Treatment Outcome?

Hypothesis 3 stated that the level of working alliance between the patients and the treatment team, measured by the Working Alliance Inventory (WAI) during the fourth week of treatment, would positively predict treatment completion and outcome in patients attending treatment for AN. This was investigated using two multiple regression analyses with changes in BMI and EDE-Q Global scores from baseline to discharge as the dependent variables, Total WAI scores at week four as the predictor variables, and AN subtype entered as a covariate in the first step. The results of these analyses indicated that, after controlling for the effect of AN Subtype, week four Total WAI scores were not a significant predictor of change in BMI from baseline to discharge, nor of change in EDE-Q Global scores from baseline to discharge. In addition, hierarchical logistic regressions, after controlling for the effect of AN subtype, did not find Total WAI scores at week four to be a significant predictor of treatment completion. Details of these results are presented in Tables 7 through 9. Thus, contrary to expectations, this suggests that working alliance at week four was not a significant predictor of treatment completion nor outcome in the current study.

Post Hoc Power Analysis

Post hoc power analyses were conducted for the regressions. The power for a sample of N=53 to capture a moderate effect size was 70%, below the recommended power level of 80%. Similarly, the power to capture a moderate effect size in a sample of N=36, as is the case of the regression analyses that include discharge EDE-Q measures, was of 50%. These results confirm that the regression analyses were underpowered (Cohen, Cohen, West, & Aiken, 2003).

Exploratory Analyses

Given the conflicting results reported in studies thus far on the importance of working alliance versus early weight gain in predicting treatment outcome in the AN population (Brown et al., 2014; Sly et al., 2013), this study examined the relationship between early weight gain and treatment outcome. A multiple regression analysis, controlling for the effect of AN Subtype, did not find the change in baseline-to-week-four BMI to be a significant predictor of change in BMI from baseline to discharge, nor of change in EDE-Q Global scores from baseline to discharge. Furthermore, using binary logistic regression, after controlling for AN subtype, early weight gain was not found to be a significant predictor of treatment completion. These findings suggest that the amount of weight gain during the first four weeks did not predict overall weight gain from admission to discharge, symptomatic change from admission to discharge, or early treatment termination. Details of these results are presented in Tables 7 through 9.

Hierarchical multiple regressions were conducted to identify baseline predictors of WAI, AMTQ, and CMTQ scores at week four, after entering weight gain (baseline to week four) as a covariate. The predictor variables included baseline BMI, AN subtype,

duration of illness (in years), current age, baseline EDE-Q Global scores, and baseline BSI Total scores. The results of these analyses indicated that none of the baseline variables were significant predictors of AMTQ, CMTQ, or Total WAI scores at week four. Details of these results can be found on Tables 10, 11, and 12. This suggests that baseline severity of illness, level of distress, and age did not seem to have an impact on subsequent reports of motivation for treatment (autonomous or controlled) or working alliance with the treatment team.

Independent sample t-tests revealed that, at baseline, patients diagnosed with AN restricting subtype (AN-R) reported lower BSI scores ($M = 1.7$, $SD = .8$) than patients diagnosed with AN binging/purging subtype ($M = 2.6$, $SD = .6$), this difference between groups was statistically significant, $t(50)=-4.261$, $p<.001$, representing a large effect size. In addition, AN-R patients also reported lower mean EDE-Q Global scores ($M = 3.7$, $SD = 1.7$) than AN-BP patients ($M = 4.95$, $SD = 1.0$) at baseline, $t(51)=-3.380$, $p=.001$, representing a large effect size. The mean score for the AN-R group was below the clinical cut-off of 4 whereas the mean score for the AN-BP group was above the clinical cut-off. Regarding BMI, AN-R patients had a lower mean BMI at week four ($M = 15.5$, $SD = 1.4$) than AN-BP patients ($M = 16.4$, $SD = 1.3$), $t(51)= -2.471$, $p<.05$, representing a moderate-to-large effect size. AN-R patients presented a greater mean change in BMI from baseline to discharge ($M = 5.2$, $SD = 1.6$) than AN-BP patients ($M = 4.2$, $SD = 1.7$), $t(51)=2.168$, $p<.05$, representing a moderate effect size. AN-R patients also reported a higher mean Total WAI score at week four ($M = 42.7$, $SD = 9.3$) than AN-BP patients ($M = 35.5$, $SD = 9.8$), this difference between groups was statistically significant, $t(51)=-$

2.711, $p<.01$, representing a moderate-to-high effect size. The groups did not differ significantly in their AMTQ or CMTQ scores at baseline or week four.

In summary, these findings indicate that AN-R patients, compared to AN-BP patients, reported less severe eating disorder symptomatology and distress at baseline. The AN-R group also presented with a lower mean BMI at time of admission, but this difference was not statistically significant. In addition, they reported a better working relationship with the treatment team by week four and showed a higher degree of BMI change from admission to discharge. The AN subtypes did not differ in terms of autonomous or controlled motivation for treatment at admission or week four. These results are presented in Table 13.

Discussion

AN is a serious and often deadly mental health disorder (Steinhausen, 2002, Sullivan, 2002), with consistently high reported rates of ambivalence and low motivation for treatment (Colton & Pistrang, 2004; Marzola et al., 2015; Reid et al.,2008; Serpell et al., 1999; Vitousek et al., 1998; Williams & Reid, 2010), as well as high rates of premature treatment termination, relapse, and poor outcome reported across treatment studies (Fassino et al., 2009; Guarda, 2008; Steinhausen, 2002; Watson & Bulik, 2013). Given the clear need to improve treatment outcome in AN patients, researchers and clinicians must develop a deeper understanding of the factors that impact treatment adherence and outcome in this population. Two potentially important factors that have not received a lot of research attention are working alliance and motivation to change. Therefore, the present study sought to shed light on these issues by examining data from

a pilot study conducted on an adult AN inpatient/day-patient treatment program in Toronto, Ontario between 2010 and 2014. The primary goals of the present study were to examine (1) the association between changes in levels of autonomous and controlled motivation for treatment and working alliance (at week four), (2) the association between autonomous and controlled motivation at baseline and treatment outcome, and (3) the association between the patients' self-reported level of working alliance (at week four) and treatment outcome in AN. In addition, a secondary goal was to identify baseline predictors of working alliance and autonomous and controlled motivation for treatment (at week four), as well as to explore the association between the rate of early weight gain during the first four weeks of the program and treatment outcome.

Statistical analyses supported the first main hypothesis of the present study. It was found that changes in level of autonomous motivation for treatment significantly predicted the level of working alliance between the patient and the treatment team at week four. To our knowledge, the current study is the first to examine this relationship. The second main finding was that there was no evidence of a significant association between baseline measures of autonomous or controlled motivation and treatment outcome. This is in contrast to a previous study which found a significant association between baseline autonomous motivation and treatment outcome in AN (Carter & Kelly, 2015). Finally, contrary to expectations, results from the present study did not find evidence of a significant association between working alliance (at week four) and premature treatment termination, nor between working alliance (at week four) and treatment outcome defined as discharge that occurred after 16 weeks of treatment and

with BMI and EDE-Q Global scores at non-clinical levels. This is inconsistent with four previous studies that found a positive correlation between measures of working alliance and either premature treatment termination or treatment outcome (Gallop et al., 1994; Jordan et al., 2017; Sly et al., 2013; Stiles-Shields et al., 2013), but partially supports the findings of Brown et al. (2013a; 2014).

In terms of secondary findings, no significant baseline predictors of working alliance at week four nor of motivation for treatment at week four were identified. This is consistent with the study by Carter and Kelly (2015) who found that the only baseline predictor of motivation for treatment was shame. Shame was not examined in the present study. Further, no significant association was found between early gains in weight and markers of treatment outcome. Finally, significant differences were found between patients diagnosed with AN-BP subtype and patients diagnosed with AN-R subtype in their baseline reports of distress and AN symptomatology, their BMI levels and reports of working alliance at week four, and their relative weight gain from baseline to discharge.

These preliminary results, however, may have been affected by a number of methodological issues that must be taken into consideration in order to properly understand and interpret the results of the study. Each of the present findings, and their significance in light of the study's strengths and limitations, are discussed in detail below.

Baseline Predictors of Working Alliance and Motivation at Week Four

Based on the assumption that level of working alliance and motivation for treatment would be significant predictors of AN treatment outcome, the present study first set out to explore possible baseline predictors of self-reports of working alliance and

autonomous and controlled motivation at week four. The predictor variables were baseline measures of BMI, EDE-Q, and BSI scores, as well as AN subtype, current age, and duration of illness.

Regarding baseline predictors of working alliance at week four, none of the variables considered were found to significantly predict Total WAI scores at week four. These results are similar to those reported in more recent studies (Stiles-Shields, Bamford, Touyz, Le Grange, Hay, & Lacey, 2016). It is possible to theorize that more severe cases of AN could be associated with lower reports of working alliance; the higher the severity of AN symptomatology the stronger the egosyntonicity of the symptoms and the more likely the conflict between patients and the health workers who advocate for change. While no such pattern could be found in the present sample, this could be in part due to low statistical power to capture the trend. Another compounding reason for these results is the fact that 51% of the sample terminated treatment before measures of the working alliance could be gathered. Perhaps these premature treatment terminations might have been linked to Total WAI scores, possibly very low ones, which could only have been determined with earlier measures of working alliance.

One unique feature of the present study that could have impacted this analysis is that a slightly modified version of the WAI was used. The modified WAI was designed to assess the relationship between the patient and "the treatment team"; to date, no other study has examined this feature in the treatment of AN. The WAI was originally designed for use in individual treatment, where the client was asked to rate their working alliance with their individual psychotherapist (Horvath & Greenberg, 1989). The present study

required changes to the wording from "therapist" to "the treatment team" to accurately reflect the treatment setting.

This change was not considered to represent a significant departure from the intended meaning of the instrument's items, but it is conceivable that it might have resulted in some degree of confusion for the patients in this study, and therefore become the cause of possible inaccuracies. Patients might have felt compelled to "average" the interactions they had with the various members of the treatment team, perhaps experiencing conflict or hostility with some and support or comfort from others; further, the pattern of interactions might have been overshadowed by impressions from one or two particularly salient interactions, for either a more positive or more negative response. This complex array of interactions might have resulted in potentially varying Total WAI scores depending on a given patient's interactions with the various members of the treatment team, the way the patient interprets these interactions, and how these interpretations are prioritized. Thus, it is possible that the validity of the measurement of working alliance might have been affected to some extent by the modifications made to this instrument in the present study. It is also possible that the changes made to the WAI in the present study may explain discrepancies between the current findings and the findings of previous studies on the working alliance in AN.

Regarding predictors of autonomous and controlled motivation for treatment, after controlling for baseline level of motivation for treatment and early weight gain, none of the observed variables (baseline measures of BMI, EDE-Q, and BSI scores, as well as AN subtype, current age, and duration of illness) were found to significantly predict

either autonomous or controlled motivation at week four. These findings are in part consistent with the results of Carter and Kelly (2015), who similarly found that baseline symptomatology was not predictive of level of autonomous or controlled motivation for treatment. These findings, however, seem to be counter-intuitive given the theoretical framework of the current study. For instance, higher controlled motivation might be found in younger patients, as they might experience more pressure from family members; and higher scores of autonomous motivation could be expected in cases were symptomatology is more severe, impairing, and distressing.

It is possible that these non-significant findings could be related to the unusually high mean autonomous motivation scores reported in the current sample, at both baseline and week four, and the possible lack of validity of the reports of motivation. These factors are explored in more detail within the discussion of motivation as predictor of outcome later in this section where it is proposed that motivation scores might have been inflated due to the particular circumstances inherent to the start of an intensive treatment program.

Another important factor that could have impacted these analyses is the low statistical power inherent in the present study. This study utilized data from a relatively small sample due to issues of attrition and sampling that have impacted AN research for decades (Fairburn, 2005; Guarda, 2008; Wilson et al., 2007). It is possible therefore that the present study may not have had sufficient statistical power to capture subtle associations between baseline variables and reports of motivation at week four, given the small sample size. Further, the current study had an attrition rate that reached 51% in the

first four weeks of treatment, before the patients' second report of motivation was gathered. While this rate of attrition is typical for inpatient AN samples (e.g., Fassino et al., 2009), in the present study this might have led to the development of a biased sample by the fourth week of treatment; it is possible that the retention of individuals who ultimately discontinued treatment early might have lent a higher variability to the sample, and higher statistical power to the analyses.

Did Changes in Motivation for Treatment Predict Working Alliance?

Given the negative impact that ambivalence towards treatment can have on interactions between AN patients and healthcare providers (Carter, Kelly, et al., 2012; Vitousek et al., 1998; Warren, et al., 2009), the first goal of the present study was to examine the relationship between motivation for treatment and working alliance. There has only been one previous study on the treatment of adult AN patients that included measures of both motivation and working alliance. However, in that study, only the association between these variables and outcome was examined (Sly et al., 2013). In the current study, it was shown that *early* increases in autonomous motivation (from admission to week four) significantly predicted higher levels of working alliance at week four, after controlling for early weight gain. These results align with those reported by Mander et al. (2013) who found that being in the contemplation stage of change was positively correlated with measures of working alliance among AN patients whereas being in the precontemplation stage of change was associated with a lower working alliance. The present results are also consistent with findings reported in other clinical populations. For example, in one study, adults treated for alcohol addiction demonstrated

a positive association between early motivation for change and subsequent ratings of working alliance (Connors et al., 2000). The current findings therefore point to the possibility that higher motivation for change at treatment onset, or early increases in motivation during the first few weeks of treatment, might facilitate a better working alliance with the treatment team.

The direction of the relationship between motivation and working alliance during the first four weeks of treatment is unknown. It is possible that the observed changes in autonomous motivation were influenced to some degree by the early development of the working alliance between patient and treatment team. For instance, an individual might present to treatment with some degree of ambivalence and, through the experience of support from the treatment team, as well as exploring the rationales behind the goals and tasks of treatment, they might see their autonomous drive for change grow and solidify. One strength of the current study is that it involved a longitudinal design that included repeated measures over the course of treatment in an attempt to capture the process of change. Although this study does not allow firm conclusions regarding the timing or direction of these relationships, motivation was measured at baseline and week 4 while working alliance was measured at week 4 in order to examine these relationships over time. In contrast, a cross-sectional study would involve measures at one time point only.

It is important to note that the theoretical framework on which Hypothesis 1 was based did not make provisions for the high baseline levels of autonomous motivation for treatment observed in the present sample. The question of change in autonomous motivation from baseline to week four assumes that baseline levels of autonomous

motivation would, in general, be lower than later in treatment. This assumption follows from the consistently high ambivalence towards treatment reported in the AN literature (Starzomska, 2009), and low motivation for treatment that has been observed in AN treatment studies (Carter & Kelly, 2015; Sly et al., 2013). In contrast, the sample analysed in this study reported very high levels of autonomous motivation at baseline, with several individuals reporting the highest possible score, and the average reported score in fact decreased slightly by week four. These high levels of autonomous motivation reported at baseline might be related to the nature of the population that was studied. As this was an inpatient sample, the patients in this study were severely underweight and typically medically unstable at the time of admission. Their high motivation ratings may possibly reflect a temporary desire to seek respite from the severe negative effects of AN, and even fear of death, but not an actual desire for meaningful behavioural changes. Given that the directionality of the association in the regression analysis indicated that an increase in autonomous motivation from baseline to week four predicted reports of higher working alliance, the findings might also suggest that working alliance was better developed in cases where patients had more moderate, perhaps more realistic, reports of motivation at baseline. There was no significant association between early changes in controlled motivation and working alliance at week four, thus providing support for this statement as well. While controlled motivation has been conceptualized as a construct detrimental to effective AN treatment (Carter & Kelly, 2015; Vansteenkiste, Soenens, & Vandereycken, 2005), its association with working alliance may not be so clear-cut, perhaps due to the methods used to measure this form of

motivation. For instance, items such as "I want others to see that I can follow treatment" or "I want my therapist to think that I am a good patient", two items on the CMTQ, may be endorsed strongly by patients who appreciate the bond they share with the treatment team and might be representative of a positive experience in therapy. Further research may be necessary to better elucidate the construct of controlled motivation and its impact, if any, on the development of the working alliance in the treatment of AN.

Did Baseline Motivation for Treatment Predict Treatment Outcome?

Despite the often negative consequences and risk of death associated with AN (APA, 2013; Arcelus et al., 2011; Gaudiani et al., 2012; Baker et al., 2000; Caseiro & Frishman, 2006; Takakura et al., 2006; Turner & Shapiro, 1992), the disorder has demonstrated a resistance to treatment (Hay et al., 2012; Steinhausen, 2002), with high rates of treatment attrition reported across treatment studies (Guarda, 2008; Kaye et al., 1999). A possible reason for the reported difficulties in successfully treating AN, may lie in the largely egosyntonic features of the disorder, which have been widely associated with a general lack of motivation for change and strong ambivalence towards engaging in treatment (Starzomska, 2009). Thus, a second goal of the present study was to assess whether motivation for treatment would predict treatment outcome.

In contrast to Hypothesis 1, the results provided no evidence of a significant association between baseline autonomous motivation and outcome or between changes in the level of autonomous motivation from baseline to week four and outcome. These findings support those reported by Sly et al. (2013) who found no association between baseline measures of motivation, nor shifts in motivation from baseline to week four, and

treatment outcome in their AN sample. The findings also partially support the results of Thaler et al. (2016) who also reported that baseline autonomous motivation for treatment had no association with treatment outcomes in regard to BMI, but was associated with a decrease in AN symptomatology. However, the present study does not align with results from Carter and Kelly (2015) who found that early reports of autonomous motivation for treatment predicted measures of outcome in a sample composed of individuals undergoing treatment for various eating disorders. Their sample, however, included a significant proportion (30.9%) of individuals diagnosed with bulimia nervosa (BN); when considering only the patients with AN, the authors found no correlation between measures of autonomous motivation and discharge BMI, although their sample size lacked statistical power. Contrasting with the overall results of Carter and Kelly (2015), the results of the present study suggest that the adult AN population may be qualitatively different from the BN population in regard to the impact of autonomous motivation on treatment outcome.

While the lack of evidence for Hypothesis 2 may be explained by low statistical power in the current study, this factor could be overshadowed in this particular instance by the atypical response patterns reported by the sample. The present study reported, overall, very high levels of autonomous motivation for treatment, both at baseline and at week four; while the average levels of autonomous motivation were slightly decreased at week four, this difference was not statistically significant. Such high levels of autonomous motivation run contrary to what would be expected of this population in light of previous research. One key feature of the AN presentation is the egosyntonicity

of the symptoms, which renders severe weight loss and associated behaviours desirable and positive from the perspective of the patient. From this viewpoint, treatment aimed at weight gain and decreasing compensatory behaviours normally becomes a conflict that threatens the patient's sense of self. Thus, it would be expected, given the theoretical framework, that AN patients would report low autonomous motivation or, at best, ambivalence.

In the current sample, mean autonomous motivation was 36.29 at baseline, with 40% of the sample reporting a score of 40 or higher and 12 individuals reporting the highest possible score of 42. This distribution of scores suggests the possibility of a ceiling effect regarding the measurement of autonomous motivation. The small decrease in scores at week four could be explained by a statistical regression to the mean, as such high scores are more likely to show a negative change over time. While these high scores are inconsistent with the theoretical expectation, they could be explained by a number of factors. One such factor could be that patients did not have a complete understanding of their true sense of motivation. It is possible that, seeing themselves at the start of a committed intensive treatment, under perceived pressure from families or health workers, they might have experienced an inflated sense of autonomous motivation. Perhaps a strong belief in an artificially high level of autonomous motivation was required to make the decision to start treatment, although this motivation may not be stable enough to withstand the demands of treatment, a pattern commonly observed in the field of physical conditioning (Sperandei, Vieira, & Reis, 2016). The reports of high autonomous

motivation might therefore be an overestimation if the challenges of treatment prove to be too high and result in early attrition or low treatment gains (Guarda, 2008).

Another possible factor that might have influenced the observed high levels of autonomous motivation for treatment at baseline could be that patients were simply not honest in their reporting. It is possible that AN patients might have felt compelled to report higher levels of autonomous motivation than they actually experienced to minimise conflict with family or the health care team and to facilitate a peaceable treatment process. It is not uncommon for individuals in this population to rush through inpatient or day treatment with self-imposed compliance for a prompter return to unsupervised life, where they can return to their egosyntonic, symptomatic behaviours (Guarda, 2008).

Ultimately, these findings suggest that autonomous motivation for treatment may not be a valid and reliable marker of true treatment engagement and, therefore, of treatment success, in the adult AN population. A possible method to explain these results may be to consider autonomous motivation as only one dimension of the complex ambivalence that individuals diagnosed with AN consistently report regarding treatment (Vitousek et al., 1998). While the individual might express an intellectual understanding of, and agreement with, a given treatment, they might simultaneously also harbour a desire or drive to sustain their AN symptomatology. Expecting that autonomous motivation should predict outcome considers motivation as a single dimension, wherein an individual can report motivation, or lack thereof, to a given degree. A model of ambivalence could add a second dimension to provide insight on the degree to which the

individual is also motivated to sustain their illness, presenting a clearer picture of the pattern of motivation for and against treatment. Perhaps such a model might lead researchers to find markers with higher predictive values of actual commitment to change.

At baseline, the sample reported moderate to high levels of controlled motivation for treatment and there was a very slight increase in the level of controlled motivation at week four, which was not statistically significant. These findings are in line with previous finding on adult AN patients in the literature. Individuals in this population often report experiencing external pressures from family, friends, and health care professionals to decrease their disordered eating and compensatory behaviours, and to regain a healthy weight; in many cases, AN patients enter treatment at the behest of close relations (Vitousek et al., 1998). The current study did not find an association between baseline levels of controlled motivation for treatment nor early changes in this construct with markers of treatment outcome, mirroring the results found by both Carter and Kelly (2015) and Thaler et al. (2016).

In the present study, the reported levels of controlled motivation at baseline were somewhat lower than the levels of autonomous motivation. Perhaps the participants were better able to assess the pressure they felt from external sources in a more objective or balanced fashion. Further, it is possible that a high level of controlled motivation might impact reports of autonomous motivation; an individual might feel compelled to present as highly motivated if they find themselves under a high external pressure to succeed.

However, there is no evidence of an association between the variables of autonomous and controlled motivation.

Regarding the overall findings in relation to controlled motivation for treatment, and together with the findings of Carter and Kelly (2015) and Thaler et al. (2016), it is possible to theorize that controlled motivation, as a construct distinct from autonomous motivation, may show its own associations, and lack thereof, with clinical variables in AN. The presence of high levels of controlled motivation, representing external pressures to complete treatment, may not indicate the absence of autonomous motivation and vice versa. In the present study, controlled motivation did not predict clinical characteristics or outcome variables. It is possible that controlled and autonomous motivation for treatment might interact in particular ways in their impact on treatment. Perhaps controlled motivation interacts to some extent with the patient's personality traits in order to have a negative or positive impact on treatment. For instance, endorsing items such as "I want others to see that I can follow treatment" or "I don't want other people to be disappointed in me", two items of the CMTQ, may be interpreted differently if endorsed by a patient who feels responsible for maintaining a positive, supportive relationship with their family than if endorsed by a patient who perceives their environment to be highly critical and demanding; the first might experience controlled motivation as a way to feel inspired to work on self-development, while the second might experience it in a reactive, anxious, or resentful way. Further research is needed to clarify the construct of controlled motivation, its valid measurement, and the mechanisms through which it might impact mental health.

Did Working Alliance Predict Treatment Outcome?

The working alliance, developed between patient and therapist, has been found to be one of the strongest predictors of treatment outcome across a multitude of psychological disorders in numerous studies (Horvath et al., 2011, Martin et al., 2000), in particular, when measured early in treatment (in the first third of treatment or between sessions 1 through 5; Horvath, 2001). Previous research has also suggested that working alliance may predict premature treatment termination in an array of mental health disorders (Sharf et al., 2010), whereas this association might remain questionable in AN treatment (Brown et al., 2013a). Given these findings, the current study anticipated that working alliance at week four would predict treatment outcome markers such as changes in BMI and AN symptomatology from baseline to discharge, as well as the rate of attrition.

The sample in the present study reported a moderate average level of working alliance with the treatment team at week four. A review of the WAI subscales revealed that the scores were rather evenly distributed between the three subscales (agreement on tasks, agreement on goals, and therapeutic bond). This minimal variability suggests that patients were fairly consistent across their reports on the three subscales. The current study did not find a significant association between working alliance and outcome nor premature treatment termination, and the third hypothesis could therefore not be confirmed. These results run contrary to the findings in the general literature on working alliance, which consistently highlights the working alliance as one of the principal predictors of outcome in treatment of a large majority of mental health disorders

(Horvath et al., 2011; Martin et al., 2000). The results of the present study may, therefore, lend support to the theory that working alliance may function differently in the treatment of AN than in the treatment of other disorders.

It is important to remember that the present study was based on data from a relatively small sample and therefore the present study may not have had sufficient statistical power to capture subtle associations between working alliance and outcome. Further, the current study had an attrition rate that reached 51% in the first four weeks of treatment, before the patient's reports of working alliance with the treatment team were gathered. This rate of attrition is typical for inpatient AN samples (e.g., Fassino et al., 2009). Thus, those who completed the working alliance measure may have been a biased sample in that they may have been more motivated for treatment. This theory is supported by the fact that shifts in motivation to change predicted working alliance in the current study; however, between-groups t-tests revealed no significant differences in baseline reports of autonomous or controlled motivation for treatment between the subsample analyzed in this study and those who terminated treatment before four weeks of treatment. The rate of early treatment termination may also have been a factor in the observed lack of association between the working alliance, outcome, or attrition. Perhaps the majority of the people who terminated treatment prematurely would have reported lower working alliance thereby contributing to more variance in the data and increasing statistical power.

The role of the working alliance in adult AN treatment remains unclear (Zaitsoff et al., 2015). To date, six studies have examined the relationship between working

alliance and treatment outcome in the adult AN population. Of note, the present study is the first one to measure the working alliance between the client and "the treatment team", rather than an individual therapist. Three of these studies focused on clinical outcome (Brown et al., 2013a; Brown et al., 2014; Stiles-Shields et al., 2013). Stiles-Shields et al. (2013) examined the relationship between working alliance and treatment effectiveness in a sample of adult AN patients receiving outpatient treatment. In this study it was found that only measures of working alliance administered toward the end of treatment predicted BMI and AN symptomatology at discharge, while mid-treatment measurements did not. Brown et al. (2013a) studied the relationship between early working alliance and treatment outcome in a sample of adult and adolescent outpatients, with working alliance measured at week six (with an overall treatment average of 44 weekly sessions) and at discharge. The authors reported no association between early measures of working alliance and weight change or the probability of early treatment termination. The results of the present study also support the finding that early-to-midpoint measures of the working alliance might not be accurate predictors of treatment outcome. In contrast, Brown et al. (2014) reported that early weight gain and not working alliance was associated with treatment outcome. However, Brown and colleagues assessed working alliance using a survey of clinicians who were asked to report on their experience working with AN patients, rather than examining the patients' perspective. Thus, methodological differences may explain the discrepant findings.

The other three studies focused on the association between working alliance and treatment dropout (Gallop et al., 1994; Jordan et al., 2017; Sly et al., 2013). These studies

found a significant relationship between working alliance and premature treatment termination in adult AN patients when the working alliance was measured earlier in the course of treatment. In the first, Gallop et al. (1994) found that higher working alliance during the third week of treatment was associated with a greater likelihood of treatment completion. Sly et al. (2013) found similar results when working alliance was measured in the first week of treatment. In addition, Jordan et al. (2017) reported that lower mean scores of working alliance, measured throughout the first five sessions, were associated with a higher probability of premature treatment termination. Brown et al. (2013a) also included an analysis of attrition but, in contrast with the literature, found no association between reports of working alliance at week six and early treatment termination. In alignment with the findings of Brown and colleagues (2013a) the results of the present study did not indicate a significant association between measures of working alliance and length of stay in treatment, and therefore do not support the findings of several previous studies. A possible explanation for this discrepancy might be that the time point during the course of treatment that was selected to measure working alliance in the present study, week four of treatment, might not have been an optimal time point to capture an accurate representation of this construct. This time point was originally selected to allow enough time for the reliable development of working alliance between the patients and the treatment team. However, it is possible that working alliance must be assessed before (or after) the fourth week of treatment in order to obtain a more accurate measure of the variable. In addition, the process of developing a working alliance with a treatment team may be different than developing a working alliance with a single therapist. Further, as

suggested by the findings of Stiles-Shields et al. (2013) and Brown et al. (2013a), the average individual with AN might require longer than four weeks to develop a degree of working alliance that could be accurately captured by the WAI.

Another possible scenario to explain the discrepant results across studies might be differences in the treatment setting. As mentioned earlier, previous research has found associations between working alliance and subsequent treatment outcome/attrition in the treatment of adults with AN (Gallop et al., 1994; Jordan et al., 2017; Sly et al., 2013; Stiles-Shields et al., 2013). Two of these studies were conducted with outpatient populations (Jordan et al., 2017; Stiles-Shields et al., 2013), while two were conducted on inpatient populations (Gallop et al., 1994; Sly et al., 2013). It is possible that working alliance with the treatment team, in an intensive treatment setting and with such an ambivalent population as AN patients, might fluctuate over time. The intensive treatment setting requires daily interactions with various members of the team and therefore provides more opportunities for relational conflict and reparation between distressed, ambivalent patients and recovery-oriented health professionals; much more than that expected in the common weekly appointments for other mental health concerns. It is possible to conceive that such variety of interactions might cause the ratings of working alliance to oscillate to some degree, perhaps significantly, from one week to the next.

Similarly, Gallop et al. (1994) and Sly et al. (2013), while studying an inpatient population, included multiple measurements of working alliance in their research design over the course of treatment whereas the current study measured working alliance only once at week four. Having such a design allowed the researchers to better determine a

timepoint at which measurements of working alliance were associated with premature treatment termination. Therefore, it is conceivable that the present research might have captured this association had it included earlier measurements of working alliance, perhaps as early as week one. Such repeated measures might shed light on how working alliance develops over time in AN intensive treatment, and to what degree it fluctuates at the various times of measurement. It could also help researchers determine if there is a single ideal time when levels of working alliance would be associated with outcome, or allow them to average the various time measurements to find more reliable values. On the other hand, the AN inpatient population tend to be a medically and psychiatrically unstable population and it is important to consider participant burden in designing clinical studies.

Another important factor to consider in relation to the reliability of the working alliance levels reported by the present sample is the changes in the wording of the items that were used to measure working alliance for this study. Perhaps one way to obtain a more accurate measure of working alliance with the whole treatment team would be to ask participants to complete a WAI questionnaire for each one of the individual members of the team. Having this detailed information could allow researchers to investigate if outcome is associated with the overall impression of working alliance, measured as an average of all the individual Total WAI scores provided by a given patient, or if it is associated with any given individual WAI scores, perhaps the most salient, extreme reports. It should be noted that the practical and logistical limitations of an inpatient treatment program, as illustrated in the current study, may render this particular

methodology unfeasible. This was the design employed by Gallop et al. (1994), which might have accounted for their findings of a positive correlation between averaged scores of early measures of working alliance and treatment completion in their sample. Jordan et al. (2017), Sly et al. (2013), and Stiles-Shields et al. (2013) might have circumvented this issue by selecting the relationship developed with one primary caregiver (e.g., key-nurse) as the subject of evaluation.

One final factor to consider regarding the reliability and validity of the working alliance reports is the fact that patients might not have been completely accurate in their ratings. Given that the WAI is a self-report measure, it is limited by the awareness the subject has on the measured construct and their willingness to share information freely. The present study used a coded-identifier data collection approach by researchers who were not part of the treatment team to mitigate the possible effects of social desirability that may hinder the patients honest responding. Alternatively, the design employed by Jordan et al. (2017), which based the evaluation of the working alliance on the assessment by blind observers, could also serve to overcome this potential limitation.

Did Early Weight Gain Predict Treatment Outcome?

While researchers have reported working alliance to be a strong predictor of outcome in different mental health disorders (Horvath et al., 2011; Martin et al., 2000), some researchers have hypothesised that perhaps the traits inherent to the AN presentation and their impact on treatment might render patients' reports of working alliance a less accurate predictor of treatment outcome than in other populations (Brown et al., 2013b). It has been suggested that an alternative predictor of outcome could be

found in measures of weight gain early in treatment (Brown et al., 2013b; Hartmann, Wirth, & Zeeck, 2007; Turner, Bryant-Waugh, & Marshall, 2015). Based on this theoretical framework, some researchers have suggested that AN treatment might be more effective if it was focused on gains in weight rather than developing the working alliance early in treatment. Thus, an additional goal of the present study was to examine the relationship between early weight gain and outcome in adult AN treatment. To explore this proposition, the present study included analyses of early weight gain (baseline to week four) in its association with outcome. The results indicated no association between degree of early weight gain and premature treatment termination, changes in BMI from baseline to discharge, or changes in AN symptomatology from baseline to discharge. These findings do not support the argument that early weight gain should be prioritized over the development of working alliance in AN treatment.

The present findings partially support the results reported by Sly et al. (2013), who observed no association between early weight gain and final treatment outcome, but did report an association between early weight gain and premature treatment termination. However, as previously mentioned, a lack of statistical power might have prevented the analyses of the present study from capturing more subtle associations between the variables. Hartmann et al. (2007) reported that weight changes in weeks three and four significantly predicted treatment outcome, in contrast to the results of the present study. This difference might be explained by differences in the time frames used for weight change across studies – admission to week four in the present study versus weeks three and four in the Hartmann et al. study; the pooling of weight gain throughout the first four

weeks of treatment might have homogenized the scores for the present study, perhaps obscuring varying outcomes between weight gain during the first two weeks and the second two weeks of treatment. In addition, Hartmann et al. (2007) excluded individuals with a BMI higher than $16kg/m^2$ from their sample; individuals with lower BMI are expected to have, on average, a more drastic weight change during treatment. The current study included several patients with BMI between $16kg/m^2$ and $18.5kg/m^2$; these patients require a relatively smaller weight change for successful treatment completion and discharge. It is possible that their inclusion might have obscured the impact of early weight gain on outcome by adding a level of variability not present in the sample used by Hartmann et al. (2007). Elsewhere, Brown et al. (2014) reported that early focus on weight gain had a positive association with gains in weight during treatment, whereas early focus on working alliance was associated with poorer treatment outcomes. The discrepancies between those findings and the present research might be explained by the methodological differences between the two studies. First, the study samples were different. Whereas the present data were collected from an inpatient unit, Brown et al. (2014) conducted their study in an outpatient setting. Another difference was the assessment method used. Brown et al. surveyed outpatient clinicians yielding indirect data from a variety of sources and treatment characteristics, which was acknowledged by the authors as a limitation. In contrast, the current study assessed patient self-reports of working alliance.

Further, some researchers have suggested that early weight gain might in fact predict measures of working alliance (Brown et al, 2013a; Xu & Tracey, 2015). While

the present study did not state a hypothesis in this regard, an exploratory analysis using the present sample did not find evidence to support such a claim. The results of the present study showed that early weight gain from admission to week four, as a marker of symptom change in AN, did not significantly predict the level of working alliance at week four. This suggests that the association between early symptom change and working alliance in AN may be different than in other mental health populations and perhaps even other eating disorders (Tasca & Lampard, 2012; Turner et al., 2015). The findings are in contrast to those of Brown et al. (2013a), who reported that weight change predicted subsequent measures of working alliance after six weeks of treatment and between the sixth week of treatment and discharge. Brown et al. conducted their study with an outpatient sample who met with a single therapist for approximately one hour per week, a setting and modality quite different from the inpatient/day treatment, clinical team-based approach that is the basis of the present study. This suggests that he impact of early weight gain on the working alliance might be impacted by treatment setting and modality. While further research is needed to clarify these findings, it is important to note that the inconclusive results of this analysis might also be the consequence of low statistical power.

Differences Between AN Subtypes

The DSM-5 distinguishes two subtypes in AN; restricting subtype (food restriction in the absence of binging or purging; AN-R) and bingeing/purging subtype (requiring bingeing and/or purging behaviours in addition to food restriction; AN-BP). The AN literature further describes a number of clinical features that seem to vary

according to the AN subtype. Patients diagnosed with AN-BP often present a higher level of impulsivity and distress (Rosval, Steiger, Bruce, Israel, Richardson, & Aubut, 2006; Vervaet, van Heeringen, & Audenaert, 2004; Wallier et al., 2009), may be more likely to terminate treatment prematurely (Elbaky et al., 2014; Fassino et al., 2009; Woodside et al., 2004), and might require a longer course of treatment (Støving et al., 2012; van Son et al., 2010). Patients diagnosed with AN-R have been reported to present a comparatively lower BMI (Vervaet, et al., 2004). Thus, the present study sought to examine whether any differences could be observed in the sample between AN subtypes in terms of baseline characteristics, such as age and duration of illness, and clinical variables, such as rate of treatment completion, number of weeks in treatment, and clinical measurements at various time points.

In comparison with the AN-BP subgroup, the AN-R subgroup reported significantly less distress and lower eating disorder symptomatology at baseline, as well as significantly higher WAI Global scores at week four. There were no significant differences in either autonomous or controlled motivation at baseline or week four between the AN subtypes. Both groups showed a significant decrease in ED symptomatology during treatment, with no significant differences between the two subgroups regarding changes in EDE-Q Global scores from baseline to discharge.

Regarding BMI and changes in BMI during treatment, the AN-R subgroup had a comparatively lower mean BMI at baseline, but reported a significantly higher weight gain over the course of treatment. These findings can be explained when considering two factors; the first factor is that the AN-R subgroup started treatment with a relatively lower

mean BMI than the AN-BP subgroup; the second factor is that the majority of the sample completed treatment and treatment is considered complete once a patient has reached a BMI above 18.5, creating a de facto upper limit for BMI. It follows that, given that patients will be discharged when they reach a healthy BMI, those who started treatment with a lower BMI are required to make comparatively greater gains. One encouraging implication of these results is the suggestion that a lower BMI (i.e., a more severe AN presentation) did not preclude the participants in this sample from making clinically significant gains. Further research with larger samples is necessary to determine the generalizability of these findings.

Regarding rates of premature treatment termination, participants diagnosed with AN-BP showed a trend towards greater rates of attrition with 33% of these individuals discontinuing treatment early in contrast with 12% of AN-R patients. While this difference between the subtypes approached statistical significance when analyzed in the final sample, a post-hoc analysis of the complete initial sample (i.e., including drop-outs) revealed a statistically significant difference. A similar pattern was found when comparing the two subtypes in terms of baseline BMI; namely, while the analysed final sample showed only a trend, a post-hoc analysis of the complete initial sample revealed that AN-R participants had significantly lower BMIs at baseline. These findings have two important implications. First, the present findings are consistent with the literature on AN subtypes, showing that individuals diagnosed with AN-BP show a significantly greater rate of attrition from treatment than do individuals diagnosed with AN-R (Elbacky et al., 2014; Fassino et al., 2009; Woodside et al., 2004) and that individuals diagnosed with

AN-R tend to present with lower BMIs than AN-BP patients. Second, this illustrates how the research on AN commonly tends to be limited by small sample sizes.

Overall, AN-BP patients in the current study presented as more symptomatic and distressed at the beginning of treatment, in line with the findings reported by Wallier et al. (2009). At week four, AN-BP patients reported a lower working alliance with the treatment team, although at this point they had achieved a higher average BMI than the AN-R subgroup. At time of discharge, AN-BP subgroup appeared to be less able to profit from treatment as they presented a higher percentage of premature termination and significantly higher symptomatology. A possible explanation for these differences may lie in the combination of behavioural and psychological features often observed in each AN subtype. AN-BP patients may experience significantly more distress than their counterparts because, in addition to a strong egosyntonic desire for weight loss, they have to cope with impulsive eating behaviours in direct conflict with their ultimate weight-loss goals. This constant struggle between two opposite poles may lead AN-BP patients to experience higher psychological distress than AN-R patients, whose behaviour is more in line with their egosyntonic drive for weight loss and may serve as a distress deterrent. This single-minded commitment to egosyntonic weight loss may also explain the significantly lower BMI observed in the AN-R subgroup at baseline.

To further highlight the differences observed between the subgroups, it is important to look at how the treatment presents differential challenges to each AN subtype. The treatment methodology would require AN-BP patients to reduce their pre-established coping behaviours (i.e., purging). It could be expected that this approach

would appear more challenging to AN-BP patients, causing a significant rift between the members of this AN subgroup and the treatment team, as suggested by the lower reports of working alliance at week four. In contrast, AN-R patients may be able to use their strong levels of persistence as a strength to adhere to the goals of treatment. This difference in the levels of impulsivity between the AN subtypes may also account for the higher rates of attrition observed in the AN-BP subgroup.

The pattern of differences observed in this study between AN subgroups regarding clinical variables suggests that AN-R and AN-BP present marked distinctions that may have important implications for treatment. These differences might indicate that the same treatment might not be optimal for both AN subtypes, whereas the currently predominant CBT intensive approach might elicit more beneficial outcomes in AN-R patients, the AN-BP population might require a treatment tailored to the particular features of their AN presentation. This latter group, for instance, might possibly benefit from a treatment that is initially less intensive, and fosters a more gradual decrease of their unhealthy coping mechanism. Such a treatment might dedicate more efforts at the start of treatment in the development of the working alliance. It is possible that a treatment approach that presents more lenient expectations at the start of treatment might help address initial levels of distress and increase treatment engagement and retention. In line with this premise, researchers are increasingly advocating that medical, psychological, and motivational factors need to be considered beyond a single diagnosis in order to make more effective decisions around clinical treatment (Geller, Coelho, Srikameswaran, Lam, Iyar, & Norris, 2017).

Clinical Implications

Several findings of interest resulted from the present pilot study. Notably, the results of the current study, coupled with the results of Sly et al. (2013), suggest that it might be of clinical interest to monitor working alliance earlier than week four, perhaps starting as early as the first week of treatment, when working with adult AN patients. While a number of studies have tried to elucidate the relationship between working alliance and outcome, there is no evidence that measurements taken at week four are associated with treatment success (Sly et al. 2013). However, researchers reported that measures of working alliance taken before week four may show associations to outcome and attrition (Gallop et al. 1994; Jordan et al., 2017; Sly et al., 2013; Stiles-Shields et al., 2013). It is therefore worthwhile to assess levels of working alliance in the initial stages of treatment to give clinicians the opportunity to address concerns in the relationship in order to improve the probability of treatment success or mitigate potential attrition.

Alternatively, another possible clinical implication might exist given that the present study did not find a significant association between working alliance and treatment outcome as measured by BMI at discharge or early treatment termination. While the working alliance is an important aspect of psychological treatment, this lack of findings might suggest that clinicians working with the AN population might not need to prioritise the development of the working alliance over other treatment factors, as this might not necessarily determine the risk of early treatment termination and may not be a defining factor of successful treatment outcome. However, given the preliminary nature

of the results and the low power of the current study, it would be premature to place significant confidence on the lack of findings in this regard.

Regarding motivation, the current findings also demonstrate, contrary to the expectations of the theoretical framework of AN, that this population can report rather high levels of autonomous motivation at commencement of treatment. Given the overall low rates of treatment success and high rates of attrition found in the present sample, aligning with the AN literature at large (e.g., Fassino et al., 2009; Steinhausen, 2002), the results suggest that clinicians working with this population should approach self-reports of motivation with a degree of caution. While autonomous motivation remains an important factor to engage in intensive treatment, the data suggests that it may not be a sufficient marker in the prediction of treatment success.

Based on the results of the present study, one aspect of autonomous motivation might yet act as a facilitator of the treatment process. The current findings suggest that early increases in motivation were associated with higher ratings of working alliance. While the causal directionality of this association cannot be reliably determined at this time, these results suggest that helping AN patients explore ambivalent thoughts and develop self-directed reasons to dedicate effort in treatment, perhaps using Motivational Interviewing or similar techniques, might encourage them to develop a better working relationship with clinicians while in treatment. Alternatively, these results could suggest that clinicians looking to help AN patients develop their autonomous motivation for treatment may be well served by improving their working alliance. Perhaps dedicating

time early in treatment to building an empathic bond and a trusting rapport with AN patients might allow for the opportunity to resolve some degree of ambivalence.

One important clinical implication of the findings of this study is the clinical salience of AN subtype; therefore, clinical teams should be strongly encouraged to emphasize the correct identification and diagnosis of the AN subcategory. Among the differences observed in the current study between AN-R and AN-BP patients is the markedly higher rates of early termination and lower reports of working alliance with the treatment team found in patients diagnosed with AN-BP. Having this important information may allow clinicians to better identify and monitor patients at a higher risk of premature treatment termination, perhaps assessing the possibility of dedicating time to building the working alliance or exploring treatment ambivalence with these patients. Perhaps due to the coexistence of highly opposed drives and beliefs, AN-BP patients also reported a markedly higher level of distress and eating disorder symptomatology at baseline. The treatment of these patients might be enhanced by a more gradual approach that is informed by a close monitoring of their distress levels. Without this consideration, and given the statistically higher degree of impulsivity that research has consistently observed in the AN-BP population (Rosval et al., 2006; Vervaet et al., 2004), the probability of attrition for these patients might be increased.

Strengths and Limitations

Strengths. The current pilot study had a number of strengths. Notably, it is the first in the AN literature to examine the associations between motivation for treatment and working alliance in this population. While other studies have included these

constructs, to date, none have investigated the link between motivation and working alliance. Given the prominence of working alliance as a predictor of outcome in the treatment of a large variety of psychological ailments, the search for factors that impact working alliance is an asset to our understanding of AN treatment. Another strength of the present study is that it had a longitudinal design that investigated treatment process variables over time, as well as predictors of treatment outcome. Psychological treatment, as a process of change, is highly dynamic and in a constant state of flux. It is very important to learn more about how clinical factors develop over time during psychological treatment and few other research studies have assessed these changes and their impact on the course of treatment in adult AN. The current study is further enhanced by repeated measures in several variables of interest. This allows for a more detailed understanding of the progression of clinical change throughout the duration of treatment. Another important strength of the present pilot study is that is used well-validated and widely used measures. One such feature is the selection of the Working Alliance Inventory (WAI) to measure the relationship between the patients and the treatment team. The WAI is the most widely utilized instrument in the working alliance literature and its use in this study allows for more valid and reliable comparison of the results with other similar research in the literature.

An additional strength of the current study is the fact that it collected a wide variety of demographic and clinical data including the patients' diagnostic subtype. This allows for the analysis and report of the contrast between the AN subgroups in an unprecedented diversity of variables, from baseline characteristics, to their particular

response to treatment, to their differences in treatment outcome. The results of the present study can therefore add important information regarding the differences and similarities between the AN subtypes. Most importantly, the information obtained through this method might help researchers elucidate how each subgroup responds to treatment, potentially leading to the development of clinical methods that more suitably tailored to the particularities of each diagnostic subcategory.

Limitations. The current study methodology also had a number of limitations. First, there was a high drop-out rate. The issue of attrition has widely plagued research studies on AN. As noted by Halmi et al. (2005), there are a number of reasons for this including the egosyntonic nature of the disorder, which can act to positively reinforce unhealthy behaviours, and the possible function of AN symptoms as a coping mechanism. In the current study, working alliance was measured after four weeks to allow the patients to adjust to the intensive treatment environment and develop a degree of working alliance with the treatment team. However, out of the 108 patients who agreed to participate in the study, only 53 remained in treatment long enough to provide data on the variables of interest, presenting an initial attrition rate of 51%. A comparison of patients who dropped out and patients who remained in treatment revealed no significant differences at baseline providing no evidence that the analysed group was statistically biased. However, it is possible that they were different in some way not measured in this study. The sample size was further reduced by additional attrition that occurred after the fourth week of treatment that limited the data available for certain variables, namely eating disorder symptomatology as measured by EDE-Q Global scores at discharge.

This illustrates the practical challenges of the real-life scenario of a patient arriving at the decision of terminating their involvement in an intensive treatment program. While they might come to this decision impulsively or in a moment of crisis, it might prove to be a practical impossibility to ask them to complete a battery of self-report questionnaires at that time. Fortunately, this is not the case for the other variable used as a marker of outcome, namely the patients BMI. As their body weight was measured regularly during treatment, their last measurement was used to calculate BMI at time of discharge.

The level of attrition in the current study has an important implication for interpreting the results. Of note is the decrease in statistical power and the confidence that can be placed on the results. Working with such a small sample may prevent the various statistical analyses capturing significant associations between variables and changes over time. This posits a particular challenge in the present study given that most analyses resulted in non-significance; a study that included a larger sample may yet reveal a true significant association between the constructs that were investigated. A second implication is that changes in symptomatology could only be conducted on what could be considered a bias sample, namely those who completed treatment. This is problematic because, as the AN literature highlights, this is not indicative of population norms (Guarda, 2008; Kaye et al., 1999). A large portion of individuals that meet the criteria for AN will not seek treatment or will discontinue treatment early (Guarda, 2008; Keski-Rahkonen et al., 2007; Watson & Bulik, 2013). The results of the analyses conducted on

such a biased sample should therefore not be generalized to the adult AN population at large.

The results of the present study are correlational and therefore do not imply causality. Thus, it cannot be stated with certainty that an increase in autonomous motivation resulted in higher levels of working alliance in the current sample. While early changes in autonomous motivation for treatment were found to predict working alliance at week four in the present research, the methodology in place does not allow for a clear determination of whether changes in motivation are the cause of the subsequent reported levels of working alliance. Although the measurements of autonomous motivation precluded the measurement of working alliance, in practice motivation and working alliance were being developed simultaneously since the beginning of treatment, perhaps influencing each other. The inability to ultimately distinguish the directionality of the association is a limitation that stems from the single measurement of working alliance that only occurred at week four to allow time for the patients to develop a relationship with the treatment team. The methodology used in this study would be improved by the addition of earlier measures of working alliance. Past research in the field of working alliance has found that valid measures of this construct could be obtained as early as the first week of treatment (Martin et al., 2000; Sly et al., 2013). The results of the current study may have benefited from reports of working alliance at weeks one, two, and three. This could serve as an improvement in two ways; first, it would maximize the information gathered from the initial sample, possibly increasing statistical power and shedding light on the characteristics of individuals who decide to terminate

treatment prematurely; second, a longitudinal, repeated-measures research design would allow a more complete understanding of how the working alliance develops over time in the adult AN population and how it is associated to markers of outcome. Future research using multiple measures of working alliance over the course of treatment is needed.

The use of self-report questionnaires to measure levels of working alliance and motivation might also represent a limitation in the present study. In the case of WAI scores, it is possible that the patients' experience of the working alliance varied across time, and the single measurement of the construct may not be an accurate representation of the constructs true values. Regarding the measurement of motivation, the level of autonomous motivation observed at baseline in the present sample was unusually high. Given that the AN population often presents as highly ambivalent towards treatment and that the ACMTQ offers no validity scales to judge the sincerity of a patient's response, it is conceivable that such high reports might be inaccurate. It is also possible that autonomous motivation might be easily overestimated in self reports and may ultimately fail to act as a predictor of treatment outcome in populations that are consistently ambivalent towards treatment. The development of ACMTQ norms for the AN population could help researchers determine how normative the given response may be.

One final limitation that should be acknowledged is that this was a single sample cohort design and there was no control group. This is another common limitation in the research involving the AN population, as it is ethically challenging to assign individuals diagnosed with such a life-threatening disorder to control groups involving no treatment or treatment that is less than optimal.

Directions for Future Research

Having described the limitations, and strengths of the present project as well as the possible clinical implications, this final section addresses possible future research directions. A number of possible avenues for future research have emerged from the current study. First, future researchers should consider very early measurements of working alliance when working with this population, especially when focusing on predictors of outcome. The present study failed to capture a significant link between measures of outcome and reports of working alliance when taken at week four of treatment while previous studies have obtained statistically significant results when reports of working alliance were gathered prior to the fourth week of treatment. Next, it will be important to determine the validity of self-reports of autonomous motivation in AN patients, and perhaps explore the significance of a model of ambivalence in this population in the prediction of treatment outcome. Contrary to the hypotheses in the present study reports of autonomous motivation did not necessarily correlate or predict more positive outcomes suggesting that perhaps autonomous motivation is not sufficient to explain the outcomes of treatment. Finally, future research may need to explore the clinical validity of the AN subtypes in the review of a unified clinical treatment that is prescribed for both. In the present study, AN subtype immerged as a significant predictor of attrition and of working alliance in alignment with several reports in the literature suggesting that the two subtypes may present different responses to treatment.

Time of working alliance measures. Researchers attempting to study working alliance in the adult AN population, in particular when searching for predictors of outcome, should consider measuring working alliance in the initial weeks of treatment The present study did not find an association between measures of working alliance at week four and treatment outcome, whereas previous studies that reported significant associations between working alliance and dropout rates have focused on single or multiple measurements of working alliance as early as week one (Gallop et al., 1994; Jordan et al., 2017; Sly et al., 2013). It is yet to be determined if there is one optimal time point at which working alliance is most predictive of outcome or if multiple measurements in the initial phases of treatment would best capture the construct as a predictor; further research is need in this regard. Future researchers should note that measurements of working alliance in adult AN patients, when taken too late, might be affected by early attrition characteristic of the population, potentially decreasing the predictive capabilities of the construct.

Validity of self-reports of autonomous motivation. One important area for future AN research endeavours is further determining the validity of self-reports of autonomous motivation and their impact, if any, on treatment. In the current study, contrary to the low levels of motivation generally reported of patients in the AN literature, the present sample reported high autonomous motivation and yet, while it was found to be predictive of working alliance measures at week four, it was not associated with treatment outcome. Future AN treatment studies should investigate the possible interactions between initial level of motivation and other related variables, such as

commitment to treatment or self-efficacy, in order to better understand motivation for treatment in AN. Alternatively, researchers exploring autonomous motivation in the AN population may be well served by adopting a model that not only accounts for the self-motivated drives that an AN patient might report at the beginning of treatment but that also expands into an exploration of the egosyntonic reasons for which the patient may be inclined to sustain their AN symptomatology. A model of ambivalence that accounts for both autonomous motivation for treatment and autonomous motivation to maintain illness may prove to be more informative and provide better insight into the drives of AN patients. Perhaps the consideration of this "motivation to sustain illness" as a factor in future regression models might help elucidate the possible association between motivation for treatment and outcome. This approach would require the development of a measure for autonomous motivation to maintain illness, which could be designed to address the particular features of the AN presentation.

AN subtypes. Finally, a topic of interest that may implicate the AN literature at large and a worthwhile subject for future research is the qualitative differences that appear to exist between the AN subtypes. In the current study, the AN subgroups differed in their reports of working alliance, baseline levels of distress and eating disorder symptomatology, as well as rate of treatment completion. These findings echo the results of similar research in the AN literature, indicating the stability of these differences. When coupling this set of observations with the larger literature on eating disorders, where qualitative differences are found between AN patients and bulimia nervosa (BN) patients in presentation and response to treatment, it is reasonable to argue that it might be of

benefit to subject the ED classifications to an in-depth review. Currently, the DSM-5

(APA, 2013) classifies individuals with an eating disorder under the diagnosis of AN if

their BMI is below 18.5 kg/m^2 regardless of their method of weight control; those who

primarily restrict their eating would receive a diagnosis of Other Specified Feeding or

Eating Disorder (OSFED), Atypical Anorexia Nervosa if their BMI is above 18.5 kg/m^2

and a diagnosis of AN, restricting subtype if their BMI is below this cut-off; those who

primarily binge and purge receive a diagnosis of BN above the BMI cut-off and a

diagnosis of AN binge-purging subtype below the BMI cut-off. What this represents is a

classification system that combines two qualitatively different presentation into a single

diagnostic umbrella based on a horizontal cut-off; a BMI below 18.5 kg/m^2. The

existence of the AN subtypes acknowledges these differences. The fact that both

presentations fall under the same diagnostic umbrella, however, might act as a potential

limitation in research and as a potential detriment for AN treatment. In AN research,

pooling treatment data from two qualitatively different diagnoses may result in confounds

that obscure the significance of treatment effects and other related variables, which could

potentially account for the mixed findings reported in the AN literature to date. In AN

treatment, pooling two populations with significantly different presentations into a single

treatment method might yield uneven or inconsistent treatment outcomes, which could

account for the low rates of treatment effectiveness and high rates of attrition in the AN

population. It is possible to conceive that patients diagnosed with AN-BP may have more

in common with BN patients than AN-R patients. Such a hypothesis would be better

represented by a diagnostic conceptualization in which the AN-BP presentation is

understood as a more severe form of BN and diagnostically differentiated from AN-R. What this would represent is a classification system that brings to the forefront a vertical division between the presentations. Researchers in the field of AN treatment should be encouraged to report findings making an emphasis on AN subtypes to further build our understanding of the differences between the groups. Ultimately, research endeavours should be dedicated to clarify which classification model would be most helpful for research in eating disorders in general, and AN in particular, in order to maximize the effectiveness of treatment methods, thus finding more consistent means to help a population suffering from great distress and facing a very dangerous outcome.

Conclusion

In summary, the treatment of adult AN remains one of the most paramount clinical endeavours while continuing to be elusive to develop and investigate due in great part to the very characteristics that define this serious disorder. The present pilot study explored the working alliance and motivation for treatment as clinical factors that might help predict treatment outcome in adult AN, and was the first research study to explore the link between working alliance and motivation for treatment in this population. While no association was found between working alliance and treatment outcome, nor between motivation for treatment and treatment outcome, the present study found that baseline measures of autonomous motivation, and early changes in this variable, predicted reports of working alliance at week four of treatment. While several limitations commonly found in the study of AN populations reduced the inferences that can be derived from these findings, the data suggests that perhaps a model of ambivalence towards treatment might

be more informative in this population than the one-sided study of motivation for treatment. Further, the current study found that AN subtypes seemed to differ in their response to treatment, the quality of their working alliance with the treatment team, and differed significantly in measures of treatment outcome and rates of early treatment termination. These findings add to the body of research that suggests AN subtypes, binging-purging and restricting, might present enough qualitative differences to warrant the consideration of different treatment approaches. In addition to this question, future research must further assess the time at which measures of working alliance should be taken to maximize their predictive capabilities and ascertain the validity of self-reports of motivation for treatment. Continued effort must be sustained in clinical research to improve the efficacy of the treatments to mitigate this distressing and life-threatening mental illness that affects so many individuals and families.

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Figures

Figure 1

Flow Chart of Sample Size and Attrition

```
┌─────────────────────────────┐
│   108 Consecutive Patients  │
│      Recruited for Study    │
└─────────────────────────────┘
                │
                ▼
┌─────────────────────────────┐        ┌─────────────────────────────┐
│  53 Patients Remained in    │        │ 55 Patients Terminated       │
│  Study with Measurements    │───────▶│ Treatment Before the         │
│  of Working Alliance        │        │ Measurement of Working       │
│                             │        │ Alliance                     │
└─────────────────────────────┘        └─────────────────────────────┘
                │                                       │
                ▼                                       ▼
┌─────────────────────────────┐        ┌─────────────────────────────┐
│ 40 Patients Completed        │        │ 25 Patients in the Attrition │
│ Treatment                    │        │ Group Completed Measures of  │
│                             │        │ Motivation                   │
└─────────────────────────────┘        └─────────────────────────────┘
                │
                ▼
┌─────────────────────────────┐
│ 36 Patients Provided EDE-Q   │
│ Scores at Discharge          │
└─────────────────────────────┘
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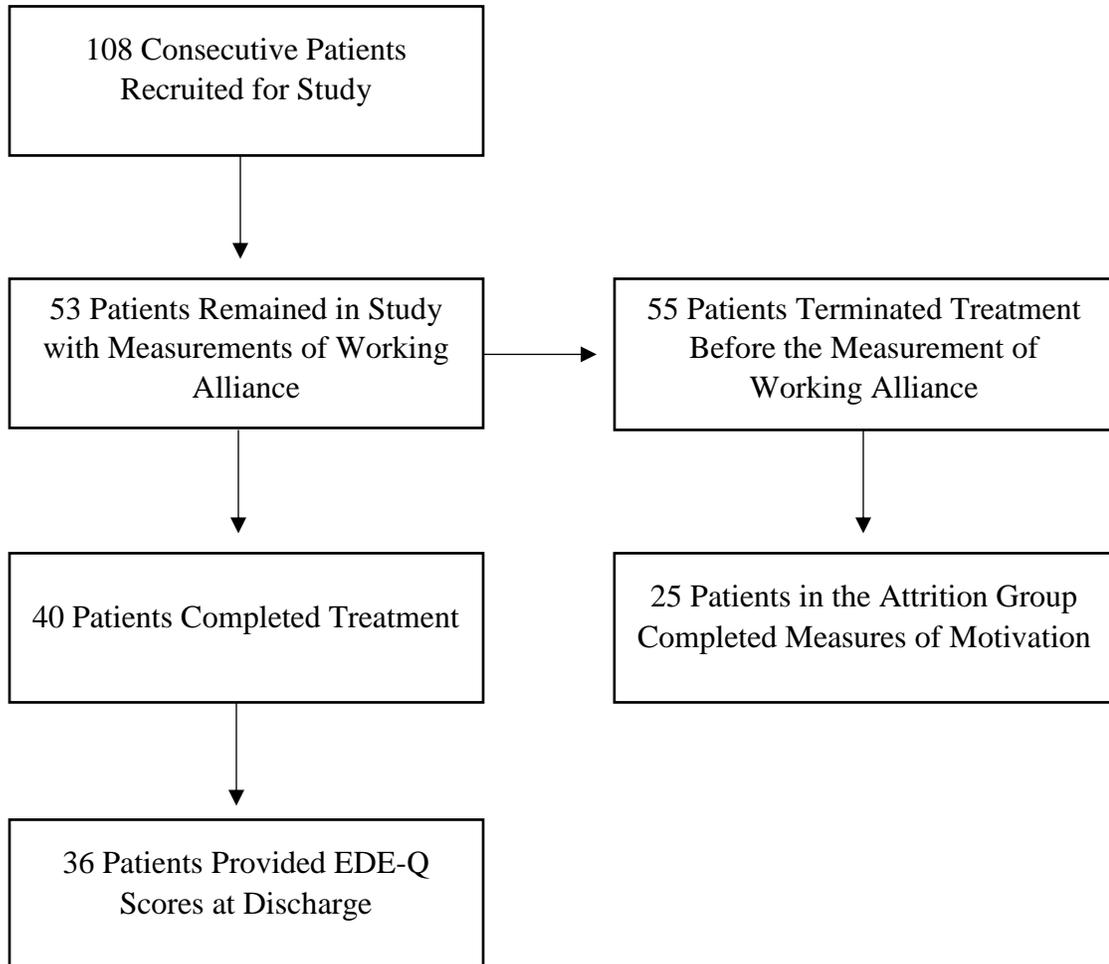
Tables

Table 1

Marital Status, Living Circumstances, Current Occupation, and Ethnicity of Sample (N=53)

	Frequencies (%)
Marital Status	
Single	37 (69.8)
Married	10 (18.9)
Separated	2 (3.8)
Divorced	1 (1.9)
Common-law	2 (3.8)
Missing data	1 (1.9)
Living Circumstances	
Lives alone	11 (20.8)
Lives with parents	24 (45.3)
Lives with partner/children	12 (22.6)
Lives with friends/roommates	4 (7.5)
Lives with other family	1 (1.9)
Missing data	1 (1.9)
Current Occupation	
Higher executives, proprietors, major professionals	2 (3.8)
Business managers, medium size business, lesser professional	4 (7.5)
Administrative, owners, small business, minor professionals	7 (13.2)
Clerical/sales workers, technicians, owner little business	2 (3.8)
Skilled manual employees	3 (5.7)

Unskilled	4 (7.5)
Student	15 (28.3)
Unemployed	10 (18.9)
Self-Employed	1 (1.9)
Community and social service occupation	3 (5.7)
Missing data	2 (3.8)
Ethnicity	
Caucasian (White)	35 (66.0)
French Canadian	1 (1.9)
West Indian	1 (1.9)
Oriental	1 (1.9)
Italian	4 (7.5)
East Indian	1 (1.9)
European	4 (7.5)
Canadian	2 (3.8)
Irish	1 (1.9)
Dutch	1 (1.9)
Missing data	2 (3.8)

Table 2

Age, Age at Onset, Duration of Illness, and Weeks in Program of Sample (N=53)

	Mean (SD)
Current age	30.00 (10.43)
Age at onset	19.63 (8.58)
Duration of illness (years)	10.67 (9.60)
Weeks in program	15.74 (5.46)

Table 3

Frequencies of Eating Disorder (ED) Diagnosis , Previous Intensive Treatment, and Program Completion (N=53)

	Frequency (%)
ED diagnosis	
AN-R	24 (45.3)
AN-BP	29 (54.7)
Previous intensive treatment for ED	
No	28 (52.8)
Yes	24 (45.3)
Missing data	1 (1.9)
Program completion	
Did not complete program	13 (24.5)
Completed program	40 (75.5)

Note. AN-R = Anorexia Nervosa, Restricting subtype; AN-BP = Anorexia Nervosa, Bingeing/Purging subtype. Program completion defined by an EDE-Q total < 4 and BMI > 18.5 at time of discharge.

Table 4

Results of Paired t-test Comparing Means of BMI, EDE-Q, BSI, AMTQ, and CMTQ Scores at Baseline, Week 4, and/or Discharge

	Baseline		Week 4		Discharge				
	Mean (SD)	*n*	Mean (SD)	*n*	Mean (SD)	*n*	*t*	df	Cohen's *d*
EDE-Q	4.38 (1.47)	53	–		2.90 (1.51)	36	7.052***	35	1
BSI	2.21 (.84)	52	–		1.31 (0.85)	36	6.570***	34	1.06
AMTQ	36.29 (5.70)	52	31.32 (7.17)	52	–		.797	50	.76
CMTQ	31.33 (7.17)	52	31.94 (6.57)	52	–		-.541	50	.09
BMI	15.01 (1.33)	53	16.00 (1.42)	53	n/a		8.394***	52	.74
	15.01 (1.33)	53	n/a		19.65 (1.55)	53	20.052***	52	3.22

Note. BMI = Body Mass Index; EDE-Q = Eating Disorder Examination Questionnaire; BSI = Brief Symptom Inventory; AMTQ = Autonomous Motivation for Treatment questionnaire; CMTQ = Controlled Motivation for Treatment questionnaire. "–" indicates that no data were collected at the time. "n/a" indicates that the data was not included in the respective *t*-test analysis.

***$p < .001$.

Table 5

Results of Independent Samples t-tests Comparing Means of Baseline Demographic and Clinical Variables Between the Analyzed Sample and Attrition Subgroup

	Analyzed Sample Mean (SD)	Attrition Subgroup Mean (SD)	t	df	Cohen's d
Age	30.01 (10.43)	29.69 (11.52)	-.153	106	.03
Duration of Illness	11.05 (9.58)	10.09 (9.76)	-.500	101	.09
T1 BMI	15.05 (1.32)	14.80 (1.50)	-.757	105	.17
T1 BSI	2.20 (.83)	2.21 (.78)	.085	106	.01
T1 EDE-Q	4.38 (1.47)	4.64 (1.10)	.769	76	.20
T1 AMTQ	36.65 (6.09)	35.16 (7.34)	-.926	74	.22
T1 CMTQ	31.32 (7.16)	31.70 (7.74)	.210	74	.05

Note. BMI = Body Mass Index; BSI = Brief Symptom Inventory; EDE-Q = Eating Disorder Examination Questionnaire; WAI = Working Alliance Inventory; AMTQ = Autonomous Motivation for Treatment questionnaire; CMTQ = Controlled Motivation for Treatment questionnaire; T1 = Baseline; duration of illness was measured in years.

All t-tests are non-significant.

Table 6

Results of the Hierarchical Regression Analyses with WAI at Week 4 as the Criterion and changes in BMI, AMTQ, and CMTQ, from Baseline to Week 4, as the Predictors (N=51)

	B	SE *B*	β	*t*
Model				
1				
T1-W4 BMI (1)	2.534	1.667	.212	1.520
T1-W4 AMTQ (2)	-.882	.257	-.438	-3.439**
2				
T1-W4 BMI (1)	2.534	1.667	.212	1.520
T1-W4 CMTQ (2)	-.317	.251	-.176	-.265

Note. WAI = Working Alliance Inventory; BMI = Body Mass Index; AMTQ = Autonomous Motivation for Treatment questionnaire; CMTQ = Controlled Motivation for Treatment questionnaire; T1-W4 = Baseline to Week 4 change. Numbers in brackets indicate the step in which each variable was added.
** $p < .01$.

Table 7

Results of the Hierarchical Regression Analyses with Baseline (T1) to Discharge (T2) BMI Change as the Criterion

	B	SE *B*	β	*t*
Model				
1 (N=52)				
AN subtype (1)	-.884	.446	-.270	.053
T1 AMTQ (2)	-.002	.037	-.007	-.053
2 (N=52)				
AN subtype (1)	-.884	.446	-.270	.053
T1 CMTQ (2)	.029	.031	.124	.908
3 (N=51)				
AN subtype (1)	-.739	.435	-.236	-1.700
T1-W4 AMTQ (2)	.016	.044	.053	.367
4 (N=51)				
AN subtype (1)	-.739	.435	-.236	-1.700
T1-W4 CMTQ (2)	.051	.038	.184	1.339
5 (N=53)				
AN subtype (1)	-.974	.449	-.290	-2.168[*]
W4 WAI (2)	-.013	.024	-.076	-.528
6 (N=53)				
AN subtype (1)	-.974	.449	-.290	-2.168[*]
T1-W4 BMI (2)	.382	363	.195	1.450

Note. BMI = Body Mass Index; AMTQ = Autonomous Motivation for Treatment questionnaire; CMTQ = Controlled Motivation for Treatment questionnaire; WAI = Working Alliance Inventory; W4 = Week 4. Numbers in brackets indicate the step in which each variable was added.
[*]$p < .05$.

Table 8

Results of the Hierarchical Regression Analyses with Baseline (T1) to Discharge (T2) EDE-Q Change as the Criterion (N=36)

	B	SE *B*	β	*t*
Model				
1				
AN subtype (1)	-.353	.373	-.160	-.945
T1 AMTQ (2)	.010	.034	.050	.289
2				
AN subtype (1)	-.353	.373	-.160	-.945
T1 CMTQ (2)	.028	.026	.182	1.078
3				
AN subtype (1)	-.353	.373	-.160	-.945
T1-W4 AMTQ (2)	.004	.039	.020	.111
4				
AN subtype (1)	-.353	.373	-.160	-.945
T1-W4 CMTQ (2)	.012	.034	.062	.359
5				
AN subtype (1)	-.353	.373	-.160	-.945
W4 WAI (2)	-.023	.020	-.211	-1.153
6				
AN subtype (1)	-.353	.373	-.160	-.945
T1-W4 BMI (2)	.031	.229	.024	.136

Note. EDE-Q = Eating Disorder Examination Questionnaire; AMTQ = Autonomous Motivation for Treatment questionnaire; CMTQ = Controlled Motivation for Treatment questionnaire; WAI = Working Alliance Inventory; BMI = Body Mass Index. W4 = Week 4. Numbers in brackets indicate the step in which each variable was added.

Table 9

Results of the Hierarchical Logistic Regression Analyses with Treatment Dropout as the Criterion (N=53)

	B	SE	Wald
Model			
1			
AN subtype (1)	1.304	.730	3.187
W4 WAI (2)	-.035	.036	.939
2			
AN subtype (1)	1.304	.730	3.187
T1-W4 BMI (2)	-.210	.431	.238

Note. WAI = Working Alliance Inventory; BMI = Body Mass Index; W4 = Week 4; T1 = Baseline. Numbers in brackets indicate the step in which each variable was added.

Table 10

Results of the Hierarchical Regression Analyses with AMTQ at Week 4 as the Criterion and Baseline Variables as the Predictors (N=51)

	B	SE *B*	β	*t*
T1 AMTQ (1)	.567	.125	.578	4.544
T1-W4 BMI (1)	.442	.844	.067	.523
T1 BMI (2)	-.543	.565	-.123	-.961
AN subtype (2)	-1.468	1.624	-.128	-.904
Age (2)	.119	.082	.221	1.446
Duration of illness (2)	-.065	.093	-.104	-.699
T1 EDE-Q (2)	-.225	.837	-.058	-.269
T1 BSI (2)	.091	1.482	.014	.062

Note. AMTQ = Autonomous Motivation for Treatment questionnaire; CMTQ = Controlled Motivation for Treatment questionnaire; BMI = Body Mass Index; EDE-Q = Eating Disorder Examination Questionnaire; BSI = Brief Symptom Inventory; T1 = Baseline; W4 = week 4; T1-W4 = Baseline to Week 4 change. Numbers in brackets indicate the step in which each variable was added.

Table 11

Results of the Hierarchical Regression Analyses with CMTQ at Week 4 as the Criterion and Baseline Variables as the Predictors (N=51)

	B	SE *B*	β	*t*
T1 CMTQ (1)	.547	.106	.605	5.141
T1-W4 BMI (1)	.264	.824	.038	.320
T1 BMI (2)	-.681	.619	-.146	-1.100
AN subtype (2)	-.097	1.813	-.008	-.053
Age (2)	.014	.091	.024	.150
Duration of illness (2)	.037	.102	.056	.358
T1 EDE-Q (2)	-.051	.917	-.012	-.056
T1 BSI (2)	1.043	1.643	.147	.634

Note. AMTQ = Autonomous Motivation for Treatment questionnaire; CMTQ = Controlled Motivation for Treatment questionnaire; BMI = Body Mass Index; EDE-Q = Eating Disorder Examination Questionnaire; BSI = Brief Symptom Inventory; T1 = Baseline; T2 = Discharge; W4 = week 4; T1-W4 = Baseline to Week 4 change. Numbers in brackets indicate the step in which each variable was added.

Table 12

Results of the Hierarchical Regression Analyses with WAI at Week 4 as the Criterion and Baseline Variables as the Predictors (N=51)

	B	SE *B*	β	*t*
T1-W4 BMI (1)	2.202	1.663	.186	1.324
T1 BMI (2)	-.387	1.067	-.049	-.363
AN subtype (2)	-4.980	3.059	-.244	-1.628
Age (2)	.283	.157	.288	1.802
Duration of illness (2)	-.283	.170	-.257	-1.665
T1 EDE-Q (2)	-2.167	1.576	-.309	-1.375
T1 BSI (2)	.579	2.842	.048	.204

Note. WAI = Working Alliance Inventory; BMI = Body Mass Index; EDE-Q = Eating Disorder Examination Questionnaire; BSI = Brief Symptom Inventory; T1 = Baseline; W4 = week 4; T1-W4 = Baseline to Week 4 change. Numbers in brackets indicate the step in which each variable was added.

Table 13

Results of Independent Samples t-tests Comparing Means of BSI, EDE-Q, WAI, AMTQ and CMTQ Scores, as well as BMI, by AN Subtypes

	AN subtype				
	AN-R	AN-BP			
	Mean (SD)	Mean (SD)	*t*	df	Cohen's *d*
T1 BSI	1.74 (.82)	2.61 (.64)	-4.261***	50	1.18
T1 EDE-Q	3.70 (1.66)	4.96 (1.02)	-3.380***	51	.91
T1 BMI	14.65 (1.33)	15.32 (1.27)	-1.858	51	.51
T2 BMI	19.82 (1.53)	19.52 (1.58)	.717	51	.19
W4 BMI	15.49 (1.40)	16.43 (1.32)	-2.471*	51	.69
T1-W4 BMI	.85 (1.06)	1.11 (.65)	-1.101	51	.29
T1-T2 BMI	5.17 (1.57)	4.19 (1.68)	2.168*	51	.60
W4 WAI	42.67 (9.33)	35.48 (9.82)	2.711**	51	.75
T1 AMTQ	36.00 (6.82)	37.21 (5.45)	-.713	50	.20
T1 CMTQ	31.08 (7.25)	31.54 (7.23)	-.225	50	.06

Note. AN-R = Anorexia Nervosa, Restricting subtype; AN-BP = Anorexia Nervosa, Bingeing/Purging subtype; BMI = Body Mass Index; BSI = Brief Symptom Inventory; EDE-Q = Eating Disorder Examination Questionnaire; WAI = Working Alliance Inventory; AMTQ = Autonomous Motivation for Treatment questionnaire; CMTQ = Controlled Motivation for Treatment questionnaire; W4 = Week 4; T1 Baseline; T2 = Discharge; T1-W4 = Baseline to Week 4 change; T1-T2 = Baseline to Discharge change.

*p < .05. **p < .01. ***p ≤ .001.