

# Toward Person(ality)-Centered Treatment: How Consideration of Personality and Individual Differences in Anorexia Nervosa May Improve Treatment Outcome

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**Anorexia nervosa (AN) is a serious illness that challenges mental health professionals globally. While family-based treatment is well established for adolescents with parents able to collaborate, little data are available to inform treatment choice for chronic or adult patients. This review proposes that the current high attrition, poor compliance, and suboptimal efficacy of outpatient interventions may reflect inadequate consideration of individual difference variables. Data on certain variables demonstrated to have relevance for AN are briefly summarized, and novel psychotherapeutic interventions that have taken these variables into account are reviewed. These data suggest that identifying subgroups of individuals with AN on the basis of relevant personality or neurocognitive variables may be one way to improve treatment acceptability and effectiveness for this challenging population.**

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Anorexia nervosa (AN) is a serious and potentially life-threatening psychiatric illness characterized by a relentless pursuit of low weight. The ego-syntonic nature of the disorder has earned it the reputation of being “one of the most difficult psychiatric disorders to treat” (Halmi et al., 2005, p. 776). Although fewer than 1%

of the population will receive a lifetime diagnosis of AN (Hudson, Hiripi, Pope, & Kessler, 2007), the burden of this disease is considerable. Comorbid medical (Rome & Ammerman, 2003) and psychiatric (Hudson et al., 2007) conditions are the norm and, in combination with an often chronic course (Keel & Brown, 2010), contribute to what is one of the highest mortality rates of any psychiatric illness (Arcelus, Mitchell, Wales, & Nielsen, 2011; Steinhausen, 2002). As a result of its many complicating factors, AN is among the most costly psychiatric illnesses and incurs costs comparable to the management of schizophrenia (Agras, 2001).

Anorexia nervosa is one of several feeding and eating disorders recognized in the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association, 2013)*, along with bulimia nervosa (BN), binge eating disorder (BED), and an unspecified diagnosis reserved for those individuals with clinically significant eating pathology that does not meet criteria for another disorder. Both clinical observation and research data demonstrate that these pathologies, while given distinct diagnoses, have substantial similarities, including similarities in disordered behaviors (Allan & Goss, 2014), cognitions (Vann, Strodl, & Anderson, 2014), and comorbidities (Hudson et al., 2007). These observed similarities are supported by empirical data demonstrating high rates of diagnostic crossover among the eating disorder diagnoses (Eddy et al., 2008; Milos, 2005). Thus, a number of experts have advocated for a transdiagnostic approach to ED research and treatment wherein all ED diagnoses are viewed as variable behavioral manifestations

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stemming from a central set of beliefs reflecting an overvaluation of eating, shape, weight, and their control (Fairburn, Cooper, & Shafran, 2003). This perspective purports that the varied symptoms across the various eating disorders are maintained by similar mechanisms and should thus respond to similar treatment (Fairburn, 2008).

A large body of literature has utilized this transdiagnostic approach to good end. A transdiagnostic approach to the study of eating pathology has shed light on common risk factors (Hilbert et al., 2014), genetic mechanisms (Bulik, Hebebrand, et al., 2007), neurobiological processes (Uher et al., 2004), and maintaining factors (Stice, 2002). Despite the promising yields of the transdiagnostic perspective, there remain compelling reasons to continue to study AN separately, or to consider personality-based subtypes that may cut across current diagnostic categories as an alternative or complementary approach. Notably, one prospective study examining diagnostic crossover in EDs found that AN was the most stable ED diagnosis (Milos, 2005). Furthermore, even among those who have migrated from AN to other EDs (e.g., BN), a history of AN places those with other EDs at risk for poor response to treatment (Eddy et al., 2007; Vaz Leal, Santos, García-Herráiz, Monge-Bautista, & López-Vinuesa, 2011), further suggesting the clinical relevance of AN-associated pathology. Overall, the prognosis for individuals with AN is significantly worse than for those with other EDs. In accordance with the clinical consensus, multiple reviews have concluded that individuals with AN do not respond as well to treatment as those with other EDs (Kelly & Carter, 2014). For all of these reasons, the present article will take a uni-diagnostic perspective (Birmingham, Touyz, & Harbottle, 2009) and focus specifically on individual difference variables that we propose may be relevant to understanding the high attrition and poor treatment response observed with AN.

Given its high disease burden and clinical challenges, identifying effective treatments for AN has been of utmost importance. Several decades of treatment research have generated some promising findings, but evaluation of those interventions has been inadequate. Clinical consensus and the limited available data both support the use of intensive treatments, such as those

provided in inpatient and residential settings that target weight restoration (Guarda, 2008; Treat, McCabe, Gaskill, & Marcus, 2008) and are largely successful in that regard, as individuals have little choice but to comply with meal plans. However, such treatments are cost-prohibitive for many individuals and are plagued by dropout and relapse rates as high as 50% (Huas et al., 2010; Woodside, Carter, & Blackmore, 2004). Additionally, clinicians have long noted the significant difficulties individuals discharged from intensive programs have in making the transition to independent decisions about food. To minimize the need for transitions, current clinical guidelines (e.g., National Collaborating Centre for Mental Health UK, 2004) recommend that individuals with AN be managed on an outpatient basis except when medically compromised.

In accord with these recommendations, a number of outpatient psychotherapies for the treatment of AN have been developed over the last several decades (see Bulik, Berkman, Brownley, Sedway, & Lohr, 2007; Guarda, 2008; Hay, Touyz, & Sud, 2012). Outpatient treatments come from a wide range of theoretical orientations and include treatments such as cognitive-analytic therapy (Treasure et al., 1995) and interpersonal therapy (McIntosh, Bulik, McKenzie, Luty, & Jordan, 2000). However, outpatient treatments have generally fallen short of expectations, with the exception of family-based treatment (FBT) for adolescents with AN (le Grange, Crosby, Rathouz, & Leventhal, 2007). Many of the randomized control trials conducted to date have failed to find meaningful differences between treatment arms (e.g., Lock, Agras, Bryson, & Kraemer, 2005), leaving the field confused as to what the treatment of choice for AN should be, at least for chronic or adult-onset cases. However, the lack of suitable treatments for AN is likely also a product of the many challenges faced by those attempting to conduct clinical trials with this medically unstable, low-base-rate, treatment-ambivalent population (Lock et al., 2011).

To date, the field has been primarily concerned with identifying a treatment that works for the modal individual with AN. This question is the typical first step in treatment development in the medical model (Bensing, 2000), which assumes that those individuals who do not respond to the first-line treatment (often referred to as “nonresponders”) will be the minority.

Decades of treatment development and research have demonstrated that this is not the case for AN. We suggest that the field's difficulty identifying a gold standard treatment for this challenging disorder may, at least in part, be the result of inadequate consideration of individual difference variables, primarily personality and neurocognitive traits. As noted above, inpatient treatment and FBT have had the most consistent results. For inpatients, there is little choice but to comply with or drop out of treatment, which many do. FBT creates a similar situation by having parents initially take on the role of staff in providing and supervising meals, but many parents are unwilling or unable to take on this role. We suggest that in such situations, the effect of patient personality variables is likely to be minimized. We also suggest that the typical difficulty reported in transitioning from fully supervised to independent food decisions may reflect the fact that personality traits reemerge at this point as significant factors affecting willingness and/or ability to comply with prescribed meal plans. In FBT, the fact that parents can more gradually reduce their supervision than can staff and that parents continue to maintain some presence in food decisions long-term may partially account for its superior effectiveness. Thus, we argue that the failure to identify a viable "first-line" outpatient treatment for AN (other than FBT) may reflect, at least in part, a failure to take individual difference variables into account. The aims of this article are to (a) summarize attempts to identify subgroups of individuals with AN based on personality features; (b) briefly review the literature on individual difference variables, including select personality and neurocognitive traits implicated in the pathology and treatment of AN; and (c) describe novel treatments that have targeted these variables and illustrate potential ways to improve treatment retention and success in AN.

#### **PERSONALITY-BASED SUBTYPES OF AN**

The last decade has seen a number of attempts to categorize individuals with AN (and individuals with EDs more broadly) into subgroups based on both behavioral and personality features. Diagnostic subgroups are not a new phenomenon: As in earlier editions, the *DSM-5* (American Psychiatric Association, 2013) recognizes two subgroups of individuals with AN based on strictly

behavioral indices. These subtypes are the restrictive subtype (AN-R), reserved for individuals who achieve their low weight purely by restricting their energy intake, and the binge/purge subtype (AN-BP), assigned to individuals who are at a significantly low body weight and also engage in repeated instances of overeating and/or compensatory behaviors. However, considerable heterogeneity in personality within each of these subtypes and high rates of crossover between subtypes call the validity and utility of these distinctions into question (Eddy et al., 2002; Peat, Mitchell, Hoek, & Wonderlich, 2009).

Personality-based classification systems have emerged as alternative or supplemental approaches to the current diagnostic framework. Rather than categorizing individuals based on the presence or absence of disordered eating behaviors, these approaches categorize individuals on the basis of common personality features. As noted in a recent review (Wildes & Marcus, 2013), such approaches are not entirely new. Research in the 1980s and 1990s focused on classifying individuals with eating disorders based on patterns of comorbidity. For example, Lacey and Evans (1986) identified a subset of patients with BN who displayed impulsivity across multiple domains. Later work sought to establish the differences in presentation, course, and outcome between these "multi-impulsive" and "uni-impulsive" bulimic individuals and generally concluded that there are meaningful differences: Multi-impulsive bulimics were observed to have higher levels of anxiety and depressive symptoms (Matsunaga et al., 2000) as well as more anger, hostility, and disordered eating after treatment (Fichter, Quadflieg, & Rief, 1994); report earlier age of onset of binge eating (Wiederman & Pryor, 1996); report a history of childhood abuse (Myers et al., 2006); and have higher rates of borderline personality disorder (Nagata, Kawarada, Kiriike, & Iketani, 2000).

Recent attempts have utilized statistical techniques such as cluster analyses to identify subgroups of individuals with EDs, with some consistent findings. For example, Westen and Harnden-Fischer (2001) utilized a Q-analysis procedure, the Shedler-Westen Assessment Procedure-200 (Westen & Shedler, 1999a, 1999b), to analyze clinician-rated personality descriptions of a large number of ED patients. Their analyses

revealed three distinct subgroups of patients with EDs: a high-functioning/perfectionistic group, characterized by high levels of conscientiousness, perfectionism, guilt, and anxiety; a constricted/overcontrolled group, characterized by emotional inhibition and avoidance; and an emotionally dysregulated/undercontrolled group, characterized by intense emotions and impulsive behaviors. The authors noted that, while patients with different diagnoses did tend to fall into different personality clusters (e.g., patients with AN were more often categorized as constricted/overcontrolled and patients with BN were more often emotionally dysregulated/undercontrolled), there was substantial within-diagnosis heterogeneity. Furthermore, within-diagnosis heterogeneity in personality features was associated with relevant clinical indicators, including global functioning, history of psychiatric hospitalizations, history of childhood sexual abuse, and binge/purge frequency. These findings have since been replicated in unique samples of both adults and adolescents with eating disorders (e.g., Gazzillo et al., 2013; Lavender et al., 2013; Turner, Claes, Wilderjans, & Pauwels, 2014; Wildes et al., 2011).

These personality-based subtypes have been shown to interact with the behaviorally based subtypes of AN in meaningful and informative ways. Westen and Harnden-Fischer (2001) found differences in the extent of personality heterogeneity within the current AN behavioral subtypes: Whereas those with AN-BP were distributed across all three personality subtypes, those with AN-R were present only in the high-functioning/perfectionistic and the constricted/overcontrolled subtypes. This discrepancy suggests that there is not a simple one-to-one correspondence between behavioral and personality subtypes of AN, but that there may be reliable differences in personality within and between the two behavioral subtypes recognized currently (even among those with AN-R, who have a relatively more stereotypic presentation). Thus, if clinicians rely solely on an individual's behavioral subtype, important information about that individual's personality may be overlooked. As will be demonstrated in the following section, taking personality traits and other individual difference variables into account may have the potential to improve treatment retention and outcome for this challenging disorder, particularly for outpatient

treatments, which rely heavily on patient motivation and engagement to be successful.

#### **INDIVIDUAL DIFFERENCES AND THE TREATMENT OF AN**

As noted above, there exists within AN (and within EDs broadly) variability across an array of personality traits, as well as subgroups of individuals with distinct personality profiles. The aim of this section is to briefly review the literature on those individual difference variables considered the most relevant to AN; in the interest of brevity, only those studies that most clearly demonstrate the relevance of the trait to the treatment of AN are presented here (see Cassin & Vonranson, 2005; Lilenfeld, Wonderlich, Riso, Crosby, & Mitchell, 2006; see also Vitousek & Manke, 1994). Table S1 (see Supporting Information) contains a summary of these studies, as well as additional references. For each variable discussed, novel treatments that have included consideration of that trait are reviewed. The following traits are reviewed: perfectionism, obsessiveness, experiential avoidance, impulsivity, and cognitive rigidity. This list includes a selection of personality traits and neurocognitive traits, each of which is included here because of its potential relevance to the treatment of AN. These traits are likely not mutually exclusive, but because each trait has emerged from a distinct line of research and has a distinct operationalization, even highly similar traits (e.g., perfectionism and obsessiveness) are reviewed separately. Further work is needed to understand the overlap among these traits. Traits included in an earlier review (Cassin & Vonranson, 2005) but not included in the present review include narcissism, sociotropy, autonomy, interpersonal sensitivity, neuroticism, and negative emotionality. Although the authors acknowledge that these traits may be relevant to the presentation and pathology of AN, they are omitted from the present review as they have not been associated directly with the development of novel treatment approaches.

In the majority of the literature reviewed, AN is treated as a single diagnosis that has been compared to other ED diagnoses. Differences in the extent to which a trait manifests within the two behavioral subtypes of AN are noted when such data are available. Additionally, it should be noted that, except where explicitly stated, studies examining the efficacy of novel treat-

ments have not selected individuals on the basis of personality traits or other individual difference variables and then assigned them to relevant treatments. Rather, treatments have been developed based on the assumption that a particular trait is associated with AN and thus targeting that trait is expected to enhance treatment efficacy for AN in general (or for AN relative to other EDs). An alternative approach that could be useful is a matching approach that would select individuals identified a priori as being elevated on the trait that is targeted by the intervention. Further work is needed to determine whether treatments that include attention to individual difference variables described here may be generally more effective, perhaps because they enhance acceptability and compliance with treatment, or whether matching individuals selected for certain traits to specific treatments enhances outcomes specifically through reducing the identified trait. Working with an already low-base-rate population increases the challenge of evaluating a matching approach, but single-case or case-series designs may be able to shed some light on the utility of tailoring treatment to address specific traits.

### **Perfectionism**

Perfectionism is widely considered to be an archetypal personality trait among individuals with AN. Several reviews have summarized the literature on perfectionism in EDs (Bardone-Cone et al., 2007; Franco-Paredes, Mancilla-Díaz, Vázquez-Arávalo, López-Aguilar, & Álvarez-Rayón, 2004). In general, the data suggest that perfectionism is a trait broadly relevant to EDs and eating-disordered behaviors and is particularly relevant to AN. In particular, a growing body of literature suggests that perfectionism may be a trait with substantial relevance to the course and treatment of AN. For example, a study by Sutandar-Pinnock, Woodside, Carter, Olmsted, and Kaplan (2003) found that among a group of inpatients with AN, lower perfectionism scores at admission predicted better response to treatment and better outcome at follow-up. A more recent study likewise found that individuals recovered from AN had lower perfectionism scores than individuals who were not recovered from AN (Keski-Rahkonen et al., 2013). Similarly, data from a longitudinal study of adolescents with AN suggest that

the relationship between perfectionism and duration of illness is inverse, such that those individuals with higher perfectionism are more likely to have a longer duration of illness (Nilsson, Sundbom, & Hägglöf, 2008). The precise mechanisms by which high levels of perfectionism confer a worse prognosis for those with AN are still unknown. One possibility is that standard treatments for AN do not typically address perfectionism directly and thus do not adequately address the ways that perfectionism contributes to AN.

In summary, data indicate that perfectionism is a personality trait implicated in risk for and recovery from AN and has demonstrated relevance to the course of treatment. Indeed, some have argued that perfectionism can be as much of a core symptom as malnourishment and may necessitate its own treatment. Shafran, Cooper, and Fairburn (2002) have labeled this particularly problematic and clinically relevant form of perfectionism as “clinical perfectionism,” defined as “the overdependence of self-evaluation on the self-determined pursuit of personally demanding, self-imposed standards in at least one highly salient domain, despite adverse consequences” (Shafran et al., 2002, p. 778). Perfectionism features prominently in Fairburn’s enhanced form of cognitive-behavioral therapy for eating disorders (CBT-E; Fairburn, 2008), which illustrates one way that treatment can be individualized to address personality traits. In CBT-E, individuals who fail to respond adequately to the initial eight weeks of standard CBT are reassessed and the most problematic maintaining mechanism is identified. Clinical perfectionism is one of the three optional modules that can be added. Intervention then attempts to broaden the individual’s scheme for self-evaluation, utilize behavioral experiments to test hypotheses about the function of perfectionism, and employ cognitive-behavioral methods to address dichotomous thinking and self-criticism. Although studies have not isolated the specific contribution of the perfectionism module, CBT-E has shown promise in the treatment of AN in open and uncontrolled trials of both adults and adolescents. Fairburn et al. (2013) found that adults with AN treated with CBT-E achieved significant weight gain and decreases in eating disorder psychopathology over the course of treatment and maintained this weight over the 60-week follow-up period, and Dalle Grave,

Calugi, Doll, and Fairburn (2013) found similar results in adolescents with AN. However, other work on perfectionism-specific interventions for AN has produced mixed results. Lloyd, Fleming, Schmidt, and Tchanturia (2014) found that a group-based cognitive-behavioral intervention aimed specifically at perfectionism in AN produced significant reductions in perfectionism and a small but significant increase in weight from pre- to posttreatment, whereas Goldstein, Peters, Thornton, and Touyz (2014) found that the addition of CBT for perfectionism to treatment as usual was no more efficacious in terms of reducing eating pathology or perfectionism than treatment as usual. The latter finding supports the notion that targeting perfectionism directly may only be necessary for some subset of AN patients, presumably those highest on this personality trait.

### **Obsessionality**

Obsessionality is a term used to reflect a range of sub-threshold obsessive-compulsive (OC) traits. Such traits are characteristic of a substantial number of individuals with AN (Błachno, Bryńska, & Tomaszewicz-Libudzić, 2014; Holliday, Uher, Landau, Collier, & Treasure, 2006) and, like perfectionism, may be relevant to the treatment and outcome of AN. While there is a large literature on the role of comorbid obsessive-compulsive disorder (OCD) and obsessive-compulsive personality disorder (OCPD) in individuals with AN (Altman & Shankman, 2009), a comorbid diagnosis of OCD requires more than the presence of obsessions and rituals around eating and weight. The present review focuses on the role of obsessionality as a trait-like feature, which among individuals with AN may be largely limited to food, eating, shape, and weight concerns and as such would not necessarily represent a comorbid disorder. Obsessionality thus defined has been shown to be associated with greater severity of AN (Jiménez-Murcia et al., 2007) and predicts worse outcomes (Crane, Roberts, & Treasure, 2007; Strober, Freeman, & Morrell, 1997). Of note, obsessionality does appear to be exacerbated by the state of starvation (Keys, Brožek, Henschel, Mickelsen, & Taylor, 1950; Pollice, Kaye, Greeno, & Weltzin, 1997) but nonetheless persists after recovery from AN (Holtkamp, Müller, Heussen, Remschmidt, & Herpertz-Dahlmann, 2005). Thus, data consistently demonstrate that obsessionality is a

trait characteristic of individuals with AN, which is typically present prior to illness onset and is not merely a by-product of the underweight state.

Clinicians have long noted that the obsessive thoughts of individuals with AN (and EDs more broadly) fall into two categories: thoughts about food and eating and thoughts about weight and shape. In an attempt to directly target these obsessions, as well as the compulsive behaviors patients develop to manage their obsessional anxiety, researchers have recently begun to examine the efficacy of treatments used to treat obsessions and compulsions found in other psychiatric disorders, such as OCD. This line of reasoning has been reviewed elsewhere in great detail (see Lewin, Menzel, & Strober, 2013; Steinglass et al., 2013). Briefly, among individuals with OCD, symptoms such as obsessionality, avoidance of feared stimuli, and ritualized behaviors are highly responsive to treatment with Exposure with Response Prevention (ERP); indeed, ERP is widely considered the only empirically supported treatment for OCD. ERP is believed to be effective because it facilitates habituation to previously feared stimuli and obsessional thoughts (Abramowitz, Taylor, & McKay, 2009). It thus stands to reason that exposure to food and eating-related obsessions while simultaneously preventing compulsive behaviors (e.g., abnormal eating behaviors such as cutting food into small pieces) could potentially be helpful for the treatment of AN. It is interesting to note that several early case reports and randomized trials examined the use of systematic desensitization, a procedure similar to ERP wherein relaxation exercises are paired with exposure to feared stimuli, or ERP itself for the treatment of AN, but reported mixed results (e.g., Goldfarb, Fuhr, Tsujimoto, & Fischman, 1987; Hallsten, 1965; Mavisakalian, 1982; Schnurer, Rubin, & Roy, 1973). More recently, Steinglass et al. (2007) demonstrated the efficacy of brief exposure therapy in a small sample of women with AN: After participating in four “training meals,” participants consumed significantly more calories at a postintervention experimental meal than they did prior to the intervention. These results were supported by a larger, randomized control study (Steinglass et al., 2013) comparing ERP for AN to an active control treatment (Cognitive Remediation Therapy, or CRT). In this study, the change in intake from a pre-

treatment laboratory meal to the posttreatment laboratory meal was significantly greater in patients who received ERP than in those individuals who received the control treatment. These data provide promising initial support for the hypothesis that targeting eating-related obsessionality and related compulsive behaviors directly might enhance weight restoration or maintenance in AN.

Exposure-based therapies have also been developed and studied for the treatment of obsessions related to weight and shape. Paramount among these is mirror exposure (ME), a therapy wherein an individual stands in front of a full-length mirror (without engaging in ritualized checking or avoidance behaviors) and habituates to the ensuing negative emotional states. There are variations in its implementation (see Luethcke, McDaniel, & Becker, 2011), but at least one application has demonstrated reductions in body dissatisfaction and body avoidance specifically in individuals with AN (Key et al., 2002). It has been suggested that ME works by eliciting and then allowing individuals to habituate to intense negative emotions and cognitions (Trentowska, Bender, & Tuschen-Caffier, 2013; Vocks, Legenbauer, Wächter, Wucherer, & Kosfelder, 2007) and by reducing self-criticism and moderating self-evaluation (Hofmann & Heinrichs, 2002). In sum, these data suggest that exposure-based interventions targeting obsessionality in AN may be useful adjunctive treatments for the alleviation of food/eating-related as well as weight/shape-related obsessions in these individuals; additional research is needed to determine whether these interventions are uniquely efficacious for those individuals with significant obsessionality.

### **Experiential Avoidance**

Avoidance and emotional inhibition are constructs that have received increasing attention in the AN literature over the last several years. Whereas early research focused on a construct labeled “harm avoidance” (e.g., Bulik, Sullivan, Fear, & Pickering, 2000; Casper, 1990; Díaz-Marsá, Luis, & Sáiz, 2000; Fassino et al., 2002; Klump et al., 2000), more recent data have emphasized the related construct of “experiential avoidance.” Given this shift in the literature, the present review focuses on experiential avoidance. Experiential avoidance is defined as a habitual unwillingness to experience unpleasant

internal stimuli, such as thoughts, feelings, and bodily sensations (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). While not a trait per se, a growing body of literature demonstrates that individuals with AN appear to possess a trait-like tendency to engage in this process, particularly with regard to the avoidance of emotions.

While there are not as yet data to indicate whether experiential or emotional avoidance moderates response to current treatments for AN, there are considerable data demonstrating the relevance of this trait to the presentation of the illness. Individuals with AN report higher levels of emotional avoidance (Wildes, Ringham, & Marcus, 2010) and emotional inhibition (Forbush & Watson, 2006; Hambrook et al., 2011) than both clinical and nonclinical controls. Furthermore, emotional avoidance was found to mediate the relationship between depressive and anxious symptoms and ED pathology in two separate studies (Fulton et al., 2012; Wildes et al., 2010). In the only experimental study evaluating the relationship between negative affect and disordered eating in AN published to date (Wildes, Marcus, Bright, Dapelo, & Psychol, 2012), individuals with AN who received a negative mood induction reported significant increases in disordered thoughts and urges to engage in disordered eating behaviors than did those who received a neutral mood induction. This finding supports the hypothesis that disordered eating in AN may help individuals with AN cope with (i.e., avoid) negative affect, as is suggested in several theoretical models of AN, including the cognitive-behavioral (Fairburn, Shafran, & Cooper, 1998) and cognitive-interpersonal (Schmidt & Treasure, 2010; Treasure & Schmidt, 2013) maintenance models.

The growing body of literature implicating emotional avoidance in the development and maintenance of AN has prompted the investigation of treatments such as Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 1999) and Emotion Acceptance Behavior Therapy (EABT; Wildes & Marcus, 2010), both of which directly promote acceptance of emotions while actively confronting avoidance behaviors. ACT was not originally developed for AN but has been identified as a potentially effective approach to AN that would deliberately take the focus off the goal

of weight gain and put the focus on increasing behaviors consistent with identified values (Hayes & Pankey, 2002; Manlick, Cochran, & Koon, 2012). ACT proposes that attempts to control emotional experiences produce distress and instead encourages the acceptance of aversive emotional states (Hayes, 2004; Hayes et al., 1999). In this way, ACT attempts to promote emotional acceptance over emotional avoidance. Several published case reports have demonstrated that ACT and ACT-based treatments can be successfully applied to AN and that treatment is associated with symptom improvement in those individuals (Berman, Boutelle, & Crow, 2009; Heffner, Sperry, Eifert, & Detweiler, 2002; Martin-Murcia, Cangas Diaz, & Pardo Gonzalez, 2011). Furthermore, two randomized control trials showed that ACT produced reductions in eating pathology in subclinical (Juarascio, Forman, & Herbert, 2010) and clinical (Juarascio et al., 2013) populations. Interestingly, ACT may be particularly useful in addressing body image dissatisfaction (Follette, Heffner, & Pearson, 2010), a typically resistant feature of AN. Pearson, Follette, and Hayes (2012) developed a one-day ACT workshop for body image dissatisfaction for college women dissatisfied with their bodies and reported significant decreases in body-related anxiety and increases in body acceptance compared with a wait-list control condition. Future studies are needed to examine the efficacy of ACT for body image dissatisfaction in individuals with AN.

Emotion Acceptance Behavior Therapy has significant similarities to ACT but was developed specifically for AN. It prominently features “psychotherapeutic techniques designed to increase emotion awareness, decrease emotion avoidance, and encourage resumption of valued activities and relationships outside the eating disorder” (Wildes & Marcus, 2010, p. 422) as additions to the standard behavioral techniques used to increase food intake and weight. Both a short case series (Wildes & Marcus, 2010) and a larger pilot study (Wildes, Marcus, Cheng, McCabe, & Gaskill, 2014) have demonstrated that EABT can produce significant improvement in weight, disordered eating, and emotional avoidance in those individuals with AN who are willing and able to complete this treatment. In sum, while additional research is necessary to confirm the safety, acceptability, and efficacy of ACT and EABT in

larger samples of individuals with AN, results from initial studies are promising and support the conclusion that treatments directed at avoidance behaviors may be useful for AN. Again, whether such interventions would more generally improve treatment response or would be better targeted for those particularly high on emotional avoidance has not been established.

### **Impulsivity**

Impulsivity is a multifaceted construct characterized by a tendency to act without forethought and is implicated in a wide range of psychiatric illnesses (Moeller, Barratt, Dougherty, Schmitz, & Swann, 2001). Although individuals with AN are typically considered to be highly restrained, a substantial subset of individuals with AN also demonstrate high levels of impulsivity (Waxman, 2009). Individuals with AN-BP may have higher levels of certain facets of impulsivity than those with AN-R (Rosval et al., 2006), although these differences may depend on the method of assessment (Claes, Nederkoorn, Vandereycken, Guerrieri, & Ver-tommen, 2006). Impulsivity does appear to be related to treatment and outcome in AN: Impulsivity is associated with higher levels of psychiatric symptoms and eating pathology (Favaro et al., 2004), predicts the presence of residual symptoms after treatment (Sohlberg, Norring, Holmgren, & Rosmark, 1989), and may ultimately be associated with unfavorable outcomes among individuals with AN (Fichter, Quadflieg, & Hedlund, 2006; but see Zerwas et al., 2013).

In sum, data suggest that impulsivity is a trait relevant to EDs broadly and perhaps to a certain subset of individuals with AN. The traditional form of Dialectical Behavior Therapy (DBT; (Linehan, 1993)), which does target impulsivity (i.e., undercontrol), has been used effectively for the treatment of BN and BED (e.g., Safer, Telch, & Chen, 2009), but its application to AN has been understudied. At present, only one case series (Chen et al., 2015) has examined the efficacy of DBT for individuals with AN. Weight gain in some individuals was achieved, but the authors concluded that the findings were very preliminary. Given our proposition that consideration of individual difference variables may be relevant to treatment response in AN, DBT may have something to offer the subgroup of individuals with AN for whom impulsivity is a significant feature.



### Cognitive Rigidity

Unlike the traits discussed thus far, cognitive rigidity is defined as a neurocognitive trait, rather than a personality trait. However, it is included in the present review as data suggest a distinctly rigid neurocognitive style is a stable characteristic of at least a subgroup of individuals with AN (Lindner, Fichter, & Quadflieg, 2014; Tchanturia et al., 2004) that persists after weight restoration. Thus, cognitive rigidity may be another individual difference variable of relevance to the etiology and maintenance of AN, as has been suggested elsewhere (e.g., Steinglass & Walsh, 2006; Tenconi et al., 2010; Treasure, Lopez, & Roberts, 2007; Zakzanis, Campbell, & Polsinelli, 2010). Further work is needed to ascertain the degree to which this neurocognitive trait may underlie some of the behaviors and cognitions currently described as personality traits (e.g., perfectionism, obsessiveness). Research on this variable is relatively new, so data in support of the effects of cognitive rigidity on treatment response and outcome are limited. However, in at least one treatment study, cognitive rigidity moderated treatment response such that those with high levels of cognitive rigidity at baseline benefited more from a treatment specifically intended to promote cognitive flexibility (CRT, discussed below) than did those with low levels of cognitive rigidity (Dingemans et al., 2014). This finding tentatively suggests that individuals with AN likely differ in the extent to which they demonstrate this neurocognitive trait and that the trait may have relevance to treatment response and outcome.

Robust findings of cognitive impairment in AN prompted the development of treatments specifically aimed at those cognitive deficits, including CRT (Tchanturia, Lloyd, & Lang, 2013). Originally developed for the treatment of patients with brain injuries (Rohling, Faust, Beverly, & Demakis, 2009) and later applied to individuals with schizophrenia (Wykes et al., 2007), CRT targets the process, rather than the content, of cognition by employing puzzles and games similar to those used in neuropsychological testing. The use of these tasks is believed to help individuals gain insight into how they think and thus gradually improve their meta-cognitive abilities. Early case studies and pilot studies of CRT for the treatment of AN found that individuals who underwent CRT showed

improved cognitive function after treatment, and the majority found the treatment acceptable (Abbate-Daga, Buzzichelli, Marzola, Amianto, & Fassino, 2012; Brockmeyer et al., 2013; Tchanturia, Davies, & Campbell, 2007; Tchanturia et al., 2008). Similar findings have also been reported for adolescents (Dahlgren, Lask, Landrø, & Rø, 2013; Lask & Roberts, 2013; Pretorius et al., 2012; Wood, Al-Khairulla, & Lask, 2011). However, only a minority of studies have observed significant weight gain posttreatment (Dahlgren et al., 2013; Tchanturia et al., 2008; see also Steinglass et al., 2013). These inconsistencies have led some to suggest that, rather than serving as a stand-alone treatment, CRT may function best as a potentially less threatening way to engage treatment-resistant individuals prior to initiating weight restoration (Tchanturia, Lounes, & Holttum, 2014; Tchanturia et al., 2013). Consistent with this hypothesis are data from a recent randomized control trial that suggest CRT may reduce attrition (Lock et al., 2013). Alternatively, CRT may work best when more selectively applied to patients with particularly high levels of cognitive rigidity.

In an attempt to broaden the effect of CRT, researchers have recently developed cognitive remediation and emotion skills training (CREST), a treatment that combines some of the meta-cognitive exercises of CRT with psychoeducation about the nature and function of emotions and basic emotion recognition skills. In this way, CREST combines elements of CRT with elements of the emotion-based treatments described previously. A case study (Money, Davies, & Tchanturia, 2011) and an observational study (Davies et al., 2012) found improvements in cognitive flexibility and modest increases in weight among those who received CREST.

Radically Open Dialectical Behavior Therapy (RO-DBT) is another treatment that we consider relevant to this discussion of cognitive rigidity even though it targets a much broader constellation of related traits. As noted in the discussion of impulsivity, only one report of DBT for AN is available, though DBT is fairly well established as a treatment for those eating disorders considered disorders of “undercontrol” and most clearly characterized by impulsive eating (i.e., BN and BED; see Katterman, Kleinman, Hood, Nackers, & Corsica, 2014). However, RO-DBT, which was

originally developed for the treatment of chronic depression, has been extended to other disorders of “overcontrol” including OCPD and AN (Lynch, Morse, Mendelson, & Robins, 2003; Lynch et al., 2007, 2013). “Overcontrol” is defined as an excess of inhibitory or self-control characterized by deficits in receptivity and openness, flexible responding, emotional expression and awareness, and social connectedness and intimacy (Lynch, Lazarus, & Cheavens, 2015). As such, we consider overcontrol to be a superordinate personality dimension or constellation of traits that likely encompasses many of the personality variables discussed earlier, including perfectionism, obsessiveness, and emotional avoidance (Lynch et al., 2013). RO-DBT does not directly target cognitive rigidity as a neurocognitive deficit (as in CRT), but it does aim to reduce behavioral inflexibility, which may well reflect such cognitive deficits. Of note, the construct of “overcontrol” is a recent development in the literature. Thus, in contrast to the other individual difference variables reviewed herein, there are no empirical data demonstrating the relevance of this broad construct to the etiology, course, and outcome of AN.

Radically Open Dialectical Behavior Therapy is based on the premise that individuals suffering from disorders of “overcontrol” possess self-control in excess, which leaves them emotionally constricted, behaviorally inflexible, and socially isolated (Lynch, Hempel, & Clark, in press). Like standard DBT, RO-DBT features a combination of individual psychotherapy, weekly skills training, telephone coaching, and team consultation meetings. Rather than teaching skills to increase emotional control, however, RO-DBT teaches skills aimed at promoting openness, flexibility, and self-inquiry. In a recent uncontrolled trial by Lynch et al. (2013; see also Chen et al., 2015), inpatients with AN who received RO-DBT demonstrated significant increases in weight and decreases in ED psychopathology and general psychological distress over the course of treatment; additional clinical trials of RO-DBT for AN are ongoing (e.g., [http://www.southampton.ac.uk/psychology/research/projects/radically\\_open\\_dialectical\\_behaviour\\_therapy.page](http://www.southampton.ac.uk/psychology/research/projects/radically_open_dialectical_behaviour_therapy.page)). Further investigation of RO-DBT may provide support for the utility of targeting overcontrol in AN, particularly if data can demonstrate that this constellation of traits interferes

with the primary goal of weight gain and that targeting overcontrol serves to enhance long-term maintenance of restored weight.

#### **LIMITATIONS**

The data reviewed here thus suggest that consideration of relevant individual difference variables may enhance outcomes in the treatment of AN. However, the thesis advanced here is at present largely theoretical and the treatment data reviewed herein are in many cases preliminary; as such, several limitations are worth noting. First, the optimal way to implement personality-based treatment of AN remains to be determined. One method, suggested earlier, might be to assess personality prior to the initiation of treatment and then, if the individual surpasses some cutoff on a given trait, assign that individual to a treatment that directly targets that trait. Alternatively, treatment might proceed in a modular fashion where the initial focus of treatment is on refeeding and once weight is restored, the individual receives one or more treatment modules that address relevant personality features in an attempt to promote continued compliance with meal plans to support weight maintenance and prevent relapse. These and other implementation approaches can and should be tested with clinical trials or, given the low base rate of the disorder, single-case and case-series designs. Future trials should also include evaluations of outcomes beyond initial weight restoration, as these long-term outcomes may most clearly demonstrate the differential effects of person(ality)-based treatment (e.g., Bardone-Cone, Sturm, Lawson, Robinson, & Smith, 2009).

Additionally, there are significant limitations to the data reviewed herein. Namely, the majority of research on AN utilizes predominantly female samples with limited racial/ethnic diversity who are generally treatment-seeking. This necessarily affects our current understanding of personality features of those with AN and of the efficacy of various treatments; more diverse and representative samples are needed. Furthermore, the relationship between personality pathology in AN and illness severity remains unclear. While it is generally accepted that severity of illness is inversely correlated with prognosis, there are no data to suggest whether higher levels of overall personality pathology are associated with greater severity of AN or whether

particular traits have a greater impact on severity than others. Thus, further research is needed to clarify the effects of personality pathology on illness severity, and by extension, on treatment response and prognosis. It is possible that illness severity moderates the effects of personality on treatment response, such that differential effects of personality on treatment response are only present among those with more severe or chronic cases of AN; such data might clarify why effective treatment for adolescents (such as FBT) may not need to consider personality features to such an extent. Alternatively, treatment setting rather than illness severity may moderate the relationship between personality and treatment response such that personality may not have large effects on treatment response in highly controlled settings, such as inpatient units or when parents take control as in FBT.

Finally, although the focus of the present article is on the role of individual difference variables in the treatment of AN, it is also possible that such traits may be worth considering in the treatment of EDs broadly. Such an approach might include identifying personality-based subgroups across current diagnostic categories and then using this information to guide treatment planning, consistent with the incorporation of perfectionism and other personality features into Fairburn's CBT-E (Fairburn, 2008). As other EDs, such as BN, are generally more responsive to treatment than AN, consideration of personality features may not be as imperative as in AN; however, a personality-based approach may still be broadly useful to the field as a whole, particularly for treatment-resistant individuals.

#### **CONCLUSION**

The body of literature reviewed here suggests that consideration of the way individual difference variables interact with treatment may be an important future direction in the treatment of AN. We propose that these individual difference variables may be particularly important in the treatment of AN as compared to other EDs, which have shown a more consistent response to first-line treatments. Data are summarized showing that individuals with AN demonstrate a range of relevant personality and neurocognitive traits, notably perfectionism, obsessive-compulsive traits, avoidance, impulsivity, and cognitive rigidity. Furthermore,

differences in these variables appear to be meaningful: The presence of these traits has shown some significant effects on the course of illness and response to treatment, although additional research is necessary to further clarify the precise role of these variables in the pathology and treatment of AN and to resolve some inconsistent findings in the literature reviewed here. The data reviewed here suggest that the current behaviorally based diagnostic subtypes may be insufficient, as they do not allow for heterogeneity based on any number of the individual difference variables reviewed here and thus fail to capture valuable information that could moderate treatment response.

At present, research on the role of individual difference variables in the etiology and maintenance of AN and research on the treatment of AN have proceeded largely independently of one another. The data presented here support the premise that these literatures should be used to inform each other such that our understanding of personality and neurocognitive variables implicated in AN can improve the diagnosis and treatment of this complex disorder (Tasca et al., 2009). Initial attempts to identify personality-based subgroups among individuals with AN (Westen & Harnden-Fischer, 2001), which may intersect with the current, behaviorally based subtypes, suggest that there is potential to match subgroups of patients to treatment on the basis of personality features or other individual difference variables and thus may be a step toward the integration of these distinct lines of research. We propose a move away from a one-size-fits-most approach to the treatment of AN and toward a person(ality)-centered treatment approach. Doing so may mean that the "treatment of choice" for a high-functioning/perfectionistic individual with AN, for whom perfectionism is a prominent personality trait, differs to some degree from that of a constricted/overcontrolled individual with AN who demonstrates highly problematic experiential avoidance. The former, for example, may benefit more from a treatment that focuses on perfectionistic tendencies within and beyond the eating disorder, such as CBT-E (Fairburn, 2008), whereas the latter might respond better to a treatment that promotes emotional awareness and acceptance, such as EABT (Wildes & Marcus, 2010), or one that emphasizes commitment to valued goals, such as ACT.

Furthermore, we propose that interventions directly addressing the more salient individual difference variables associated with the pathology of AN may be generally better able to address the ambivalence and resistance that interfere with compliance to prescribed eating plans. The highly ego-syntonic nature of AN may reduce acceptability of treatments that primarily (or too directly) target weight gain. Personality traits may help explain the often subtle resistance to treatment that is noted. Thus, shifting attention away from an exclusive focus on weight restoration may be particularly relevant to enhancing the acceptability—and ultimately retention—of individuals in outpatient treatments or to facilitate weight maintenance once weight restoration has been achieved in more controlled settings. We also noted that response to treatment in AN seems to be most consistent when other individuals (i.e., inpatient staff or parents) take charge of eating disorders. In those situations, individual traits may be less influential than when independent eating decisions are required.

In conclusion, the field is in need of a new approach to the treatment of AN: Current treatments simply are not adequate for many individuals with this challenging disorder. Given that multiple individual difference variables have been implicated in the etiology, maintenance, treatment, and prognosis of AN and that individuals with AN can be reliably separated into distinct personality-based subgroups, interventions that incorporate the treatment of relevant personality and neurocognitive features as well as weight restoration represent a promising new avenue with the potential to improve treatment retention and outcome. Such an approach would also be in line with the broader movement toward evidence-based practice in clinical psychology (American Psychological Association, 2006; Spring, 2007). The data reviewed here suggest that such an approach may produce better results for individuals with AN, a low-base-rate disorder that has defied efforts to identify a clear first-line treatment. Future research is necessary to clarify the optimal integration of individual difference variables into the treatment of AN. Only then will we be able to say with certainty that such person(ality)-centered approaches to the treatment of AN represent a significant advancement over the status quo.

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#### SUPPORTING INFORMATION

Additional Supporting Information may be found in the online version of this article:

**Table S1.** Summary of Individual Difference Variables in AN and Respective Targeted Treatments.