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Anorexia Nervosa and Obsessive-Compulsive Tendencies: A systematic Review of the Literature

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Anorexia Nervosa and Obsessive-Compulsive Tendencies: A systematic Review of the Literature

Janice M. Loscheider

M.S.W Clinical Research Paper

Presented to the Faculty of the
School of Social Work
St. Catherine University and the University of St. Thomas
St. Paul, Minnesota
In partial fulfillment of the requirements for the degree of

Master of Social Work

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The Clinical Research Project is a graduation requirement for MSW students at St. Catherine University/University of St. Thomas School of Social Work in St. Paul, Minnesota and is conducted within a nine-month time frame to demonstrate facility with basic social research methods. Students must independently conceptualize a research problem, formulate a research design that is approved by a research committee and the university Institutional Review Board, implement the project, and publically present the findings of the study. This project is neither a Master's thesis nor a dissertation.

Abstract

Successful treatment methods for adult sufferers of anorexia nervosa (AN) have still not been supported by research. Recently, many authors have suggested that research into shared traits involving obsessive-compulsive tendencies might contribute to improved theory based on etiology of the illness. The purpose of this systematic literature review is to bring the multitude of studies focusing on the shared underlying traits and the apparent overlap of disorders like obsessive-compulsive disorder, obsessive-compulsive personality disorder, and AN together in a way that truly speaks to improved treatment methods. First, findings include a potential predisposition, or common cause relationship between personality factors like perfectionism, high harm avoidance, high persistence, low novelty-seeking, and low cooperativeness to both OCPD and AN especially among individuals with the restricting subtype. In this case, a new treatment method called radically open-dialectical behavior therapy, which speaks to the common underlying factors of both OCPD and anorexia nervosa, may improve treatment. Secondly, findings show the co-occurrence rates of OCD and AN to be far ranging at 10%-60%, while still showing more co-occurrence than could be explained by chance. Family studies also support a common cause model due to the fact that obsessive-compulsive disorders are more likely to occur in relatives of eating disorder probands. In this case, when true obsessionality and compulsivity is suspected, a new treatment method using a modified obsessive-compulsive spectrum disorder model will inform treatment.

Table of Contents

Introduction.....	5
Literature Review.....	7
Conceptual Framework.....	16
Methodology.....	18
Data Abstraction and Analysis.....	20
Findings.....	22
Obsessive Compulsive Tendencies.....	22
OCD.....	22
Obsessive-Compulsive Behaviors.....	22
OCPD.....	23
Temperament and Personality Traits.....	24
Perfectionism.....	24
The Temperament and Character Inventory.....	26
Discussion.....	30
Treatment Implications and Summary.....	30
Transdiagnostic Theory.....	21
Radically Open-Dialectical Behavior Therapy.....	32
A Modified Obsessive-Compulsive Spectrum Disorder Model.....	36
Limitations.....	38
Implications for Future Research.....	39
References.....	41

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Anorexia Nervosa and Obsessive-Compulsive Disorder: A systematic Review of the Literature

The National Association of Anorexia Nervosa and Related Disorders (n.d.) estimates that at least 30 million Americans suffer from eating disorders. However, it is hard to track the prevalence of eating disorders. They are both under-reported and under-treated. In one study funded by the National Institute of Mental Health (2011) it was found that approximately three percent of U.S. adolescents are affected by an eating disorder but the majority do not receive treatment for their eating related condition (Swanson, 2011). Eating disorders are a serious mental illness with the highest mortality rate of any mental illness (“ANAD,” n.d.; Smink, Hoeken, & Hoek, 2012). Increased mortality rates exist across eating disorder diagnosis, even those once thought to be less severe. Death is most commonly due to medical complications associated with the disorder or from suicide (American Psychiatric Association, 2013). Crow et al. (2009) found mortality rates for anorexia nervosa (AN) to be 4.0%; in addition they found rates for bulimia nervosa (BN) and other specified feeding or eating disorder (OSFED) to be at 3.9% and 5.2% respectively. The DSM-5 reports the crude mortality rate for anorexia nervosa to be approximately 5% per decade (American Psychiatric Association, 2013).

Most frequently, treatment like cognitive behavior therapy (CBT) and interpersonal psychotherapy (IPT) are used to treat eating disorders across individual diagnoses. Unfortunately many still fail to recover (Wilson, Grilo, & Vitousek, 2007). Anorexia nervosa (AN) is arguably one of the most difficult eating disorders to research with any efficacy due to small research samples, the wide variety of often unempirical treatment methods used in studies, and the large drop-out rates among research subjects (Agras et al., 2004; Steinhausen, 2002; Wilson et al., 2007). In spite of these challenges, Stienhausen (2002) compiled results from

124 studies over the second half of the 20th century and was able to estimate that among patients who survived, an average of 46.9% recovered, 33.5% improved, and 20.8% remained chronically ill with the disorder over the long term. However, it was mentioned that conclusions in a large number of studies were jeopardized by high dropout rates with no consistent pattern or obvious indication that those with higher dropout rates had better results (Stienhausen, 2002).

Unfortunately, not much research exists on successful psychotherapy treatments for AN for similar reasons. Wilson et. al. (2007) reported that, “Above all, the disappointing findings of treatment research highlight the need for a better understanding of anorexia nervosa psychopathology” (p. 203). They went on to highlight the need to understand the attitudes that lead patients to resist treatment, “...which often include the conviction that thinness and restraint are more important and somehow more ‘correct’ than recovery (p. 203). These statements were followed by a call for research into better forms of psychotherapy that examine the issues that render this illness so resistant to treatment (Wilson et al., 2007).

The purpose of this systematic review of the available literature will be to evaluate the literature on the possible etiology of the illness. Thereby, specific treatment methods can be identified and conclusions about important components of the treatment methods can be drawn from the literature. The hope of this student researcher is that this systematic literature review will expand on the school of social work’s understanding of treatment resistant cases of eating disorders. It is also hoped that it will offer clinical social workers a deeper understanding of how to work with this population because the literature reports that they are needed in the field (Agras et al., 2004).

Literature Review

Anorexia Nervosa

Definitions. A diagnosis of anorexia nervosa (AN) meets with three primary symptom presentations. First, the patient rigidly restricts energy intake on an ongoing basis. Second, the patient expresses an intense fear of gaining weight by engaging in behaviors that he or she believes will interfere with weight gain in spite of a body weight that is less than what is considered minimally normal. Third, patients' experience of their weight and shape and the significance of their weight and shape is distorted; or, in the event that patients are aware of their thinness, they will seem unaware or unconcerned with the serious health risks of being malnourished. The DSM-5 indicates levels of severity in accordance with body mass index (BMI) recommendations set by the World Health Organization categories for thinness (American Psychiatric Association, 2013).

The DSM-5 distinguishes two subtypes. Restricting type (AN-R) is the diagnosis given to individuals who have not engaged in binge-eating or purging behavior for a period of at least three months prior to diagnosis. AN-R presentations include dieting, fasting, and sometimes extreme exercise to achieve weight loss. Binge-eating/purging type (AN-BN) presentations are similar to AN-R except that the individual uses purging behaviors: this may include self-induced vomiting, misusing laxatives, enemas, or diuretics to control weight. This may also include binge-eating behaviors followed by purging. Crossover between subtypes commonly occurs over the course of the disorder; therefore, the DSM-5 advises that distinguished subtypes should refer to current symptoms rather than the longitudinal course of the illness (American Psychiatric Association, 2013).

Common treatment approaches. AN is usually treated on an outpatient basis; however, issues like depression, suicidal ideation, failure of outpatient treatment or an inability to gain weight or reverse severe cycles of bingeing and purging may warrant hospitalization or partial hospitalization. Issues surrounding severe starvation and extreme weight loss like hypotension or hypothermia, and electrolyte imbalance also signal a need to hospitalize the patient. Current psychological treatment methods will generally involve some type of behavioral modification combined with individual and group psychotherapy. The behavior modification may involve positive reinforcement in the form of special privileges like a pass with a family member to conceptually help the patient to achieve a weight goal that would have been outlined in a treatment contract. Individual psychotherapy techniques usually emphasize a behavioral approach involving nutritional education, psychosocial support and cognitive restructuring techniques (Black & Andreasen, 2011).

In severe cases of AN it is recommended that before psychotherapeutic intervention begins, weight is initially restored to the degree necessary for the patient to be able to comprehend and participate in therapy (Strober, 2013). CBT and IPT are currently the recommended psychotherapeutic interventions of choice only because they have both demonstrated some efficacy in the treatment of bulimia nervosa and binge-eating disorder (Black & Andreasen, 2011). Wilson et al. (2007) reported that CBT as a treatment for bulimia nervosa was shown to typically eliminate binge eating and purging in approximately 30% to 50% of all cases. Theory-driven, manual based CBT was shown to be the most researched evidence-based treatment for bulimia nervosa. Theory is based on a cognitive model of the supposed mechanisms that maintain bulimia nervosa. Similarly, IPT adapted for bulimia nervosa is a model applied to the treatment of AN. This model emphasizes current interpersonal issues that

are considered to increase stress and thus play into disordered eating behaviors (Black & Andreasen, 2011). Both CBT and IPT were found to be superior to basic behavioral treatments (Wilson et al., 2007).

Success of treatment approaches. Very little evidence of successful treatments for AN exist. This is particularly true for the successful treatment of adult sufferers of the illness (Steinhausen, 2002; Wilson et al., 2007). A relatively recent treatment approach called the Maudsley Model involves conjoint family therapy and has proven to be the only effective evidence-based treatment of AN to date (Keel & McCormick, 2010). Unfortunately this treatment has only been indicated for adolescent patients (Lock & Fitzpatrick, 2009). Patients who develop AN in adulthood or those with a longer history of AN have not been shown to benefit (Wilson et al., 2007). If adolescents with AN are not treated successfully, prognosis becomes less favorable since effective treatment methods, even those successful in the short-term, have not been identified for adults (Bulik, Berkman, Brownley, Sedway, & Lohr, 2007, Steinhausen, 2002; Wilson et al., 2007).

Currently, the literature says more about which treatments to avoid than which to utilize for adult sufferers of AN. This includes treatments that are of short duration for example those that meet for 20 sessions or less. It also includes treatments that only consist of medication or nutritional counseling. Speaking to the lack of proven methods for treating AN, Agras et al. (2004) commented, "...the relatively modest success of specific interventions in adult patients may reflect delivery of truncated or attenuated treatments and/or insufficient regard to the particular nature of AN or issues of chronicity more than it reflects the impact of any particular treatment paradigm (e.g., family systems theory; cognitive-behavioral theory)" (p. 515).

Difficulty of treating AN. In the above quote, Agras et al (2004) were likely referring to the fact that the current treatments of choice for AN, namely CBT and IPT are being used because they have shown moderate success in the treatment of another illness, namely bulimia nervosa (Black & Andreasen, 2011). At the same time outcome studies on the course and treatment of AN in the 20th century showed that less than half of the patients with AN—an exact figure of 46% met with full recovery, one third improved with partial or residual features of AN, while 20% remained chronically ill (Steinhausen, 2002). Wilson et al. (2007) note that the numbers in favor of recovery across the literature reflect the recovery of adolescents who are treated in the early stages of the illness.

The problems with applying CBT and IPT for bulimia nervosa to the treatment of AN do not end here. Wilson et al. (2007) compiled findings showing that empirically tested treatments for other eating disorders like CBT for bulimia nervosa (CBT-BN) are actually rarely implemented in clinical practice. According to a survey of mental health professionals in Calgary, Alberta, Canada conducted by Von Ranson & Robinson (2006), instead of evidence-based CBT for example, a higher percentage of therapists reported using CBT as part of self-described eclectic therapists' approaches in the treatment of AN. This meant that CBT techniques were often combined with diverse combinations of psychological treatments, including addiction-based approaches. Wilson et al. (2007) went on to indicate that this is not only unsupported empirically but that addiction-based approaches are not theoretically or procedurally compatible with CBT (Wilson, 2010). Not only did this survey highlight concerns about certain types of psychotherapy integration, it also brought to light the fact that few therapists were able to name the primary author of the CBT and IPT manuals from which they had been trained which caused Von Ranson & Robinson (2006) to question if they were really

using those evidence-based treatments. They also found that therapists relied more on their own clinical experience and judgment than on evidence of controlled research (Von Ranson & Robinson, 2006).

It makes sense that if an empirically based treatment method for the successful treatment of AN does not exist, clinicians will modify techniques to try and deal with the often chronic nature of AN. Most treatment manuals outline methods that do not extend beyond 6-12 months (Wonderlich et al., 2012). Von Ranson & Robinson's (2006) survey results may also reflect what is already known about the lack of formal training opportunities in eating disorder treatment (Wilson et al., 2007). Fewer than half of the respondents had been formally trained in any treatment for eating disorders in the context of graduate training; at the same time the vast majority expressed a wish to receive training in CBT or IPT if it were offered (Von Ranson & Robinson, 2006). Wilson et al. (2007) expressed an opinion that doctoral training programs in the United States provide insufficient and inadequate educational opportunities for training in eating disorders treatments, especially evidence-based treatments.

Treatment methods that have been proven to work for adult sufferers of AN are still nonexistent. Positive outcomes across studies have come from the treatment of adolescents with a brief experience of symptoms. "None of the modalities tested—including family therapy, behavior therapy, cognitive behavioral therapy, interpersonal psychotherapy, several forms of dynamic therapy, and supportive therapy—has achieved comparable success with more established cases of anorexia nervosa" (Wilson et al., 2007, p. 202). Research is often compromised due to the fact that sample sizes are usually small and many patients drop out prematurely (some due to the fact that they must be hospitalized). The few positive or negative findings in terms of treatments come from single studies with 8-10 participants per cell, which

are then incorrectly extrapolated across patient groups of varying age, duration and severity.

“The disappointing findings of treatment research highlight the need for a better understanding of anorexia nervosa psychopathology” (Wilson et al., 2007, p. 203).

CBT and core psychopathology. Manual based CBT for the treatment of bulimia nervosa (CBT-BN) is the most researched evidence-based treatment for bulimia nervosa and is currently the most widely applied treatment method for AN and BN (Wilson, 2007). While it’s theory of core psychopathology has been revised since its original inception in a number of ways including a newer transdiagnostic perspective that makes a case for its applicability to the maintenance of all eating disorders, its core features are still maintained. Fairburn (n.d.) defines a cognitive process whereby one’s ability to control weight, shape and eating behavior is over-valued. Fairburn (n.d.) explains that while most individuals are prone to evaluating their abilities across many areas of their lives, those with eating disorders determine their core self-worth to a large extent on their shape, weight and their ability to control them. This differs from dissatisfaction with one’s weight or shape, which is common among the general population. According to Fairburn (n.d.), most features of the disorder appear to be secondary to this core psychopathology with varying expressions.

This core theory accounts for everything but binge eating behaviors. These are believed to be a natural result of the unrealistic and perfectionistic standards set by the eating disordered individual. Originally, it was said that if and when the individual’s self-defined ideal eating behavior was not upheld, he or she was prone to over-react and see the incident as proof of a lack of self-control. This then was said to cause the individual to temporarily abandon their efforts to restrict eating resulting in a binge. Now, the binge-eating episode would cause the individual to react with even greater dietary restraint and thereby increase the likelihood of binge eating,

which would then become a self-perpetuating cycle. Additional factors related to the maintenance of the disorder are said to be: the likelihood that dietary slips and binges were in response to acute mood changes (usually adverse mood states) so the behavior was rewarded by distraction from adverse mood states; the likelihood that the introduction of purging behaviors would result in more bingeing since a deterrent of binge eating (the likelihood of weight gain) was removed; the likelihood of the individual to see themselves at fault rather than their standards, resulting in a cycle of negative self-evaluation-unrealistic standards-failure to maintain standards-enhanced negative self-evaluation-doubling down of efforts-and so on (Fairburn, n.d.).

Obsessive-Compulsive Tendencies

Since successful treatment for adult sufferers of AN has still not been supported by research, many have called for research into better forms of psychotherapy that examine the issues that render this illness so resistant to treatment (Wilson et al., 2007). The case has been made by many authors that shared traits involving obsessive-compulsive tendencies might contribute to improved theory based on origins (etiology) of the illness (Halmi et al., 2005). The literature on eating disorders (ED) is abundant with subject matter related to the obsessive-compulsive tendencies present in eating disorders and the apparent overlap of disorders like obsessive-compulsive disorder (OCD) and obsessive-compulsive personality disorder (OCPD). Studies and articles pertaining to obsessive-compulsive tendencies in EDs are difficult to assess and summarize due to the fact that many studies have failed to use standardized measures for diagnosing EDs, OCD, and personality disorders (Serpell, Livingstone, Neiderman, & Lask, 2002). The umbrella term obsessive-compulsive tendencies is used in this study to refer to basic obsessive-compulsive behaviors and the disorders OCD and OCPD.

OCD. Some of the aspects that make AN so difficult to treat seem to mirror obsessive compulsive disorder, which is another mental illness involving unrelenting fear driven thoughts and behaviors. Researchers have long commented on, and given detailed reports of some of the overlapping aspects of OCD and AN (Altman & Shankman, 2009). While OCD is an anxiety disorder and AN is an eating disorder, both disorders share cognitive processes like perseverating thought patterns and preoccupations that are driven by fear or anxiety producing stimuli. In AN, this would include thoughts associated with overeating or having a feared shape or size, while in OCD this would more typically include thoughts associated with mistakes being made or contamination. Likewise, in both disorders such thoughts are typically followed by a negative affective state, which is then followed by behaviors with a compensatory function. In AN, this might take the form of restricting behaviors, compulsive exercise or checking. In OCD it would more likely present as ordering or compulsive washing. In either case, the behavior is serving the purpose of regulating negative affect—more specifically anxiety (Altman & Shankman, 2009). Diagnostic features of OCD are the presence of recurrent obsessions or compulsions that are severe enough to be time consuming, or cause marked distress or significant impairment. Obsessions include persistent ideas, thoughts, or images which may be experienced as intrusive and inappropriate and that cause anxiety or distress. The individual experiences the obsession as unwanted. Thus the individual attempts to ignore, suppress, or neutralize the obsession with some other thought or action (i.e. through performing a compulsion). Compulsions often manifest as rituals, repetitive behaviors, or mental acts, which are excessive and are experienced beyond the developmentally appropriate period that the individual feels driven to perform in response to an obsession or according to rigidly applied rules. These behaviors or mental acts are aimed at preventing or reducing distress or preventing a dreaded event or situation; however, the

compulsion is either not connected in a realistic way to what they are designed to neutralize or they are clearly excessive (American Psychiatric Association, 2013).

Obsessive-compulsive behaviors. Some studies look at obsessive-compulsive tendencies among individuals with eating disorders in terms of obsessive-compulsive behaviors rather than comorbid disorders. This is probably most often assessed using the Yale-Brown-Obsessive-Compulsive Scale (Y-BOCS). This interview is designed to rate both presence and severity of obsessive thoughts and compulsive behaviors. These are the same kind of obsessions and compulsions that are typically found in individuals with OCD. It is considered to be the “gold standard” for measuring obsessive-compulsive symptom severity (The Price Foundation Collaborative Group, 2001).

OCPD. A personality characteristic or trait is a series of behaviors that one engages in habitually. Personality traits associated with OCPD include perfectionism, conscientiousness, rigidity, and preoccupation with rules and ethics. Many writers and researchers have suggested a link between AN and OCPD. It features preoccupation with orderliness, details, lists and an inability to compromise, as well as interpersonal control at the expense of flexibility, openness and efficiency (Serpell et al., 2002). A diagnosis of OCPD must include four of the following criteria: preoccupation with details/list/organization/schedules to the point where the primary objective is lost; perfectionism that interferes with task completion; excessive devotion to work and productivity at the exclusion of social activity and relationships; over conscientiousness and inflexibility about issues involving morality, ethics or values; an inability to discard worn out or worthless objects that have no sentimental value; reluctance to delegate tasks unless others submit to the individual’s way of doing things; a miserly spending style toward self and others; rigidity and stubbornness (American Psychiatric Association, 2013).

OCPD differs from OCD in that it is a pervasive pattern of behaviors and personality characteristics. It involves thinking, feeling, and acting in a way that impacts how one operates in the world and in one's relationships. The individual considers it the right way to do things and is resistant to change. On the other hand, OCD differs because the individual does not like the features of their experienced obsessions and compulsions. Additionally, OCD is not a desired way of operating in the world, behaving interpersonally, or of meeting personal goals.

Summary and gaps, including need for systematic review. Since the literature has yet to produce an empirically supported method for successfully treating AN in adult populations (Wilson et al., 2007), researchers have called for more studies analyzing the specific aspects of AN that render it so difficult to treat (Agras et al., 2004; Wilson et al., 2007). This has produced a multitude of studies looking at the relationship between AN and obsessive-compulsive tendencies designed to draw some conclusions about the possible driving force behind the behaviors that render AN—especially AN complicated by comorbid conditions like anxiety disorders and personality disorders so difficult to treat (Steinhausen, 2002). Countless studies have yielded far ranging reports of comorbidity and potential crossover of illnesses. What seems lacking at this stage of research, are studies that bring the wide-ranging evidence together and evaluate it in terms of treatment options. This study would add to the current literature by summarizing the literature supporting an association between AN and obsessive-compulsive tendencies while applying it to informing improved treatment methods.

Conceptual Framework

Many researchers have noted that overlapping aspects of AN and obsessive-compulsive tendencies appear to reveal shared etiology (Altman & Shankman, 2009). The study of behavioural phenotypes involves looking at those sharing a common disorder's observable traits

including common behaviors, cognitive processes and styles of interacting with society that are consistently associated with a syndrome. The strictest definition concludes that a behavioral phenotype is specific to a syndrome known to have a chromosomal or genetic etiology where there is little doubt that this anomaly is causal to the syndrome or disorder. Many believe that this definition is too restrictive. First, if it is only restricted to disorders with an identified genetic anomaly. This eliminates too many conditions simply because the genetic deficit is unknown. Secondly, how can it be proven that a genetic anomaly is causal to the disorder if behavior is modified by experience? It is also daunting to think of how it is possible for studies using actual humans as opposed to models of systems to truly clarify the mechanisms that link genetic anomalies to behavior thereby proving that they are causal. These are some of the reasons for their being no true consensus of the term (Skuse, 2000).

In its strictest form, the study of behavioural phenotypes serves the purpose of identifying proven links between phenotype and genotype. Articles and studies concerned with identifying a behavioural phenotype based on widely identified personality and temperamental traits and related behaviors common in individuals with eating disorders, AN and related obsessive compulsive tendencies have proliferated over the past several decades (Cassin & Von Ranson (2005); McCabe & Boivin (2008). While studies have spoken to the neurobiological and environmental factors that may be common to AN and obsessive-compulsive tendencies to explain possible etiologic overlap, research demonstrating the relative neurobiological and environmental causes, is still in its early stages and has yet to demonstrate causality. Some studies have suggested at possible environmental, genetic, neuroimmunological, neuroanatomical and neurochemical links, but further research is needed to identify the specific

mechanisms involved (McCabe & Boivin, 2008; Karwautz, Rabe-Hesketh, Collier, & Treasure, 2002; Stein, 2000).

In spite of their inability to show a chromosomal or genetic etiology, studies trying to develop a behavioral phenotype linking temperament, personality and obsessive-compulsive tendencies to eating disorders like AN can still show some utility in terms of informing improved treatment methods for AN. There are some theoretical models that could be helpful in illustrating the utility of analyzing the relationship between the developing behavioural phenotypes and an eating disorder. I will outline two. First, A common cause model would look at the developing behavioural phenotype and the eating disorder as independent conditions that are caused by a common underlying factor. Second, A predispositional model would describe a relationship where the developing behavioural phenotype or the disorder of interest precedes the eating disorder, thereby increasing the risk of developing an eating disorder. In this model the personality or behavior related pathology and eating pathology would be considered distinct constructs within the model (Adan & Kaye, 2011). Environmental factors will influence the intensity of the phenotype for this reason independent of genotype.

Methodology

The research design for this study of the relationship that exists between AN and obsessive-compulsive tendencies is a systematic review of the literature. This research design is indicated for several reasons including: the vast amount and wide range of research that has been done on this relationship; the fact that basic questions concerning etiology have yet to be answered in any meaningful way; and the fact that the key question about how to improve treatment methods based on findings about the relationship that exists between AN and obsessive-compulsive tendencies has gone unanswered. In short, framing the research findings in

the literature in a way that underscores applicable treatment protocols will address the key question about how to apply some of what we have learned about this relationship to improved treatment methods. In this systematic review of the literature, studies geared toward developing behavioural phenotypes and identifying their relationship with AN will be used to identify new treatment strategies that are more specifically related to core phenotypic differences like personality, temperament, and behaviors. Additionally, these studies will be used to identify new treatment strategies that are related to current treatment models for obsessive-compulsive disorder.

Articles for this study were selected using databases including Summon, PubMed, and PsycINFO. Initially, Search terms included combinations of “eating disorders” and “obsessive compulsive,” “comorbid,” “prevalence.” When many peer reviewed theoretical articles and studies showed a trend toward information and findings suggesting a strong correlation between AN, OCD/OCPD, and etiology, search terms were refined. At that point, combinations of search terms like “anorexia nervosa,” “obsessive compulsive disorder” and “obsessive compulsive personality disorder,” were focused on exclusively. Sometimes, when an article was identified as potentially useful to this study based on its annotation, additional articles were automatically identified by the search engines Summon, and PubMed as being related to the identified article and the option to open these additional articles was presented. In this way, other articles were also identified as useful to this study.

Peer reviewed theoretical articles and studies that were identified as showing the potential to be useful based on a quick assessment of the annotation were initially divided into the following categories: articles pertaining to the prevalence and temporal relationships of comorbid EDs including AN and OCD/OCPD; articles pertaining to the prevalence and temporal

relationship of EDs including AN and obsessive-compulsive tendencies based on a variety of other assessment measures; articles pertaining to obsessive compulsive tendencies and EDs including AN based on observed etiologic overlap. The articles relating obsessive-compulsive tendencies and EDs including AN based on etiologic overlap varied a great deal; thus, they were further divided into the following categories: studies focused on environmental factors; studies on neuroanatomical, neurobiological and neuropsychological factors underlying both types of disorders; genetic studies; family studies focused on etiologic overlap between AN or ED probands (the patient or member of the family that brings a family under study) and relatives with either obsessive-compulsive behaviors, OCD, or OCPD; articles linking various underlying temperament and personality traits to both AN and related eating disorders and obsessive-compulsive behaviors, OCD, and/or OCPD. Then, articles from each category were scanned and either thrown out or charted.

Data Abstraction and Analysis

First, articles related to environmental, genetic, neuroimmunological, neuroanatomical and neurochemical links were eliminated because of the wide-ranging mechanisms of study and measurement tools. An inability to generalize results, which were also more preliminary in nature, made data too hard to apply to possible treatment protocols. The articles remaining fell under the headings: studies related to EDs including AN's comorbid relationship with OCD and/or OCPD; studies related to the relationship between AN and other EDs and obsessive-compulsive tendencies (the exact term varied by assessment tool); family studies focused on etiologic overlap between AN or ED probands and relatives with either obsessive-compulsive tendencies, OCD, or OCPD; and finally, articles linking various underlying temperament and

personality traits to both AN and related eating disorders and obsessive-compulsive behaviors, OCD, and/or OCPD.

Each remaining category of articles was separated by its own excel spreadsheet. Each article was scanned for information including study type, population, measures and findings. Then, each article was either charted or thrown out. If five or more articles remained in a category search terms were refined. For example, articles relating specific personality and temperament traits to both obsessive-compulsive tendencies and anorexia yielded more than five articles that looked relevant; thus, the searches were completed again. Then, new terms were used in searches based on terms and phrases that were common to more than one article's title or abstract. Sometimes the term or phrase was chosen not because it was used more than once but rather because it seemed relevant to the study due to the fact that it related anorexia and obsessive-compulsive tendencies to etiology in a way that could inform treatment.

At this point, more detailed data was extracted from selected articles using the same spreadsheets. Study types were refined into further categories with respect to their ability to demonstrate a common cause model between AN and a behavioural phenotype involving obsessive-compulsive tendencies or their ability to demonstrate a predisposition model between AN and a behavioural phenotype involving obsessive-compulsive tendencies. Uniformity of definitions related to obsessive-compulsive tendencies that fell outside of defined OCD and OCPD based on standard measurement devices were sought. Uniformity of definitions related to underlying temperament and personality traits based on standard measurement devices were also sought. This led to the elimination of a large number of articles as the Yale-Brown obsessive-compulsive scale (Y-BOCS) was favored to measure obsessive compulsive behaviors, and the

temperament and character inventory (TCI) was favored to measure temperament and personality traits. More on why these instruments were favored will be discussed later.

With the elimination of so many studies due to the reasons stated above, more organic and specialized searches were conducted using the assessment tools as search terms combined with terms related to the words and phrases contained in the titles, abstracts and the body of articles in each remaining category. Searches were also conducted using the references sections of remaining articles. Also, when an original source seemed superior and when the search engine allowed it, “cited by” was used to look for similar articles.

Findings

Obsessive Compulsive Tendencies

OCD. There have been a multitude of articles examining the possibility that OCD and EDs, especially AN, are related disorders (Wu, 2008). It has also been reported that OCD, obsessive-compulsive spectrum disorders, and EDs have higher rates of comorbidity than could be explained by chance (Abramowitz, McKay, & Taylor, 2008). EDs and OCD have been found to co-occur in 10%-60% of cases of AN and in 0%-40% of cases of BN (Godart, Flament, Perdereau, & Jeammet, 2002, Halmi et al., 2005). Family studies have also pointed to a common cause model by showing that OC spectrum disorders are more likely to occur among relatives of eating disorder probands than relatives among the general population. (Bellodi et al., 2001; Lilienfeld et al., 1998).

Obsessive-compulsive behaviors. As already noted, some studies look at the relationship between eating disorders and obsessive-compulsive behaviors rather than assessing individuals for comorbid disorders that include core obsessive-compulsive behaviors. One recovered study design assessed individuals with an ED, individuals who had recovered from an

ED at least one year prior, and individuals without an ED for obsessive-compulsive behaviors to show if these behaviors continue after recovery from an eating disorder. It was concluded that these symptoms do not vary in a significant way after recovery so there is a possibility that obsessive-compulsive behaviors are trait-related and contribute to eating disorders (Von Ranson, Kaye, Weltzin, Rao, & Matsunaga, 1999). A similar finding was made in a study that assessed individuals who had a diagnosis of AN-R for at least 3 years prior to assessment and their siblings with a lifetime diagnosis of AN or BN. Obsessive-compulsive behaviors were found to be part of a larger grouping of behavioural traits that were predictive of ED subtypes, especially the AN-R subtype (The Price Foundation Collaborative Group, 2001).

OCPD. Although it is unclear if OCD and OCPD share common causative factors (Halmi et al., 2005), generally speaking, individuals with AN-R also tend to have obsessive-compulsive tendencies that include OCPD and other cluster C personality disorders like avoidant and dependent personality disorders, which are characterized by personality traits like inhibition and anxious features. In a sampling of studies looking at reports by individuals recovered from eating disorders, OCPD was found to be the most common personality disorder among those recovered from AN-R (Sansone, Levitt & Sansone, 2004). A very strong twin study with a prospective design showed that OCPD traits occur more frequently in those who go on to develop AN than in those who do not. This showed that OCPD traits may predispose the individual to the development of AN (Rastam, 1992). Cassin & Von Ranson (2005) also found notable results by exclusively analyzing studies that assessed personality disorders by diagnostic interview versus self-report measures. They found that self-report measures tended to over-diagnose. Among studies that separated personality disorders by ED subtypes they found that OCPD was most frequently diagnosed among those with AN-R, which was closely followed by

avoidant personality disorder. Their results also showed that while self-report instruments tend to overestimate the rate of personality disorders for both ANR and BN, they do generally yield similar patterns of findings in terms of most common personality disorders (Cassin & Von Ranson, 2005). Finally, a study by Matsunaga et al. (2000) showed that OCPD rates remain elevated over the general population after recovery from an ED, again suggesting that OCPD is not just a complication of the ED.

Temperament and Personality Traits

Perfectionism. Perfectionism is considered a risk factor contributing to the development of EDs and their maintenance (Egan, Wade, & Shafran, 2011). Perfectionism has also been linked to OCD. The Obsessive Compulsive Cognitions Working Group has identified perfectionism as one of the six primary factors in OCD (Cottraux et al., 1997). A study by Yahghoubi & Mohammadzadeh (2015) found that maladaptive perfectionism was predictive of obsessive-compulsive features and pathological eating attitudes using a combination of the obsessive-compulsive inventory-revised (OCI-R) and the perfectionism inventory (PI). There is also overlap between perfectionism and the diagnosis of OCPD, “perfectionism that interferes with task completion” (American Psychiatric Association, 2013, p. 678). Halmi (2004), reported that individuals with AN and those recovered from AN had higher perfectionism scores than healthy controls using the eating disorders inventory perfectionism subscale (EDI-P), and two versions of the Multidimensional Perfectionism scale (MPS). Additionally, individuals with EDs, who had both OCD and OCPD had the highest perfectionism scores. This study included findings that OCPD was more related to elevated perfectionism than OCD, which led them to conclude that high perfectionism, and OCPD might predispose an individual to develop an ED. In an attempt to identify personality traits that increase

vulnerability for the development of AN, Lilenfeld (1998) found that there was an increased risk for the development of OCPD in relatives of anorexic probands even if the probands did not have OCPD. This led to the conclusion that AN and OCPD share familial risk factors. Another family study of EDs found that female relatives of probands with an ED had elevated perfectionism regardless of the presence of an ED. This led them to conclude that perfectionism was transmitted independent of an eating disorder, and, therefore may predispose individuals to EDs.

It should also be noted that one of the findings of this review is that literature on perfectionism is hard to thoroughly interpret due to the wide variety of measurement tools used by researchers. It is also relevant to the understanding of EDs including AN and its crossover with obsessive-compulsive tendencies that Fairburn, Cooper, and Shafran (2003) specifically addressed perfectionism in addition to three other maintaining processes that were said to interact with core psychopathology so that change was inhibited (Fairburn et al., 2003). Fairburn's (n.d.) model of psychopathology, which underlies his treatment method—cognitive behavior therapy for bulimia nervosa (CBT-BN) was outlined earlier in the literature review. It is the most widely accepted model of psychopathology used for both bulimia nervosa and AN. Fairburn et al. (2003) included this statement about perfectionism as a maintenance mechanism of eating disorder psychopathology in the introduction of a transdiagnostic theory to provide for the individuals who did not recover from treatment via CBT-BN. Maintaining processes were said to include “clinical perfectionism” (in addition to the perfectionism inherent to eating disordered tendencies). Shafran, Cooper, and Fairburn (2002) defined clinical perfectionism as, “the overdependence of self-evaluation on the determined pursuit of personally demanding, self-imposed, standards in at least one highly salient domain, despite adverse consequences” (p. 778). Its core characteristics were said to be clinically relevant in two ways. First, clinical

perfectionism was said to be overly dependent on striving for and achieving personally demanding standards. Shafran et al. (2002) explained that this overdependence revealed an evaluation of the self that was extremely vulnerable so that failure to meet demanding standards resulted in self-criticism. Second, the scheme for self-evaluation was said to be dependent on the domain in which the perfectionism was expressed. Therefore, if self-evaluation depended on ongoing striving to meet demanding self-imposed standards in the domain of weight loss, then psychological (and possible physical) dysfunction would result. This was said to account for the continuous striving of people with perfectionism to attain their goals. It was also said to account for their self-criticism, fear of failure, and their inability to relinquish standards even when they resulted in adverse consequences. The inability to relinquish standards even when they resulted in adverse consequences was noted as an important distinction in clinically relevant or pathological perfectionism (Shafran et al., 2002).

The temperament and character inventory. The temperament and character inventory (TCI) (Cloninger, Przybeck, Svrakie, & Wetzel, 1994) is the most commonly used measurement tool to look at temperament and personality in the field of eating disorders. Cloninger refers to temperament as moderately heritable emotional responses that are stable throughout life, and are mediated by neurotransmitter functioning in the central nervous system. The TCI assesses four temperament dimensions, which include: novelty seeking; harm avoidance; reward dependence; and persistence. Additionally, it assesses three character dimensions. These include: self-directedness; self-transcendence; and cooperativeness. Cloninger refers to character as consisting of self-concepts, values, and goals that develop through experience (Fassino, Amianto, Gramaglia, Facchini, & Daga, 2004).

A majority of cross-sectional studies have been conducted using this measurement instrument. Most commonly, EDs have been found to correlate with a highly harm-avoidant temperament in combination with a lower self-directedness score (Fassino et al., 2004). Harm-avoidance assesses a tendency to inhibit behavior to avoid punishment. It is also said to be related to increased serotonergic activity. High harm avoidance speaks to a fearful, pessimistic, shy, worrying temperament. The character trait self-directedness assesses the individual's view of the self as autonomous and integrated. Low self-directedness is associated with immaturity, fragility, difficulty in pursuing goals, and a belief that behavior is determined by external influences outside of one's control (Cloninger et al., 1994).

High harm avoidance and low self-directedness also coincided with low scores in the character trait cooperativeness in a recovered study design of individuals with ED profiles. This means that assessments were made after recovery from an ED so that the personality traits would be more likely to represent a predisposition factor than a state dependent characteristic. The character trait cooperativeness is said to assess the individual's ability to view the self as part of society (Cloninger et al., 1994). Low cooperativeness is associated with a tendency to be socially detached, less tolerant, and more critical of others. Overall, individuals with such a combination of personality traits tend to respond to situational stress with fear, anxiety, behavioural inhibition, and depression (Klump et al., 2004).

This profile, involving high harm avoidance, low self-directedness and low cooperativeness, was corroborated in an AN family study which suggests a predisposition model. However, in this instance high scores were also found in the temperament trait persistence and low scores were found in the temperament trait novelty-seeking. Since these personality traits were not shared by the sisters of AN probands, this study's predisposition model also suggests

that this personality profile represents a vulnerability factor (Karwautz et al., 2002). Cloninger's measure of persistence assesses an individual's perseverance without the use of intermittent reinforcement. Cloninger also links it to decreased noradrenergic activity. High persistence is associated with perfectionism, overachievement and diligence. The temperament trait Cloninger calls novelty-seeking is characterized by behavioural activation to pursue reward. It is thought to be related to decreased dopaminergic activity. Low novelty seeking is associated with rigidity, orderliness, frugality, and indifference (Cloninger et al., 1994). All together, this combination of temperament and character traits would portray an individual: who was more likely to react to a stressful situation with fear, anxiety, behavioural inhibition, and depression; who was overachieving, diligent and perfectionistic; and who was more rigid (less likely to take risks), prone to orderliness and frugality and indifferent to reward.

One cross-sectional study by Klump et al. (2000) also controlled for variances among AN subtypes: RAN (restricting anorexia nervosa; (PAN) purging type anorexia nervosa; and (BAN) bingeing type anorexia nervosa. It was found that the character trait self-directedness was highest among RAN subjects in relation to the other subtypes. RAN also differed from the other AN subtypes with the highest score in persistence and the lowest score in novelty-seeking. Klump et al. (2000) went on to interpret these findings as showing that those with RAN may be the most avoidant of change and risk of the three subtypes. It was also suggested that persistence and self-directedness might give these individuals the necessary perseverance and determination to allow them to perpetuate restricting behavior without developing bingeing and purging behaviors.

These findings were corroborated by (Fassino et al., 2002). Low novelty-seeking also suggests that such individuals avoid risk and appear reluctant to engage in new activities. This

profile contrasts with those with bingeing and purging behaviors who scored higher on novelty-seeking (Fassino et al., 2002; Klump et al., 2000), and suggests that those with bingeing and purging behaviors are likely to be more impulsive, intolerant of routine and excitable (Cassin & Von Ranson, 2005). These findings showing that those with AN-R might be the: most avoidant of risk and change; most prone to perfectionism; and most prone to rigidity, obsessiveness and perseverance are corroborated by other accounts of AN-R. The current studies and others have also reported that AN-R might have the most homogenous personality profile (Schmidt, 2003). In a large international study The Price Foundation Collaborative Group (2001) looked at 237 relative pairs including probands with a lifetime 'core' diagnosis of AN for not less than 3 years prior to ascertainment and siblings with a lifetime diagnosis of AN & BN. Subjects were assessed for temperament and personality traits and behaviors. Then researchers used discriminant analysis to see how reliably subjects were assigned the correct subdiagnostic label when only looking at the extracted personality/behavioural factors. The subdiagnostic label was found to correlate with classification based on personality/behavioural factors approximately two-thirds of the time for AN including subtypes and BN. However, accuracy jumped to 80% among subjects with an AN-R subtype who had remained AN-R without conversion to another subtype for at least three years prior to the study. According to their findings, a behavioural phenotype including trait anxiety, harm avoidance, perfectionism, obsessive-compulsive behavior, and diminished self-directedness may typify an underlying construct among individuals with AN. These findings are consistent with substantial literature showing that anorexic individuals, especially those with AN-R, have extreme levels of behavioural rigidity, emotional restraint and perfectionism (The Price Foundation Collaborative Group, 2001). Remember that these traits also match the inhibited, rigid, perfectionist, and anxious personality

profile of an individual with OCPD, which was also found to most commonly co-occur with the AN-R subtype.

The phenotypic characterization of eating disorders and OCPD based on personality and behavioural constructs may prove to be useful in identifying genetic susceptibility to disease (The Price Foundation Collaborative Group, 2001). I will try to show that it can also inform treatment methods using a new method called radically open-dialectical behavior therapy. Then I will show how crossover between obsessive thought patterns and compulsive behaviors in AN and OCD can inform treatment of AN using a modified obsessive-compulsive spectrum disorder model.

Discussion

Treatment Implications and Summary

Transdiagnostic theory lends support for new treatment models. Fairburn et al. (2003) noted that "...CBT-BN is not effective enough: at best, only half the patients make a full and lasting response. This raises the important question, "Why aren't more people getting better?" (p. 514). To account for this, an updated theory was introduced. This updated theory upholds the original core eating disorder maintaining mechanisms outlined above but it added the following maintaining processes which were said to interact with the core psychopathology so that change was inhibited. The maintaining processes were said to be: clinical perfectionism (as was already mentioned above); core low self-esteem; mood intolerance, and interpersonal difficulties. Additionally, the transdiagnostic perspective argued that all eating disorders share the same core feature, "patients over-evaluating eating, shape and weight and their control" (p. 519).

While on one hand Fairburn et al. (2003) seemed to be addressing improved treatment theory by adopting the perspective that core features were present across subtypes of eating disorders, on the other hand, they spoke to some variance in personality and temperament and related maintaining mechanisms by subtype:

Clinical perfectionism is more prominent in anorexia nervosa than bulimia nervosa which may partly account for these patients success at restricting their eating. Core low self-esteem also occurs in anorexia nervosa especially in more chronic cases where it appears to be an important maintaining factor. In contrast, mood intolerance...is less typical of patients with anorexia nervosa, although it is seen among some of those with the binge eating/purging form of the disorder. Lastly, interpersonal difficulties are frequently present in anorexia nervosa, both with the patient's family and with his or her peers ...Thus, each of the four additional sets of maintaining processes specified in the broader conceptualization of bulimia nervosa is also likely to operate among subgroups of patients with anorexia nervosa. And again, in our experience, the same applies in precisely the same way to subgroups of patients with atypical eating disorders (Fairburn et al., 2003, pp. 521-522).

What Fairburn et al. (2003) seem to be getting at is the fact that varying causative and/or maintaining underlying temperament/personality traits and behavioral tendencies (behavioural phenotypes) may find expression in varying ways across eating disorders while serving to maintain the disorder. Some characteristic maintaining processes or rather transdiagnostic processes were generalized by Fairburn et al. (2003) as the maintaining mechanisms: clinical perfectionism; core low self-esteem; mood intolerance; and interpersonal difficulties:

We have not proposed that these additional mechanisms necessarily operate simultaneously, nor have we suggested that they are active in every case. Indeed, their partial independence may account in part for the varied and fluid form of these disorders. Rather, we have suggested that in individual patients they contribute to the maintenance of the eating disorder and that, under such circumstances, unless they are successfully corrected, treatment is not likely to result in full and lasting recovery... (Fairburn et al., 2003, pp. 521-523).

Fairburn et al. (2003) also announced that this new transdiagnostic approach to theory and treatment extended beyond the field of eating disorders. It was said to be relevant when the clinical features of two or more diagnostic states overlap and are maintained by common pathological processes as evidenced by either shared distinctive clinical features or movement of patients between the diagnostic states. Furthermore, this overlap should be identifiable by something like a common distinctive obstacle to change or by the development of a common distinctive method of achieving change. The presence of either of these two characteristics suggests that both disorders share a common maintaining process (Fairburn et al., 2003, pp. 521-523). This theoretical model will be used to lend validity to the following two treatment model recommendations for AN.

Applying findings to a radically open-dialectical behavior therapy model.

Transdiagnostic overcontrol. Just as Fairburn et al. (2003) discussed the importance of addressing core etiology and maintenance processes in the treatment of AN, Lynch et al., (2013) looked at overcontrol as a transdiagnostic process in the etiology and maintenance of some cases of AN, most common to those with the core AN-R subtype. The findings of this systematic literature review are summed up remarkably well by this quote, in which Lynch et al. (2013)

share a behavioural phenotype that leads the individual sufferer to act and react to stimuli with excessive levels of self-control. “Over-control (OC) or excessive inhibitory control has been linked to social isolation, poor interpersonal functioning, hyper-perfectionism, rigidity, risk aversion, lack of emotional expression, and the development of severe and difficult-to-treat mental health problems, such as chronic depression, anorexia nervosa, and obsessive compulsive personality disorder” (p. 2). In many ways the profile of individuals with an overcontrolled approach to coping also mirrors the definition of clinical perfectionism shared by Shafran et al. (2002).

Clinical perfectionism, OCPD, and AN with underlying TCI traits. Defining clinical perfectionism, Lynch, Hempel, & Dunkley (2015) paint a picture of an individual who sets high standards for her or himself, works hard, and will often sacrifice personal needs in order to achieve desired personal goals and standards. In addition to matching with findings in regards to AN and clinical perfectionism and diagnostic overlap with OCPD, the concept of transdiagnostic overcontrol also goes along with the large amount of information shared in reference to the temperament and character inventory (TCI). This showed that individuals with AN (especially those with AN-R) have a more homogenous temperament and character profile (behavioural phenotype) characterized by: extreme levels of behavioural rigidity; emotional restraint and inhibition; perfectionism; obsessiveness and perseverance; reluctance to engage in new activities, and avoidance of risk and change (Fassino et al., 2002; Klump et al., 2000; The Price Foundation Collaborative Group, 2001; Schmidt, 2003), which again may be in contrast to other phenotypic presentations of ED subtypes that show higher TCI scores in temperament traits suggesting higher impulsivity, intolerance to routine, and emotional excitability (Cassin & Von Ranson, 2005). These traits are more in line with what Lynch et al., (2013) would refer to as issues

related to an undercontrolled personality subtype. This is the behavioural phenotype characteristic of personality disorders like borderline personality disorder, which is the type of population that dialectical behavioural therapy (DBT) was originally designed to treat.

The RO-DBT treatment model. DBT was based on a model in which the core problem was seen as severe emotion dysregulation, an invalidating environment, and from the perspective of phenotypic behavioural patterns—an undercontrolled coping pattern. In contrast, RO-DBT was developed based on its conceptualization as a transdiagnostic treatment for disorders of overcontrol, so strategies are different in spite of core principles having much to do with standard DBT. Rather than resting strategy on emotion dysregulation (the core problem of DBT), RO-DBT defines the core problem as “emotional loneliness secondary to low openness and social-signaling deficits” (Lynch, Hempel & Dunkley, 2015, p. 142). While the individual with too much self-control might have high aptitude for pursuing long-term goals and following rules related to social control, Lynch et al. (2015) posit that such an individual will often feel “clueless” about how to adopt a sense of belonging with others or how to develop intimacy with others. Herein lies the core problem of those suffering from disorders of over-control.

Core theory. Theory rests on the idea that a predisposition for heightened threat sensitivity (harm-avoidance) and low levels of reward sensitivity (reward dependence) and family/environmental experiences emphasizing mistakes as intolerable and self-control as imperative, result in a neurologic system that is less able to enter its safety zone. In contrast, when an organism *is* able to enter its neurologic safety zone, the calming parasympathetic nervous system is activated. When the parasympathetic nervous system is activated, it works to override the sympathetic nervous system thus allowing the organism to relax enough to explore and communicate with others. However, since a threat is often perceived in the surrounding

environment by the over-controlled individual, the dominating sympathetic nervous system (which is responsible for the fight, flight or freeze response) leads to an increased heart-rate, this activates the striated muscles of the face and head, which results in a reduced ability to engage in the social world. For the over-controlled individual, defensive arousal leads to disingenuous or frozen expressions and stilted interactions with others (Lynch et al., 2013).

RO-DBT also sees restrictive eating as a maladaptive means of coping with the pervasively negative affect associated with high harm avoidance and accompanying sympathetic nervous system responses. In this way, it would be false to say that RO-DBT and its associated disorders of over-control are opposite to DBT and related disorders dealing with the problems of being undercontrolled. Both groups have had to develop maladaptive means of coping with negative affective states and dysregulation. In RO-DBT it is believed that the depleted metabolic state brought on by restrictive eating activates the calming parasympathetic nervous system, which inhibits the activating sympathetic nervous system and results in emotional numbing. This is another way in which restrictive eating and ultimately starvation are reinforced as an emotion regulation strategy. This also feeds into the conception of the core problem as emotional loneliness because it results in blunted emotional expression, which further exacerbates social ostracism.

RO-DBT addresses this core issue through strategies with neurophysiology and the communicative functions of emotions in mind. Strategies focus on social connectedness and this includes skills acquisition in activating the calming parasympathetic nervous system. This means that over-controlled individuals must learn to activate social-safety responses and learn to signal cooperation to others before engaging socially. Activation of the social-safety system is also believed to reduce compulsive behaviors like restrictive eating that are driven by stress (via

the sympathetic nervous system) and negative affect. By learning to activate the social-safety system, an individual opens oneself to the calming effects of the parasympathetic nervous system (Lynch et al., 2013).

Applying findings to a modified obsessive-compulsive spectrum disorder model.

While suggesting that the RO-DBT model is applicable to the treatment of AN based on literary findings linking its maintaining factors to those personality and behavioural traits common to OCPD, a modified obsessive-compulsive spectrum disorder model could likewise be applicable to the treatment of AN based on OCD symptom overlap. As was mentioned earlier in the literature review, the diagnostic features of OCD are the presence of either obsessions or compulsions that are severe enough to be time consuming or cause distress or significant impairment. Obsessions are defined as being persistent and intrusive. They are unwanted. The individual feels driven to perform compulsions in response to an obsession or according to rigidly applied rules. These behaviors or mental acts serve the purpose of preventing or reducing distress or preventing a dreaded event or situation. Such behavior must either be clearly excessive or it must not be connected in a realistic way to what it is designed to neutralize (American Psychiatric Association, 2013). Looking at a typical case of AN in terms of this definition, even if one takes issue with considering AN preoccupations as unwanted, it is hard to deny that the AN sufferer's weight control behaviors are rigidly applied, are aimed at preventing or reducing distress, and are about preventing a dreaded event or situation to the point of excess.

AN and crossover with OCD. Crossover of AN and obsessive compulsive tendencies were evidenced in this systematic review by more comorbidity than could be explained by chance (Godart et al., 2002; Halmi et al., 2005) and family studies showing that OC spectrum disorders are more likely to occur among probands with EDs (Bellodi et al., 2001; Lilenfeld et

al., 1998). Additionally, findings found evidence of crossover through assessment of obsessive-compulsive behaviors from before the individual sufferer of AN was malnourished or after recovery (Von Ranson et al., 1999), and in AN probands and their family members with a history of EDs. This showed obsessive-compulsive behaviors to be trait related (The Price Foundation Collaborative Group, 2001).

An obsessive-compulsive spectrum disorder model for EDs. Addressing this apparent overlap, McCabe & Boivin (2008) reintroduced a modified version of Salkovskis' cognitive-behavioural model of OCD that incorporated modifications based on eating disorders literature and the evidence that was available to them on the overlap between eating disorders and OCD. The original etiologic model of OCD is a cognitive behavioral model that emphasized the belief that individuals with OCD misinterpret intrusive thoughts and that this is in part responsible for the formation of obsessionality. Additionally, it shares how faulty beliefs about intrusive thoughts—like that thinking about something makes it more likely to happen, adds to the anxiety and the urge to engage in a compulsion (Salkovskis, Shafran, Rachman, & Freeston, 1999). Directly applying this cognitive model to AN, would mean interpreting the weight and shape related obsessions seen in AN from this perspective. It would imply that it is the misinterpretation of thoughts like, “I feel fat,” into conclusions like, “...therefore I am fat,” that heighten the anxiety and result in compulsive behaviors like rigid restricting, purging, and repeated body checking. The disorder is then further established since acting in compulsive ways serves to reinforce misinterpretation and manifest obsessions. The cycle is self-perpetuating.

The core model was also modified to incorporate a physiologic feedback loop informed by dieting and purging behaviors, and a pathway was also added to the model to account for

some arguments that eating disorders involve thinking that may be more intentional and behaviors that may be more purposeful than in standard OCD profiles (McCabe & Boivin, 2008).

Limitations

Since treatment methods for AN that have support for success in adult populations still do not exist, many researchers have called for more research into the underlying mechanisms that render AN so resistant to treatment (Wilson et al., 2007), and more research into traits that contribute to the maintenance of anorexic behavior like perfectionism and rigidity (Agras et al., 2004). This systematic review of the literature included the review of many studies that heeded these requests. However, many studies had to be eliminated from the results due to the lack of uniformity in tools used to measure such underlying traits.

This was probably the most evident in the area of perfectionism. While there were also disparities in the measurement devices used to assess things like temperament and personality for example, there were enough studies showing uniformity by using the TCI that findings reflected by other measures could be eliminated, leaving enough data to generalize findings to some extent. However, in the case of perfectionism, measurement uniformity was practically nonexistent. After considering dropping it all together, it was ultimately decided that it was too important as a maintaining mechanism of both AN and OCPD to completely eliminate. However, the body of findings is less reliable due the fact that varying measurement tools were used. Since studies showing a predisposition or common cause model of perfectionism in regards to AN and obsessive-compulsive tendencies were also favored the number of studies included in the findings section was greatly reduced.

Studies identifying obsessive-compulsive behaviors were also greatly reduced due to the fact that many studies used varying measures of obsessive-compulsive traits. The Y-BOCS was

avored in this review to measure the obsessive thoughts and compulsive behaviors and to give a sense of the severity level. It measures for the same kind of obsessions and compulsions that are typically found in individuals with OCD. Again, looking for common measures in addition to predisposition or common cause models also reduced the number of studies reviewed in findings.

The scope of this systematic literature review was greatly reduced as a whole due to the fact that studies with a prospective (the strongest test of a predisposition model—the assessment is conducted before the disorder of interest presents itself), recovered (tests for predisposition by conducting an assessment after recovery from an ED) and/or family study design (can show predisposition or common cause by looking at patterns of personality in family members of currently ill or recovered probands) were sought due to their strength in speaking to etiology and/or causality over cross-sectional studies involving personality traits and behaviors. It has been noted by many sources that extended periods of starvation impact traits like rigidity and obsessiveness (Adan & Kaye, 2011). Unfortunately, very few studies on temperament and character have had the preferred prospective, recovered or family study design and thus cross-sectional studies were included in this study even though their ability to speak reliably to etiology is limited.

Implications for Future Research

Overall, the most important insight that should inform future research toward improvements of treatment acceptance in individuals suffering from AN, and other EDs, and comorbidity of OCD tendencies is that the underlying mechanisms that maintain the disorder certainly must vary from individual case to individual case, no matter the sub diagnosis. This speaks again to improved and standardized measurement tools related to personality and behavioural traits that can be informed by new treatment innovations like RO-DBT, DBT, or an

enhanced obsessive-compulsive spectrum disorder model for EDs. In terms of the underlying issues named as over-control and undercontrolled problems, it would be important to the successful treatment of more patients if screening methods could be applied to inform if RO-DBT (which is recommended for disorders of over-control) or DBT (which is more appropriate to treat undercontrolled behaviors) would be most appropriate. However, in the case of adding features of CBT for OCD (which includes targeting the misinterpretation of repetitive thoughts) to ED treatment, screening for the presence of true obsessionality would be important for many clients.

Generally, it could be said that more individualized treatment options seem to be the answer to the lack of success in treating adults with AN. In this way obsessive-compulsive tendencies and/or underlying personality traits could be targeted for treatment. As Fairburn et al. (2003) said of their take on the maintaining mechanisms of varying cases of eating disorders, "...Indeed, their partial independence may account in part for the varied and fluid form of these disorders...in individual patients they contribute to the maintenance of the eating disorder and ...unless they are successfully corrected, treatment is not likely to result in full and lasting recovery..." (Fairburn et al., 2003, pp. 521-523). The first step toward treating the individual maintaining mechanisms lies in identification through improved and standardized measures of personality and obsessive-compulsive tendencies that can be used in research and ideally, maybe even treatment settings. At this stage, improved studies through the use of standardized methods would hopefully contribute to the ultimate goal of more personalized treatment.

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