

# Incorporating Dispositional Traits into the Treatment of Anorexia Nervosa

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**Abstract** We provide a general framework to guide the development of interventions that aim to address persistent features in eating disorders that may preclude effective treatment. Using perfectionism as an exemplar, we draw from research in cognitive neuroscience regarding attention and reinforcement learning, from learning theory and social psychology regarding vicarious learning and implications for the role modeling of significant others, and from clinical psychology on the importance of verbal narratives as barriers that may influence expectations and shape reinforcement schedules.

**Keywords** Anorexia nervosa · Attention · Eating disorders · Perfectionism · Reinforcement · Temperament · Treatment

I took the road less traveled by, and that has made all the difference.

Robert Frost

Don't consider your reputation and you may do anything you like.

Chinese Proverb

## 1 Introduction

Clinical perfectionism in those with anorexia nervosa (AN) is proposed to motivate extremes of performance at the expense of health even prior to illness onset. Indeed, the rigid structure (e.g., repetitive behavioral routines, constrained behavioral options) self-imposed by those with AN is juxtaposed upon a relentless drive that, even prior to initial manifestations of extreme dietary restriction, serves to neglect biological needs if pitted against a perceived failure to meet stated objectives (Zucker et al. 2007). In fact, characterizations of the childhoods of those with AN, developmental periods prior to onset of severe malnutrition, are uncannily in their consistency (Wonderlich et al. 2005). Neglecting sleep to complete homework, turning in twice the length of papers requested by teachers, and practicing beyond the recommendations of coaches, pose a dilemma for parents who eventually are forced to “punish” these conscientious children by imposing unwanted limits on individuals who are just “too good,” (i.e., follow rules without limit). In fact, so strikingly consistent are these narratives, that a wise clinician can leverage knowledge of this relentless perfectionistic drive and rigid behavioral repertoire to help convince reluctant parents, that is, parents having difficulty recognizing their child has a diagnosis of AN, that their child “fits the mold”; and thus the abrupt changes in nutritive habits are, indeed, but one sign of a larger constellation of features that may be cause for concern. Perfectionism is thus an important feature not only because of its impact on functioning, but also because it may provide an opportunity: an acceptable entry point to speak to parents and children about the biological and behavioral processes that may reinforce the ill state of AN.

In this chapter, we use perfectionism as an exemplar of a trait feature that would benefit from targeted intervention, and as a springboard to illustrate a general framework for addressing trait features in AN. There are several content areas and interpersonal processes we consider in providing this general framework. For example, we address the foci and integrity of attention neural networks, explore interpersonal reinforcement contingencies that may inadvertently exacerbate systematic modes of responding, and consider how reputation narratives may constrain experience and limit knowledge acquisition. We then describe a treatment model that attempts to address these domains. To operationalize the term “trait feature,” we adopt as our definition that stated by Tellegen et al. (1988), “a psychological (therefore) organismic structure underlying a relatively enduring behavioral disposition, i.e., a tendency to respond in certain ways under certain circumstances.” An extensive developmental literature supports the relationship between temperament and the emergence of behavior problems (Graham et al. 1973; Eisenberg et al. 2000, 2005). A comparison of the predictive validity of personality, socioeconomic status, and cognitive variables on such important life outcomes as mortality, divorce, and occupational attainment revealed that personality demonstrated equal predictive power (Roberts et al. 2007). Against a clinical background, not only do trait features, by definition, persist beyond acute psychiatric symptom expression, but trait features and frank personality disorders have been reported to negatively impact treatment prognosis and illness course (Bizeul et al. 2001; Nilsson et al. 2008; Skodol et al. 2005; Barber et al. 1997). Given the seeming constancy and potential deleterious effects of certain trait modes of responding, the need to incorporate trait features into intervention strategies is apparent. The manner in which to do so is far less clear.

## 2 Developmental Considerations in Addressing Trait Features

Trait features show different degrees of continuity across the lifespan, developmental variation that can inform intervention approaches (Caspi et al. 2005). For the clinician, temperament and personality research is informative in delineating the structure of personality to focus intervention targets, the stability of personality to inform reasonable intervention goals, and the relative influence of environmental versus biological influences on personality change to inform the strength of expected treatment effects. Before exploring these issues, we begin with some definitions. Temperament, defined as constitutionally based individual differences in reactivity and self-regulation, influenced over time by heredity and experience (Derryberry and Rothbart 1997), had long been considered the domain of researchers investigating biologically influenced modes of responding in early childhood, while personality had been considered the adult expression of stable patterns. However, these differentiations are gradually morphing (McAdams and Olson 2010). Longitudinal studies are increasingly examining the stability of both the structure of personality in childhood and adolescence relative to adulthood as

well as the intraindividual stability of features across the lifespan. Such studies are crucial if we are to take adolescent-defined vulnerabilities of pathology and relate them to their childhood equivalents for early intervention and prevention efforts, as well as capitalize on peak periods of plasticity to maximize intervention effectiveness.

Not only may personality evidence greater variability during certain developmental periods, but also average levels of trait features may differ over time. Meta-analyses summarizing longitudinal investigations of personality stability demonstrate developmental changes in stability coefficients within individuals across time as well as developmental shifts in mean levels of trait features across development (Roberts and DelVecchio 2000). For example, in their widely-cited meta-analytic review of 152 longitudinal studies of personality stability, Roberts and Del Vecchio (2000) report rank-order correlation coefficients that demonstrated variability throughout the lifespan with stability increasing from a low of 0.31 in childhood, to 0.54 in college, and stabilizing to 0.74 in late adulthood. We illustrate such developmental variation to highlight an important balance that must be bridged between the expectations for change and the acknowledgement of latent tendencies. For example, research examining the teaching practices of educators demonstrates that children will rise to expectations: they will perform better academically if more is expected of them academically and they are treated as if they can meet those expectations (Page and Rosenthal 1990). There is a clinical corollary to this narrative in the study of anxious children. Study of parenting practices with an anxious child indicates that when parents treat their anxious child tentatively, the child is less likely to approach a subsequent novel task than when parents convey their confidence in their child's ability (Gruner et al. 1999). Such examples highlight how expectations of the abilities of others can influence both the opportunities provided to build behavioral repertoires and shape the behavioral patterns that are reinforced: when we expect error, we look for error, and when we doubt capacities, we limit opportunities. Such examples are not intended to implicate influential members of an individual's social environment as *causing* trait modes of responding, but rather to highlight the importance of incorporating these social contingencies in affecting change.

Individuals form a self-narrative ("I am lazy"), and may imagine (or verify) the narratives that others (e.g., parents, teachers, friends) hold of them ("everyone expects me to be perfect"). Further, whatever the congruence between the expectations of others and an individual's conceptualization of these expectations, in fact, others do form narratives ("Mary never makes mistakes"). Such storied expectations of others and the self have implications for change. Individuals will work to maintain a verbal and felt sense of cohesion of self-definition (Swann and Read 1981). Others may exhibit biased processing of information that confirms the narrative they hold of others [see well-established constructs in social psychology such as the "halo effect" (Nisbett and Wilson 1977)]. Thus, the degree to which an individual's social support network inadvertantly challenges change efforts by reinforcing an individual's tendency to respond in certain ways or alternatively, encourages change by altering reinforcement contingencies, has been of

limited study in the management of trait features in eating disorders intervention research.

Yet, it is also true, that when individuals have actively begun to engage in change efforts, they often repeatedly re-experience the strong urges, intrusive cognitions, or other remnants of trait modes of responding (e.g., a sudden urge to escape from an ambiguous situation as in those with elevated levels of harm avoidance) (Marlatt and Gordon 1985). Such urges to perform a repetitive behavior pattern have been robustly reported (Sobik et al. 2005) and strategies to address such urges have been incorporated into relapse prevention methods for binge eating (Sobik et al. 2005; Allen and Craighead 1999) in the context of eating disorder treatment [also see literature on relapse prevention in addiction, (Marlatt and Gordon 1985)]. If not educated about these patterns, individuals attempting to address trait modes of responding may fear that they are relapsing or that change efforts are hopeless, when, in fact, such reemergence of well-established, maladaptive patterns is a well-known phenomenon in the emotional learning and memory literature (Kelley et al. 2005; Archbold et al. 2010). Thus, preparing individuals for such psychological triggers as well as giving them tools to respond to such cues is also an essential aspect of treatment of trait modes of responding. Balancing the optimal balance between acceptance and change efforts in the management of trait features is thus a much needed area of inquiry.

### 3 The Role of Attention in Addressing Trait Features

The harmonic integration of sensation and attention is the bedrock of experience. Thus, characterizing sensory and related attention capacities can help inform the phenomenology of psychiatric disturbance, in general, and AN, in particular. Further, targeting such basic capacities may be a particularly critical domain to address in interventions designed to target trait features. Such a perspective is not new. Posner and Rothbart (2007) in their highly cited review of the neural networks that subserve attention, characterize attention as the critical foundation for self-regulation, processes that modulate reactivity to sensory stimuli. Posner and Rothbart describe three broad attention networks: the *alerting and orienting* network involves maintaining a sense of alertness or awareness to incoming sensory input (from the internal and external environment) combined with capacities to align attention to the sources of this sensory input, for example, guiding visual attention towards a novel movement you notice in a field, towards a thin individual who enters a room, or towards movement in the gut. Thus, these first two networks are conceptualized as reactivity to stimuli (Posner and Rothbart 2007). The third network, the *executive attention* network, is described as resolving conflict between other neural networks, a task which entails both the upregulation and downregulation of various neural activities. Of importance, the efficiency of this latter network demonstrates change with experience, and has been linked with the childhood temperament factor of effortful control, defined as the ability to inhibit a prepotent

response in order to activate a weaker response, as well as capacities to plan behavior and detect error (Posner and Rothbart 2009). The efficient function of this network has been linked to a broad range of adaptive outcomes including conscience, theory of mind, emotion regulation, and socialization (Simonds et al. 2007; Kieras et al. 2005; Rothbart et al. 1994). Given the aforementioned definition of trait features as typical modes of responding to stimuli, targeting the efficiency of specific attention networks would seem to be critical in interventions designed to address these stable characteristics.

It is perhaps surprising then that adult models of personality do not incorporate attention. Caspi et al. (2005) in their comprehensive review of developmental variation in personality, note the confusing absence of attention in models of adult personality given the pivotal role of attention in child models of temperament. In contrast, the role of attention and more specifically, attention biases, have been very influential in models of psychiatric disorder maintenance. For example, in major depressive disorder, information-processing models highlight how systematic biases in orienting to certain types of content (e.g., personal failures, past errors) decrease the breadth of information entering awareness and negatively influence subsequent adaptive responding, thus potentially contributing to the maintenance of psychiatric disturbance (Beck 1979). Similarly, early information-processing models of AN and other eating disorders focused on biased orienting and memory for illness-related content (Williamson et al. 1999). Neuropsychological investigations have provided fairly consistent evidence demonstrating that performance on neuropsychological measures of set-shifting are impaired in those with AN (Roberts et al. 2007; Tchanturia et al. 2004). While seemingly implicating impairment in the distributed neural circuitry that supports the attention executive network, neuroimaging data are limited, but provide preliminary support for aberrant functioning in behavioral set-shifting (Zastrow et al. 2009) supporting deficits in inhibiting a prepotent behavioral response in AN. Combined, the available data support the potency of incorporating improvement in attention efficiency into interventions aiming to influence trait modes of responding, a strategy particularly efficacious for AN given prior evidence of impaired performance in tasks that require shifting of attention sets. Further elaboration of attention capacities in those with AN combined with knowledge of how existing treatment models address modes of attention may best facilitate our ability to match patients to treatment and develop novel strategies.

## **4 Personality and Social Reinforcement Contingencies**

### ***4.1 Reputation Narratives***

The majority of individuals will work to be understood by others, even when such efforts are detrimental. Self-verification theory is a model proposed by Swann

and Read (1981) which posits that individuals will work to maintain a cohesive narrative that corresponds with one's self-definition: they will ignore or negate information that conflicts with their own self-definition and will work to elicit reactions from others that confirm their self-definition. In fact, so powerful is this motive that individuals will pursue consistency over valence: those with a negative self-concept will seek out confirming evidence even when this evidence validates a negative self-concept (North and Swann 2009). In other words, consistency can be more reinforcing than positively valenced information. Of interest, a related finding has been reported in studies examining mechanisms of change in psychotherapy research (Koerner and Linehan 2000; Lynch et al. 2006). Study of process issues, those factors related to the delivery of therapy including the interpersonal transactions of therapist-client, indicates that the experience of validation from the therapist is a potent hypothesized mechanism of change in therapeutic interactions and may contribute to better retention in therapeutic interventions (Linehan et al. 2002). A review by North and Swann (2009) proposes several benefits to self-verification including anxiety reduction, improved health, and psychological coherence. We argue, consistent with the theoretical writings of Linehan (1997) and Greenberg and Paivio (2003) regarding emotional validation and the vast literature on responsive parenting (Propper and Moore 2006), that such self-verification is critical to adaptive self-regulation, as verification of one's experiences is necessary to acquire the ability to discriminate the motivational salience of different internal states. If an actor experiences gut motility, a beating heart, sweaty palms, and other obvious signs of arousal, but is told by significant others that "nothing is wrong," over time, the actor may lose the ability to recognize and discriminate the importance of different arousal states and would fail to link specific arousal states to adaptive modes of responding (i.e., a pounding heart becomes a source of confusion rather than an adaptive response to potential danger). The need for validation thus seems to be essential for achieving adaptive self-regulation, but poses a seemingly complex dilemma for addressing persisting maladaptive modes of responding, as in pathological trait features. A proposed solution, incorporated explicitly into models of cognitive-behavioral therapies (Linehan 1993), is to validate emotional experience and gently shape more adaptive modes of responding via positive and negative reinforcement (e.g., acknowledge the actor is upset, but inform that it is difficult to listen to what they have to say when he or she speaks in an abusive tone). Achieving the balance between validation and change may thus be a critical process in interventions that seek to target trait modes of responding.

## ***4.2 Niche-Building Processes***

People may seek out, influence, or create environments that are associated with and may reinforce their trait dispositional tendencies (Caspi et al. 2005). Explanatory models derived from study of environmental and genetic influence on the emergence and maintenance of trait modes of responding share common themes with

theoretical models of self-definition from fields of social and clinical psychology such as self-verification theory (Swann and Read 1981). Concepts such as “niche-building processes” (Caspi et al. 2005) incorporate a developmental framework to explain how trait dispositions may be maintained as they elicit certain characteristic responses from others and may further lead to the selection or creation of environments consistent with these typical response patterns. For example, an anxious child may naturally elicit a protective posture from a responsive parent, a sensitive pattern of behavior that is reinforced as the mother witnesses the decreased arousal in the child when novel stimuli are avoided. If such avoidance is taken to extremes, the benevolent desire and parental instinct to comfort and protect may unintentionally backfire: resulting in an increasingly limited range of exposure to novel experiences for the child with associated narrowed opportunities for practice for the child to cope with change and develop an adaptive response repertoire. Anxious parents may further potentiate this avoidance due to a parallel desire to minimize their own arousal by constraining access to unknown environments as well as via role-modeling of fear responses to uncertain situations. Thus, the parent’s personality and parent responsivity to the child’s temperament are influential features among a complex array of biological and situational variables that shape the form of adaptive parent-child interactions and may contribute to patterns of responding that help shape a persistent self-narrative (Propper and Moore 2006).

Irrespective of cause, over time a narrative may evolve about the child’s capacities that is reinforced by others and eventually endorsed by the child. “I am shy” thus becomes a verbal shorthand that encapsulates a broad, yet consistent, behavioral repertoire characterizing the child’s interactions with others. This narrative may further facilitate the recall of information as the child is able to differentially retrieve information consistent with this self-narrative, potentially via increased elaboration of self-referential information at encoding. In the present, conceptualizing oneself as shy and fearful, the child may come to doubt her capacities to cope with novelty, influencing subsequent choices when faced with interactions with novel environments. Thus, such transactions exemplify *niche building processes*, a term used to explain influences that constrain variability in human personality (Caspi et al. 2005). Trait features elicit responses from others and influence the environment; individuals with particular trait features may seek out certain environments, and individuals may build situations in which their latent tendencies become reinforced. Such influential transactions between parent and child or between individuals with important social influences illustrate the potential potency of incorporating relevant others into treatments that attempt to manage detrimental trait dispositions.

### **4.3 Role Modeling**

Vicarious or observational learning is a powerful mechanism whereby individuals acquire novel information yet circumvent the necessity of experiencing events



directly (Bandura et al. 1963). Perhaps not surprisingly, the influence of vicarious learning has been widely researched in the arena of fear-acquisition as there is an inherent adaptive advantage to learning about potential harm via verbal reports or watching others, thus obviating the need for direct experience (Guzman et al. 2009; Askew and Field 2008). Thus, it is not hard to imagine that if one were attempting to influence a typical mode of responding with the substitution of an alternate pattern, as in treatments that address trait features, role modeling target alternative behaviors by influential others would be a critical domain of inclusion. Otherwise, if individuals in the environment model divergent information from that which is instructed in the therapeutic setting, then behavioral intervention may be rendered obsolete. An excellent example of interventions in which the role-modeling of significant others is incorporated is in the realm of pediatric obesity (Wrotniak et al. 2005). In family-based interventions for pediatric obesity, the inclusion of parents has been found to be essential to reinforce behavior changes in the child (Epstein et al. 2007). However, not only is the child's eating a target of intervention, the parents' eating is also a treatment target as substantial research documents the importance of social influence on food selection and food quantity (Shutts et al. 2009; Redd and de Castro 1992). Further, direct manipulations of the home environment that further reinforce the behavioral changes targeted in treatment have also been essential in achieving and sustaining weight loss maintenance in children (Epstein et al. 2007). Thus, in interventions that aim to target typical modes of responding, incorporation of significant others is essential not only in establishing adaptive reinforcement contingencies of the patient's behavior (e.g., applauding demonstrations of bravery in the harm avoidant child), but also in role modeling such changes to emphasize the critical importance of targeted adaptations in behavior.

#### ***4.4 Interim Summary***

In the prior sections, we discussed the importance of addressing or acknowledging trait modes of responding in the context of therapeutic interventions. We described a general framework for addressing trait features and highlighted certain domains that would be important for inclusion on the basis of existing evidence. In the next section, we introduce the trait feature of clinical perfectionism and describe how it has been defined in the literature.

### **5 The Example of Perfectionism**

Perfectionism has been associated with increased suicidal ideation (Hamilton and Schweitzer 2000; Hewitt et al. 1997), suicidality (Jacobs et al. 2009), self-injury (Hoff and Muehlenkamp 2009), and completed suicides, often as individuals

seemingly reach the pinnacle of achievement in their domains of importance (Blatt 1995). In AN, perfectionism predicts poor treatment prognosis (Bizeul et al. 2001) and persists with illness remission (Nilsson et al. 2008), though exceptions have been noted (Bardone-Cone et al. 2010). Further, those individuals with AN whose mothers also endorse elevated levels of perfectionism exhibit the highest levels of eating disorder symptomatology (trios study) and may thus index a subset of those with AN who evidence a particularly biologically influenced form of the disorder that may be further maintained by social reinforcement contingencies (e.g., modeling of perfectionistic striving in parents). Yet, despite the clinical significance of perfectionism, there has been limited work examining the degree to which the impact of this feature can be minimized.

To be sure, the very nature of the construct of perfectionism continues to be debated (Hewitt et al. 2003; Shafran et al. 2002). Even such basic considerations as whether perfectionism is uni-or multi-dimensional (Shafran et al. 2002; Hewitt and Flett 1991a), whether perfectionism is best conceptualized as a trait disposition or a behavioral pattern (Slade and Owens 1998), or even if there can be both adaptive and maladaptive forms of perfectionism remains an issue (Slade and Owens 1998; Terryshort et al. 1995). Recent critiques of the nature of this construct as it pertains to individuals with eating disorders reject the notion of the multi-dimensional nature of perfectionism and posit that the core aspect of perfectionism is a uni-dimensional feature that relates to decrements in self-esteem resulting from perceived failure; that is, failure to meet ideals of extreme performance is relevant only so far as such failures influence the individuals' self-evaluation (Shafran et al. 2002). We concur with this emphasis and build on the definition of Shafran et al. (2002) by further operationalizing perfectionism in relation to attention, learning, and reinforcement contingencies, incorporating, in part, elements of the model of perfectionism posited by Slade and Owens (1998) which conceptualizes perfectionism as a behavioral pattern that is maintained by both positive and negative reinforcement. The model of Slade and Owens (1998) adopts a developmental framework to understand the shift of perfectionism from a positively to a negatively reinforced behavioral pattern. In other words, striving for outcomes that were positively reinforced can morph into strivings maintained by negative reinforcement contingencies (e.g., someone who initially experiences pleasure at an accomplishment can come to experience only a temporary decrease in guilt or shame when receiving results because they are striving to avoid disappointing themselves or others rather than working to achieve mastery). Thus, both the definitions of Slade and Owens (1998) and Shafran et al. (2002) address attention by characterizing perfectionism as biased orienting to outcomes of performance. Building on these definitions, we reiterate our definition of perfectionism as

Perfectionism is the unrelentless striving to avoid the guilt or shame of not working towards the inevitable and infinite next step of a rigid policy designed to avoid error

– a definition that we feel incorporates the definition of Shafran et al. (2002) and Slade and Owens (1998), but attempts to elaborate these definitions by positing

specific relationships to the self-conscious emotions and incorporates predictions about modes of approaching learning tasks.

This definition would lead to distinct predictions about the relationship of perfectionism to attention networks and learning strategy. We would expect elevations on measures of perfectionism to be related to biased attention orienting to outcomes of performance, reinforcement of this perseverative focus by transient reductions in negative affect, and subsequent failure to alter strategy on the basis of trial and error learning. Hopelessness, a frequent associated feature of perfectionism, is a logical, but unfortunate, result when biased orienting towards a specific outcome limits the number of options deemed acceptable. Such fixed orienting may increase vulnerability to experience failure and/or may limit sustained feelings of success as the focus of attention immediately moves to the next opportunity for potential failure.

However, perfectionism is also rather unique among trait features in that the role of interpersonal factors is incorporated into many widely-accepted multi-factorial definitions (Hewitt and Flett 1991a). Hewitt and Flett's multi-dimensional perfectionism scale contains three factors: other-oriented perfectionism, self-oriented perfectionism, and socially prescribed perfectionism (Hewitt and Flett 1991b; Cox et al. 2002). While other-oriented perfectionism captures an individual's perfectionist expectations for the behavior of others, socially prescribed perfectionism is the belief that others expect perfectionism from the actor. Relatedly, Frost et al. (1990) developed a multi-dimensional scale of perfectionism with dimensions capturing parental criticism and parental concerns over mistakes. The integration of these social and individually-focused dimensions has been examined in recent factor analyses and adds to the current debate about whether perfectionism can have both adaptive and maladaptive dimensions (O'Connor et al. 2009). O'Connor and Dixon describe a 2-factor solution, one factor associated with striving and thus putative positive reinforcement contingencies and one factor associated with perfectionistic concerns or putative negative reinforcement contingencies. More specifically, *self-oriented perfectionism-striving*, is a factor associated with personal standards, organization, and self-oriented perfectionism and is associated with trait measures of consciousness; *self-oriented perfectionism-concerns* is a factor incorporating concern over mistakes, parental expectations, parental criticism, doubts about actions, and socially-prescribed perfectionism (beliefs that others expect one to be perfect). Other authors (McCreary et al. 2004) have reported a 3-factor solution that has the social factors that maintain perfectionist behavioral patterns load on a separate factor. It is important to reiterate that while the construct of perfectionism is unique in incorporating interpersonal factors into several definitions, as we have previously mentioned, interpersonal factors are influential in the maintenance of many trait patterns of responding. Combined, this body of data suggests that interventions that solely target the individuals may be insufficient, rather, incorporating relevant members of an individual's social network so that reinforcement contingencies can be altered, may be in a particularly efficacious manner to manage deleterious forms of perfectionism, and in strategies to address trait features, in general.

**Interim Summary.** In the previous section, we discussed prior definitions of perfectionism and attempted to synthesize these definitions with learning theory. We described the role of interpersonal factors in the maintenance of trait features, including perfectionism, and argued that treatment include the social network as a target in addition to the individual. In the following sections, we use clinical perfectionism as a specific example of trait modes of responding and illustrate how it is addressed in an intervention that involves both parents and their adolescents with AN.

## **6 Perfectionism Addressed Via Group Parent Training**

We have developed a group parent-training program (GPT) designed to treat adolescent AN, a treatment influenced by extant models of cognitive behavioral and emotion-focused therapies (Greenberg and Paivio 2003; Linehan 1993). This treatment is designed to enhance adaptive self-regulation in adolescents diagnosed with AN by using parents as role models of responsivity to their own basic biological needs and attentive to the motivations conveyed by emotional experience. Development of this intervention considered the mode of treatment delivery, the content of treatment, and the critical role of therapist as role model. GPT incorporates the elements we have designated as being relevant for addressing trait features (attention, reputation narratives, social modeling, social reinforcement contingencies). In the sections that follow, we describe the theoretical model that guided the development of this intervention, delineate how each domain is addressed, and describe preliminary data on the treatment outcomes.

### ***6.1 Theoretical Model Guiding Intervention Content***

Responsive parenting has been an influential construct across psychological disciplines. Developmental psychologists emphasize the importance of a responsive style of parenting in the development of adaptive self-regulation in children, social psychologists emphasize the importance of responsive parenting on theory of mind and other constructs necessary for empathic attunement to others, and clinical psychologists emphasize the link between responsive parenting and mental health (Propper and Moore 2006; Smith et al. 2006; TamisLeMonda et al. 1996). Responsive parenting has numerous definitions, but we adopt the definition of Propper and Moore (2006) as they define the parenting behaviors that may influence infant emotionality: “Caregivers facilitate the establishment of physiological homeostasis as they assist in attaining a balance between endogenous needs and exogenous stimuli” (p. 435). We consider this construct as critically important to incorporate into interventions designed to address AN. Whatever be the complex array and combination of influences that impact the emergence of AN, at its essence,

individuals with AN have failed to incorporate the task of responsively “parenting” themselves, they neglect all needs: be they basic sustenance, fatigue, or the motivations expressed by emotional experience. Rather, they are at war with their bodies: trying to manipulate and control what should be a seamless dance between bodily arousal and adaptive response.

We consider *self-knowledge* and *self-trust* (lay concepts we introduce in the intervention) as products of the trial and error learning that necessarily occurs as an individual attempts to decipher and respond to internal experience and to define the meaning of that experience in relation to environmental events. We define self-knowledge as the emerging and evolving product of the ability to decipher motivated states such as hunger, fatigue, or emotional experience. We define self-trust as the establishment of a secure base with oneself, that is, the product of adaptively responding to one’s basic needs, a combination of interoceptive sensitivity, interoceptive accuracy, visceral conditioning, and abstract cognition. Over time, such dynamic transactions may result in a felt sense of self-knowledge as the individual comes to recognize patterns of arousal, the situations that provoke them, and the actions that dampen them (e.g., “I usually feel this when I see that and doing this makes me feel better”). Thus, repeated and prolonged failure to respond to such internal signals would result in an utter dearth of self-knowledge and failure to develop self-trust, resulting ultimately in a vulnerability to operationalize one’s self-definition in only the most concrete and external of terms: achievement. In other words, perfectionism and related negatively-reinforced achievement striving may be reinforcing, in part, because it obviates the need to decipher internal experience: the goal is what is important irrespective of the cost or limit imposed by somatic needs. Further, operationalizing an abstract notion of the “self” in terms of concrete benchmarks of achievement naturally coincides with either an inability (or unwillingness) to respond to the complex, fluctuating, and constantly unpredictable internal milieu of somatic experience.

Of interest, data from our lab demonstrate that certain aspects of perfectionism are associated with deficits in abstract reasoning. In a study of social cognition in adult women with AN, we studied a sample of 21 women currently diagnosed with AN; 21 women who had a history of AN but were weight-restored for a minimum of 12 months, and 23 adult women who served as the healthy control reference group. An interesting interaction emerged between facets of perfectionism that have been reported to be distinctly elevated in those with eating disorders relative to psychiatric control groups: the concern over mistakes subscale. This subscale was negatively associated with nonverbal abstract reasoning as indexed by subtests on the Wechsler Adult Intelligence Scale (Matrix Subtest) in both groups with AN, with small to medium effects ( $r^2 = 0.24$ ,  $p = 0.02$  for current,  $r^2 = 0.33$ ,  $p = 0.01$  for weight-restored). However, this relationship was non-significant (and positive) in the healthy control group ( $r^2 = 0.01$ ,  $p = 0.59$ ). On measures of verbal abstract reasoning, concerns over mistakes was negatively related to this construct in individuals weight-restored with a history of AN ( $r^2 = -0.31$ ,  $p = 0.006$ ), while healthy controls demonstrated a significant positive relationship ( $r^2 = 0.23$ ,  $p = 0.02$ ). Such preliminary findings highlight that certain aspects of perfectionism

such as flaw detection may function very differently against the clinical background of perfectionism. Whereas for healthy control subjects, concern over mistakes may be indexing flaw detection, for those with AN, such flaw detection may be an adaptation to deficits in abilities to derive higher-order abstract concepts from exemplars of both verbal and nonverbal sets. Further study is needed to replicate these findings in a larger sample. This pattern of results has potentially fascinating implications for the role of perfectionism as a compensatory strategy to ameliorate deficits in the ability to understand the abstract, complex, and nuanced notion of the self.

Combined, such data support the importance of enhancing response flexibility as a target of treatment when addressing clinical perfectionism. Further, utilizing strategies that build on concrete examples rather than abstract concepts may be a necessary therapeutic adaptation, particularly in younger aged groups. The strategy that we employed in the development of this intervention was to use parents as role models of adaptive self-regulation. In addition to teaching parents skills to manage their child's disorder, our focus was on capitalizing on parents as influential role models of behavior change. Our reasoning was that by teaching or improving the parents' capacity to be responsive to their own needs, they would serve as a concrete example of "self-responsive parenting," that is, adaptive self-regulation. In addition to potentially benefiting the parent's own mental health and adaptive function, such a strategy would have the benefit of circumventing putative deficits in abstract reasoning in their children by direct role modeling of the development of the self. Further, advances in the study of empathic responding are increasingly supporting that individuals understand the experiences of others via a virtual embodiment of the felt sense of others (i.e., your feeling of sadness provokes similar somatic and cognitive experiences and thus I apprehend your experience) (Ochsner 2008). Thus, improving parents' ability to be responsive to their own needs may enhance their ability to sense the needs of their children.

## ***6.2 Attention Focus in Group Parent Training***

By definition, individuals high in clinical perfectionism focus on the outcomes of their efforts. Such a perseverative focus, potentially supported by superior sustained attention (or intriguingly, deficits in set-shifting), may appear advantageous in that the individual seems impervious to goals other than the self-declared objective. Notwithstanding how rewarding (or "in control") this perseverative focus may be experienced by those with AN, in particular, or in those with elevations in clinical perfectionism, in general, in fact, such a strategy does not result in optimal learning (Sutton and Barto 1998). An optimal learner does what works most of the time (Montague et al. 2006). However, every now and then, an optimal learner must sample from novel domains (Sutton and Barto 1998). For example, suppose you have a favorite restaurant and a favorite item that you order at your favorite restaurant. Well, most of the time when you dine at this restaurant, you order

your favorite item because you know that you enjoy it – it is a certain quantity. However, there may be items on the menu that are even more delicious than your favorite item. If you don't branch out and try new dishes every now and then, you may not be making the optimal choice. Such a dilemma constantly interferes with adaptive problem-solving in those with elevations in clinical perfectionism. Not only is there a fixation on the outcome of efforts, but there is fixation on a *particular* outcome and a *particular* strategy to achieve that outcome. Once a perfectionist declares the stated objective and the manner in which that objective will be achieved, the proverbial gauntlet has been thrown. No other outcome is acceptable and failure to achieve this stated goal results in elevations in the self-conscious emotions [guilt, shame; i.e., a negatively reinforced contingency as predicted by Owens and Slade (Owens and Slade 2008) and decrements in self-esteem as predicted by Shafran et al. (2002)]. In terms of attention, this may be operationalized as biased orienting to outcomes, advanced abilities to ignore or disregard conflicting information as reflected in advanced capacities to maintain a particular set (or failure to shift sets), and failure to benefit from feedback.

We adopted a “process versus outcome” approach, grounded in mindfulness techniques, to address biased orienting and inflexible responding in AN. Mindfulness skills, and the corresponding acceptance-based philosophies that support these approaches, have been increasingly integrated into recent evolutions of interventions based on behavioral learning theories (Linehan 1993; Hayes et al. 2006). Mindfulness is born of Eastern spiritual practices and emphasizes the importance of increasing contact with the present moment unfettered by beliefs or judgments that would otherwise shape the direction and sustain fixation of attention (Kabat-Zinn 1990). Motivated states naturally and adaptively direct visually guided attention to objects most salient to satiate the needs of the individual at that moment. While adaptive, such foci may restrict the field of vision and limit behavioral options. Thus, one technique to facilitate development of focused, purposeful, and flexible attention is mindfulness practice. In a typical mindfulness exercise, an individual is asked to shift the perspective from which private events are viewed, from a participant, in whom there is no separation between self and experience, to an observer, who observes one's thoughts dispassionately – as one would observe any other object in the environment. Individuals learn to describe internal and external events as a means to disconnect themselves from the literal interpretation of their experience. That is, thoughts and feelings are labeled and experienced as thoughts and feelings. Thus, the thought “I am a failure” becomes “I am having the thought that I am a failure.”

The philosophy and related strategies of mindfulness-based approaches may be particularly suited for individuals whose biased focus towards outcomes may compromise effectiveness. However, we were concerned that “marketing” the proposed strategies as mindfulness-based approaches may be unpalatable to parents whose own extreme achievement-striving makes them biasedly oriented to the most concrete of outcomes. Thus, in accordance with the strategies of motivational interviewing (Miller and Rollnick 2002), we join with parents in validating the utility and ease of an outcome-focused approach, and gradually highlight the

differential benefit of a more balanced, or “process”-focused approach. As explained in the context of this intervention, while an initial focus on the outcome of efforts may dictate the selection of responses and the dictated goal, a *process approach* values each step along the path (i.e., attempts towards the goal). The value of every behavioral attempt towards a goal is framed as providing new information that advances knowledge, thereby constantly updating the utility of the selected path. Thus, while a clinical perfectionist may view any failure to adhere to a course of action as a signal of weakening “will-power” or a decrement in self-discipline, the process philosophy allows parents to alter their mode of learning while preserving their personal dignity: by switching to a process approach, they may maximize outcomes by becoming more flexible responders to momentary fluctuations in experience. This is merely a way of framing the tenets of reinforcement learning in a way that is accessible in the context of a clinical intervention. We are teaching parents (and their children) to be optimal learners (Sutton and Barto 1998). In fact, prior research demonstrates decrements in problem-solving in individuals with elevated clinical perfectionism (Stoeber and Eysenck 2008). Further, given evidence of prior decrements in abstract reasoning, we attempt to frame the process ideology very concretely. Parents are given behavioral examples that operationalize the adoption of an attentional stance that moves from biased orienting towards outcomes to more flexibly orienting to the vast variety of stimuli in the environment, that is, the momentary fluctuations in experience that inform optimal decision-making. Table 1 provides some examples that parents are given to differentiate these different attention foci. Parents are assigned homework assignments in which they must practice this shift of focus (Zucker et al. 2005). Thus, they are not directly trying to change the adolescent by manipulating her or his attention; rather, they are gently shaping this shift in focus via their own role modeling and via shifts in reinforcement contingencies as described below.

### ***6.3 Shaping as Attention Retraining to Goal Approximations***

Parents sometimes (or often) inadvertently reinforce an outcome focus. Questions about their child’s academic grades, their race time during track events, or other strictly outcome-focused parameters of performance have the effect of narrowing both the breadth and depth of conversations. We propose that such shaping via the focus of conversations gradually orients the child’s attention to these concrete indexes of achievement. Yet, parents may direct the orienting of attention in ways other than the topic of conversation, but also by the manner in which they reinforce the behavior of their child. For example, we have operationalized a behavioral pattern we refer to as the “yes, but” phenomenon among parents with elevations in clinical perfectionism. When enacting this behavioral pattern, parents, in a seemingly benevolent gesture to advance their child’s performance, only partially reinforce efforts by praising, but then immediately couple that praise with a suggestion for superior efforts on the next learning occasion: “Great job on



**Table 1** Parent Handout of a Process vs. Outcome Approach

*Baby Steps Towards a Process Approach*

1. Choose one event every day to focus on with your PROCESS outlook. Be in the moment, do only one thing, be an observer and describer – not a judger and multi-tasker.
2. Set aside a time each day where the family is together for at least a 15 min period to touch base and connect. If possible, make it a mealtime.
3. Do one thing at a time
4. Learn from an experience, don't judge
5. Trust that if you focus on being effective in the moment, the rest will follow.

	Process	Outcome
Athletics	<ul style="list-style-type: none"> <li>• Enjoyment of the event</li> <li>• Using performance to become a better athlete</li> </ul>	<ul style="list-style-type: none"> <li>• Score</li> </ul>
Academics	<ul style="list-style-type: none"> <li>• Learning</li> <li>• Using grades as data to improve study strategies</li> <li>• Using grades as data to enhance learning</li> </ul>	<ul style="list-style-type: none"> <li>• Grades, class rank</li> </ul>
College choice	<ul style="list-style-type: none"> <li>• Consideration of your child's personality, academic interests, and extracurricular interests</li> <li>• Finding a school that matches your child</li> </ul>	<ul style="list-style-type: none"> <li>• Highest ranked</li> <li>• Finding a school that matches the neighbor's expectations</li> </ul>
Conversation	<ul style="list-style-type: none"> <li>• Listening to the other person</li> <li>• Honoring your opinions</li> <li>• Being genuine in your feedback</li> </ul>	<ul style="list-style-type: none"> <li>• Focusing on how the other person will feel about you after the conversation</li> <li>• Thinking about what you should be doing rather than sitting and talking</li> <li>• Planning the next thing you will say</li> </ul>
Mealtimes	<ul style="list-style-type: none"> <li>• You are eating and enjoying the food</li> <li>• You are enjoying the company of your family</li> <li>• You are focusing conversation on experiences of the day</li> </ul>	<ul style="list-style-type: none"> <li>• You are doing a million other things while you eat</li> <li>• You are watching television while you eat, so you don't miss anything</li> <li>• You are watching television while you eat so you can avoid talking</li> </ul>
Physical appearance	<ul style="list-style-type: none"> <li>• You are appreciating what you look like in the moment</li> <li>• You take pride in your appearance</li> <li>• You focus on what your body can do</li> <li>• You accept those aspects of your appearance that you do not control</li> <li>• You invest a reasonable amount of time in your appearance</li> </ul>	<ul style="list-style-type: none"> <li>• You compare yourself to an ideal</li> <li>• You berate yourself for the discrepancy between your ideal and you</li> <li>• You refuse to accept your current appearance if it is not the ideal</li> </ul>

this paper, *but* next time you should really try to work on your transitions.” There are several processes that may be interacting to negatively impact improved performance via this behavioral pattern. First, emotional tone as embodied in factors such as voice prosody is important. When such feedback is delivered against a negative emotional background, such seemingly benevolent feedback can be interpreted as shaming and belittling. Second, such change efforts inadvertently

ignore the vast amount of research supporting the utility of shaping change efforts (Skinner 1953; Skinner 1975; Morris et al. 2005). In other words, when individuals are rewarded for approximating a desired outcome, receipt of the reward is reinforcing enough to persist with change efforts. In contrast, parents with elevations in clinical perfectionism, in a benevolent desire to improve their child's outcomes, may persistently correct their child, a behavioral pattern that may inadvertently stifle subsequent strivings.

## **6.4 Role Modeling**

Parent role modeling of a desired change in behavior is a potentially potent influence on adolescent behavior change, in general. In the case of AN, in which adolescents have at best mixed motivations to attend treatment, role modeling of parents may be one of the few vehicles available to clinicians to influence behavior change in the initial stages of treatment. The debate between the existence of negative and positive forms of perfectionism becomes particularly informative in determining what aspects of parent behavior should be modeled, and what aspects should be addressed in treatment. In accordance with prior reviews of perfectionism, we concur that it is not striving for extreme achievement that is detrimental. Rather, there are specific aspects of such striving that may impede psychological and physical health, not only in those with AN, but in clinical perfectionism more generally.

Shafran et al. (2002) propose that it is reactions to failure that may influence psychological and physical health in those with elevated clinical perfectionism. We further contend that not all striving is adaptive and provide parents with several parameters to examine their chosen path of perfectionistic strivings: health and authenticity. First, we give parents the guideline that strivings for achievement should not interfere with health. While parents can readily recognize the dangerous consequences of such relentless striving on the health of their ill child, they may be less aware of the chronic impact of sleep deprivation, skipped meals, lack of balance between leisure and work, et cetera, on their own mental health and ultimately, productivity.

Of importance, perfectionism is notoriously difficult to target in treatment for many reasons, not the least of which is the presence of intermittent reinforcement schedules in which the desired perfectionistic outcome is achieved, albeit fleetingly. Targeting perfectionism in those parents who likely have been successful (indeed, sometimes incredibly successful) in obtaining outcomes may seem a daunting task, indeed. Yet, multiple factors support why addressing trait features in parents in the context of eating disorder treatment may afford a particularly efficacious milieu for such efforts. First, parents will do for their children what they will not do for themselves. Thus, parents may be more willing to attempt to alter a typical mode of responding if such change may potentially benefit their child than they would be to address this behavior pattern without this social contingency in place. Second, we do not focus on the extent of striving but rather on reactions to failure. Fairburn and Shafran and others have

posited that perfectionism was toxic to those individuals who interpreted perceived failures in relationship to evaluations of the self (Shafran et al. 2002). We concur with this definition as failures to achieve a self-proclaimed outcome may result in increases in the self-conscious emotions, a potent form of aversive conditioning. As those with elevations in clinical perfectionism may be particularly vulnerable to define self-worth in concrete terms, such cognitive features may eventually provide an additional target of intervention. To alter this influence on self-definition, we considered several elements as critical. We had to change the context of a failure to achieve desired outcomes from a perceived threat to self-worth to an opportunity for self-growth. Fortunately, a vast literature on reinforcement learning supported our case. Research on problem-solving in those with elevations in clinical perfectionism supported a perseverative problem-solving style, inefficiency on cognitive tasks, and difficulty re-engaging on a task with which they had experienced prior failure (Stoeber and Eysenck 2008; Egan et al. 2007; Saddler and Sacks 1993). Study of the neurobiology of reinforcement learning, in general, highlighted the changing rate of dopaminergic firing, a marker of increased potentiation of synaptic communication, in response to unexpected outcomes: that is, we learn more when things do not go as planned (Schultz et al. 2008). Parents are taught that a focus on experiential learning may have an unintended effect: it may improve outcomes. Armed with data and the putative benefit of their child's health, introduction of content to address perfectionism in parents of those with AN had a surprising effect – shifting focus from the intermittent reinforcement of rare outcomes to the constant reinforcement afforded by new learning.

Finally, we desired to have parents examine whether such strivings were authentic reflections of personal values. As mentioned, for many, perfectionistic strivings are intended to influence public opinion and are less about what is personally meaningful for the individual in question. As forging an identity distinct from their eating disorder may be an essential component of effective treatments for AN (Serpell et al. 1999), parental role modeling of the search for self-motivated (rather than reputation-mediated) goals may be another critical social influence to shape their child's own self-selection of goal-directed behavior. Role modeling of such complex constructs by the parents further provided a concrete example that would hopefully bypass any deficits in abstract reasoning in the adolescent, so that he or she would fully comprehend what the parent was modeling. Combined, we intended for such treatment foci to not only alter parent role modeling of behavior critical to influence the biased outcome strivings of the child, but also that the parent's own mental health may be improved.

## ***6.5 Social Reinforcement Contingencies***

People value success and attune to authenticity. As one may imagine, the desire to change the context and nature of perfectionistic strivings has multiple social barriers – not just those presented by the role modeling of parents. Rather, an

outcome-focused perspective provides a simple vehicle to rank and judge others and is a natural part of our evolutionary history (Zink et al. 2008). Wisely, we do not take up this argument. Rather, we focus on the realities of intimate human relationships and the essential role of vulnerability in the formation of trusted bonds. In economic games of trust, the individual who is voracious in his or her strivings is rarely trusted, while players who sacrifice part of their hand or are willing to risk evidence of a vulnerability are often described as more trustworthy and suitable teammates (King-Casas et al. 2005). Such findings from the field of neuroeconomics contradict several well-replicated behavioral patterns in those with elevations in clinical perfectionism: the belief that failure will distance them from others (Hewitt et al. 1998). Rather than attempt to shift such contingencies, the focus of treatment is on operationalizing the limits of control: those aspects that parents can control (their own behavior) and those they cannot (everything else- including the opinions of others). Thus, parents are encouraged to risk the authentic display of mistakes and to examine the outcomes.

## 6.6 *Niche Environments*

As individuals seek out and create environment that reinforce trait modes of responding, it would not be surprising to see individuals with elevations on measures of perfectionism seek out competitive environments. Surprisingly, the data are rather mixed and this may speak to the debate regarding whether there are adaptive and maladaptive forms of perfectionism (Slade and Owens 1998; Flett and Hewitt 2006). For example, Stornelli et al. (2009) examined differences in perfectionism and negative affect between students in academically gifted programs, arts programs, and regular academic programming finding no differential distributions of levels of perfectionism, but a consistent relationship of perfectionism with negative affect. However, research has also supported elevated levels of perfectionism in increasingly competitive environments such as dance companies (Thomas et al. 2005). Though the direction of causality is necessarily complex, such a relationship may be an excellent exemplar of the operation of niche environments: individuals' trait features becoming intensified via the type of environments they choose combined with the tendency to seek out those environments that reinforce these tendencies. Certainly, it is not hard to imagine how challenging it would be for individuals with elevated levels of clinical perfectionism when surrounded by individuals who perpetually feel guilty about their failures to achieve desired outcomes. In intensive treatments for substance abuse, two complementary social models are recommended in relation to the niche environments of individuals with a former addiction. Alcoholics Anonymous, a widely disseminated and influential program for the treatment of alcohol abuse and dependence, has individuals with shared experiences participate in group meetings and engage in peer mentoring to support behavior change. Accumulating evidence supports the efficacy of this model (Laffaye et al. 2008; Blonigen et al. 2009; McKellar et al. 2003). In addition,

individuals with prior addiction are often encouraged to change their prior social context to the extent that former partners and/or friendships help to facilitate abuse (McKellar et al. 2008). Our goal was to model the creation of adaptive social networks while not inadvertently reinforcing maladaptive behavior in the context of GPT. The group context itself provides a potent environment for the formation of adaptive social contingencies. Each week, social dynamics within the group demand that parents report mistakes, group leaders are encouraged to share their own social mishaps, and particularly emotional, volatile, and seemingly ineffective interactions are celebrated with humor (Zucker et al. 2005). Despite the reluctance or disbelief with which parents may regard changes in social status resulting from confessions of failure, the group context provides a virtual experiment of these beliefs: not only is status not injured, but relationships are enhanced (Kawamura and Frost 2004). Further, via repeated exposures not only to their own, but to the mistakes of other parents, parents come to appreciate what they have been instructed about the educational value of mistakes: they learn from the mistakes of other parents: when things go well, they pay less attention. Our adolescent group establishes similar expectations for failed performance.

## ***6.7 Changes in Perfectionism in Adolescent Anorexia Nervosa***

We examined changes in self-report measures of perfectionism in the context of a treatment trial of adolescent AN. In this trial, families were randomized to receive either the Maudsley model of family therapy as manualized by Lock et al. (2001), or Group Parent Training and an Adolescent Interoceptive-Skills Group (adolescents in a group with other adolescents with AN). Our interest was examining change in the frequency of perfectionistic cognitions relative to changes in the experienced distress regarding perfectionistic cognitions. In other words, with treatment we expected individuals to become less distressed by the presence of perfectionistic cognitions (e.g., thought content related to fear of failure). As our interest is in the capacity for change in trait features in adolescents for the purposes of this chapter, we combined our treatment groups to maximize our power to detect change. We employed the Perfectionistic Cognitions Inventory (PCI), a self-report measure of the frequency of perfectionistic cognitions (e.g., “I need to be perfect. I should never make the same mistake twice. I have to be the best.”), designed by Flett et al. (1998). We adapted this measure by adding an item that assessed the level of distress about having this thought for each item that assessed frequency. We totaled these distress items separately from the frequency items. The change in PCI distress from baseline to 6 months was significant ( $n = 17, p < 0.05$ ), and there were trends from 3 months to 6 months ( $n = 16, p = 0.08$ ) and from baseline to 12 months ( $n = 10, p = 0.07$ ). However, the frequency of perfectionistic cognitions also changed, from baseline to 3 months, baseline to 6 months, and baseline to 12 months. The PCI total change from 3 months to 6 months was not significant. Controlling for level of baseline symptoms, the PCI sum change score from

baseline to 6 months was correlated with EDE shape concern at 6 months (controlling for baseline EDE shape concern,  $r = 0.52$ ,  $p < 0.05$ ;  $n = 13$ ). The PCI distress change score from 6 to 12 months was correlated with the change in fasting from 6 to 12 months ( $p = -0.68$ ,  $p < 0.05$ ;  $n = 7$ ). To be sure, our sample size and subsequent power limit our ability to fully address the capacity for change. We provide these data merely to illustrate that when designing interventions that aim to address or incorporate trait modes of responding, our choice of outcome measures may need to reflect alternatives to symptom reduction, but rather changes in the impact of symptoms on functioning.

## 7 Summary

We attempted to provide a general framework to guide the development of interventions that aim to address persistent features in eating disorders that may preclude effective treatment. Using perfectionism as an exemplar, we drew from research in cognitive neuroscience regarding attention and reinforcement learning, from learning theory and social psychology regarding vicarious learning and implications for the role modeling of significant others, and from clinical psychology on the importance of verbal narratives as barriers that may influence expectations and shape reinforcement schedules. Exciting advances in the neuroscience are rapidly propelling our understanding of brain function in AN, findings that will greatly augment our capacity to develop novel intervention strategies. Yet, all interventions are embedded in a social context and thus, the thoughtful incorporation and leveraging of this social context may greatly potentiate our capacity to significantly change the course of these severe disorders.

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