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The purpose of this article is to outline a model of anorexia nervosa (AN) as a disorder of psychological inflexibility, motivated by an insatiable desire for prediction and control with related intolerance for uncertainty. We describe preliminary data that provide initial support for this conceptualization and point to the ways in which mindfulness and acceptance-based strategies might be particularly useful for treating AN. This article is not intended to be

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an exhaustive literature review, rather a conceptual framework to guide future research and treatment development.

INTRODUCTION

An emaciated 15-year-old painstakingly and meticulously places dry cereal into a measuring cup, leveling it 3 times with a knife and carefully checking the box to ensure the caloric information has not changed since she read the box this morning. Unaware of her hunger, the helpless stare from her father, or the amount of time that has passed, she focuses only on whether the piece of cereal rupturing the smooth surface should be removed or perhaps the piece next to it as well. . . .

Anorexia nervosa (AN) is a devastating illness in which behavior is profoundly narrow, rigid, and seemingly disconnected from somatic experience. This behavioral profile, when combined with the self-imposed starvation pathognomonic of the disorder, contributes to the designation of eating disorders as one of the 10 leading causes of disability among women (Mathers, Vos, Stevenson, & Begg, 2000; Striegel-Moore & Bulik, 2007). While advances have been made in the management of adolescent AN (Keel & Haedt, 2008; Lock & Fitzpatrick, 2009); a significant minority fail to directly benefit from treatment (Eisler, Simic, Russell, & Dare, 2007), comorbid psychopathology persists (Herpertz-Dahlmann et al., 2001), and crossover to other forms of eating disorders is common (Eddy et al., 2008; Tozzi et al., 2005). Moreover, recommended treatments for adults with AN remain elusive (Berkman, Lohr, & Bulik, 2007; Bulik, Berkman, Brownley, Sedway, & Lohr, 2007; Wilson, Grilo, & Vitousek, 2007).

Numerous elegant models inform the pathophysiology and phenomenology of AN (Kaye, Fudge, & Paulus, 2009; Schmidt & Treasure, 2006; Steinglass & Walsh, 2006). This article aims to augment existing models of AN by providing a framework from which to understand the seemingly relentless fight against the body that is characteristic of the disorder. We begin by proposing a model of AN as an illness of psychological inflexibility, defined as an inability to behave flexibly in the presence of difficult thoughts, feelings, and bodily sensations. We propose that among individuals with AN, fear of harm and demand for certainty lead to over-reliance on verbally ascribed rules for behavior to minimize ambiguity, avoid mistakes, and provide the semblance of control over aspects of experience that are essentially uncontrollable (i.e., the volatility of the body associated with motivational states such as hunger or affect). We further propose that this inflexibility motivates symptom expression. We describe how rules for behavior provide an illusion of safety and certainty, thereby allowing for short-term relief,

but at the expense of long-term physical and psychological health which require sensitivity to fluctuations in experience to respond to dynamic emotional and metabolic needs. Subsequently, we review emerging research that supports the clinical relevance of psychological inflexibility for the prognosis and differentiation of AN (e.g., psychological flexibility changing in tandem with symptom remission) and explore ways in which mindfulness might facilitate flexible interaction with difficult thoughts and feelings and expand behavioral options in the presence of heightened arousal or states of uncertainty. In conclusion, we comment on areas for future research and treatment development.

ANOREXIA NERVOSA: A MODEL OF PSYCHOLOGICAL INFLEXIBILITY

Challenge of Controlling the Experience of the Body

Individuals with AN behave as if they are at war with their bodies, fighting for dominance or complete control. Inevitably, this is a losing battle. There are far too many fluctuating variables determining the condition of the body at any given moment for somatic states to be precisely manipulated (or "controlled"). For example, consider the factors that maintain energy homeostasis. While the energy demands of the body on any given day can be approximated with various equations (Harris & Benedict, 1919), in fact, these demands constantly vary. Such energy needs are a result of "controllable factors" such as diet and exercise combined with innumerable, "uncontrollable" internal factors that, while contributing to metabolic demands, are inaccessible to conscious manipulation (e.g., degree of muscle repair and growth, energy cost of digestion, etc). Augmenting this array of controllable and uncontrollable factors are other dynamic variables such as stage of development, status of menstrual cycle, stress, and sleep, among other variables. As if this were not complex enough, the metabolic demands of the body are recursive not linear—when we fight against the body by denying basic needs, the body "fights back" via metabolic adaptations.

Emotion is another example of a multi-systemic body experience that, like energy storage and use, eludes complete and absolute control. Consider the automaticity of sympathetic and parasympathetic (Bradley & Lang, 2007) nervous system activity in the presence of an unpleasant stimulus (e.g., a threatening gesture), or a previously benign stimulus that has acquired aversive qualities due to past experiences. Direct attempts to suppress the arousal that accompanies activation often have paradoxical effects, serving only to intensify the emotional experience (Gross & Levenson, 1997). Further, spontaneous recovery occurs, such that if arousal is deconditioned (i.e., an object that caused fear ceases to cause fear), a fear reaction may resurface without warning (Bouton, 1994; Wilson & Hayes, 1996). Repeatedly, data on

suppression of panic, pain, and trauma, to name a few, demonstrate that despite our best efforts, the internal world cannot be manipulated or controlled to the same degree as some aspects of the world outside the skin (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996; Merwin, Rosenthal, & Coffey, 2009).

For most individuals, fluctuations in need and bodily experience are par for the course. For example, in times of increased hunger, many people simply eat more to meet this demand. However, for individuals with AN, anxious temperament and accompanying demand for certainty (Godart et al., 2003; Godart, Flament, Perdereau, & Jeammet, 2002; Halmi et al., 2000; Lilenfeld, Wonderlich, Riso, Crosby, & Mitchell, 2006; Raney et al., 2008; Strober, Freeman, Lampert, & Diamond, 2007) may make this somatic variability intolerable and propel desperate attempts to force homeostasis. Individuals with AN may use extreme behaviors such as fasting and excessive exercise to control biological needs and stifle related motivational drives. Because the complexity of the body precludes precise prediction and control, imperfect solutions may contribute to the experience of the body as confusing, feared, or otherwise undesirable. The result may be increasingly stringent and extreme attempts to manipulate experience. Distress from even minor perturbations in somatic experience may contribute to well-established behavioral features in AN, such as perpetual error monitoring (e.g., body checking, weighing). These attempts to reduce feelings of fear and uncertainty are a logical, though maladaptive, response when one is trying to control such a naturally volatile system. Thus, those with AN may attempt to further manipulate those variables over which they have control (diet and exercise), redirecting attention away from aspects of experience that are more amorphous and less amendable to direct change. The result is an extreme state of biological and emotional suppression, a state highly reinforcing for those who demand certainty. Although this is theoretical, early descriptions of AN (e.g., Bruch, 1973) and the narratives of individuals with the illness support this notion (Serpell, Treasure, Teasdale, & Sullivan, 1999). There is also growing empirical evidence for the relationship between AN symptomatology and fear or nonacceptance of emotional responses (Merwin, Moskovich, & Zucker, 2010; Merwin, Zucker, Lacy, & Elliott, 2010; Wildes, Ringham, & Marcus, 2010).

Verbally Ascribed Rules are the Solution (and the Problem)

The manner in which the symptoms of AN provide a sense of predictability, safety, and control (Schmidt & Treasure, 2006; Serpell et al., 1999) has occupied philosophers, clinicians, and researchers since AN was first recognized as a disorder of the mind (Brumberg, 1985, 1988). We maintain that AN does so because it provides clear rules for behavior, bypassing and attenuating volatile somatic-affective experiences which are less certain and

have greater likelihood of error. Indeed, verbal rules decrease ambiguity and provide a precise road map to guide complex decisions. In the context of AN, rules dictate when and what to eat, and how much, among other decisions. Not only does this make attending to internal experience less important, but also the verbal rules themselves and associated reliance on cognitive channels may actually dampen somatic sensations. Dampening is particularly likely if those rules result in significant weight loss which perpetuates physiological adaptations that attenuate arousal. Indeed, with prolonged starvation, there is robust evidence of increased parasympathetic influence (Miller, Redlich, & Steiner, 2003), and bradycardia is a well-known adaptation to inadequate nutritional stores (Mitchell & Crow, 2006). Such physiological adaptation would be expected to reduce the overall intensity of affect (Craig, 2004), and, along with the muting of hunger cues that occurs after pronounced neglect (Wang, Hung, & Randall, 2006), promote feelings of behavioral control. In this way, individuals with AN have found an internal control strategy that does indeed "work" because it directly impacts physiological functioning, and thus effectively reduces aversive somatic-affective experience. However, while negatively reinforcing, overreliance on verbal rules for behavior also has costs.

Laboratory-based studies have demonstrated that verbal rules can interfere with learning from experience (Hayes, Thompson, & Hayes, 1989; Hayes, Brownstein, Haas, & Greenway, 1986; Hayes, Brownstein, Zettle, & Rosenfarb, 1986; Wulfert, Greenway, Farkas, & Hayes, 1994). This research has shown that when individuals are given verbal instructions about how to perform a task (e.g., "press the button fast to earn points" in a computer game) they are likely to follow that rule even when conditions change and the strategy is no longer effective in achieving reward (e.g., pushing the button slowly earns more points). This is in contrast to when individuals are in this same situation without verbal instruction. Without direct instruction, individuals will adopt a strategy based on their experience of what works (e.g., to win points) and more readily change this strategy when the conditions change. Thus, although verbal rules are extremely useful, reducing the need for prolonged trial-and-error learning, they can also interfere with the ability to learn directly from experience that may shape more adaptive behavior or otherwise maximize outcome. This has been called *rule-based insensitivity*, and refers to the phenomenon that under some conditions, individuals fail to adjust behavior to match the conditions of the environment due to competing verbal rules. Of importance, rule-based insensitivity is potentiated among those who score high on a measure of self-reported rigidity (Wulfert et al., 1994), a characteristic common among individuals with AN and likely exacerbated in the acute ill state. Thus, the more premorbid rigidity among individuals with AN, the greater the reliance on rules rather than experience, and the more starved they get, the more rigidly rule-governed they become.

In the ideal scenario, verbal instructions are flexibly integrated with direct experience. For example, while we have guidelines about when and how much to eat; our behavior is also determined by our past experience of eating to alleviate the physical discomfort of hunger. Thus, we might notice that it is 6:00 pm (a verbal guideline about meal time) and then check in with our hunger to determine whether to eat and how much. In the case of AN, verbal guidelines about eating, exercise, and the like, are applied rigidly to the neglect of direct experience. Not only does this result in a failure to meet basic needs (e.g., energy deficits resulting from pre-determined calorie limits), but it also prohibits corrective experiences. In this way, the solution is the problem; adopting rules for behavior decreases anxiety associated with ambiguity, but it also disrupts reinforcement learning that would allow individuals with AN to use somatic-affective cues more effectively.

Neuroimaging studies of adults with AN who have been weight-restored and free of eating disorder symptoms for a significant duration of time provide partial evidence for the applicability of this to individuals with AN. In a study by Wagner and colleagues (2007), individuals with AN demonstrated decreased activation in neural regions implicated in reinforcement learning. Further, whereas control subjects demonstrated variability in patterns of activation depending on the momentary results of their choice, those with AN did not evidence such variability and thus were less responsive to momentary feedback on their choices in a learning task. Further, among AN participants, neural regions associated with coding the outcomes of effort and supervisory control were more active (Wagner et al., 2007). This study, as well as others (Steinglass, Walsh, & Stern, 2006; Tchanturia et al., 2004) provide corroborating evidence that among individuals with AN, a narrow focus on rules expected to generate particular outcomes might interfere with the ability respond effectively to changing contingencies of the moment.

Minimizing Threat: Using Verbal Rules in Social Situations

There are two potential ways to dampen uncomfortable arousal. One way is to attempt to directly manipulate the state of the body (e.g., using verbal rules about diet and exercise), another way is to reduce contact with sources of perceived threat. AN principally emerges in adolescence, when the threat of social rejection by peers is paramount (Forbes & Dahl, 2010; Hudson, Hiripi, Pope, & Kessler, 2007). In adolescents and adults with AN, research has repeatedly illustrated heightened interpersonal sensitivity and fears of negative evaluation (Broberg, Hjalmers, & Nevonen, 2001; Herpertz-Dahlmann et al., 2001; Kaye, Bulik, Thornton, Barbarich, & Masters, 2004). Reducing the threat of social rejection (and thus the accompanying anxious arousal) may be accomplished via a number of strategies. For example, using restriction to achieve a thin-ideal might function in part, to reduce threat and increase comfort in social situations by conforming to societal standards of

attractiveness and the like. However, individuals with AN might also do other things to reduce risk. For example, they may directly avoid evocative social situations (e.g., not participating in less structured social activities, not self-disclosing personal information). And, of prime relevance to the current paper, they might also use the strategy that they have found useful in other domains i.e., following rules for behavior that reduce ambiguity and provide a sense of control.

Rules regarding how to behave in social situations or "social scripts" can be quite useful, providing guidelines on how to behave in novel situations, managing impressions, and allowing individuals to gain acceptance. For individuals with AN, such a strategy may be employed rigidly to reduce perceived risk of rejection and provide an organizing frame to manage complex social interactions (Zucker et al., 2007). This strategy would likely be "effective" in attenuating immediate social anxiety. However, in much the same way that individuals with AN body check or weigh to establish the accuracy of their solutions, they might also be compelled to scan or monitor the social environment for signs of error (particularly given the ultimate lack of control one has over the opinion of others). This tendency would be expected to lead to increased attention to social threat cues, such as rejecting facial expressions from others. Monitoring for social error is actually quite adaptive in order to adjust one's behavior to the demands of the situation. However, it becomes problematic when it limits the scope of information available or generates other forms of cognitive or behavioral rigidity.

Increased attention to social error and the narrowing of behavioral options to those that facilitate self-preservation may worsen or perpetuate social dysfunction among individuals with AN. In those with AN, displaying a behavioral repertoire overwhelmed by the motivation to protect against threat and mask vulnerability may contribute to perception of individuals with AN as cold, stilted, or aloof. Moreover, this pattern of visually guided attention may limit the scope of stimuli available to guide behavior and lead to a failure to perceive social nuances and positive cues. Thus, the very sensitivity to rejection which aims for self-preservation may inadvertently increase the likelihood of social failure and thus increase anxiety. Greater anxious arousal would be expected to generate increased attention *toward* the body and *away from* social stimuli. As a result of these processes, individuals with AN may cling ever more tightly to rigid rules as a solution to the overwhelming complexity of interpersonal interactions and fail to notice and implement alternative behaviors that would be more effective.

Thus, we are postulating two sources of interference with optimal learning in social situations: biased attention that decreases the range of information available to update verbal rules, and a failure to adapt verbal rules and use them flexibly based on new information. We propose that

unlike the realm of diet and exercise in which rigid rules ultimately leads to reductions in aversive arousal, over time, using social scripts may actually create circumstances that facilitate *more frequent or intense* negative affect. The end result is an interpersonal system that is largely ineffective (Zucker et al., 2007) and a further retreat to the world of the body and AN, which promises to bring acceptance and at least provides a direct target for change. Although the reasons are complex and likely interact to potentiate dysfunction, this is consistent with data that indicate poorer interpersonal functioning and greater interpersonal distrust is associated with poorer prognosis and a more chronic illness course (Goodwin & Fitzgibbon, 2002; Wentz, Gillberg, Anckarsater, Gillberg, & Rastam, 2009).

Thus far, we have described how the symptoms of AN can be understood as attempts to minimize the risk of somatic-affective volatility by over-reliance on verbal rules for behavior and by monitoring for errors. Although these behavioral strategies increase the experience of prediction and control, they also directly interfere with building a meaningful, rich life—both in harmony with the body and in sync with other people (See Figure 1). Such a behavioral system exemplifies *psychological inflexibility,* a focus of recent advances in behavior therapy which emphasize the way in which diverse symptom presentations may function to regulate affect or control other aspects of internal experience (Barlow, Allen, & Choate, 2004; Hayes et al., 1996). Such therapies are further distinguished by the use of acceptance and mindfulness strategies and philosophies to increase behavioral options. Some of these newer approaches (e.g., Acceptance and Commitment Therapy; ACT) specifically integrate the role of language and cognition in promoting and maintaining maladaptive rigidity, such as that imposed by verbal rules. In the next section, we describe data that support the utility of targeting psychological inflexibility in treatment of AN. First we briefly review data that indicate effectiveness of these newer behavior

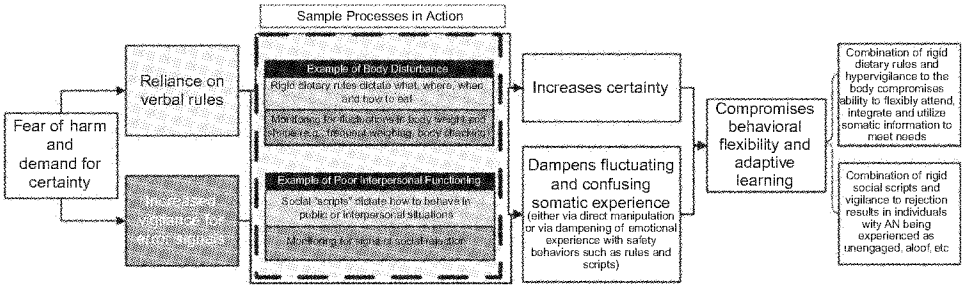

FIGURE 1 Hypothesized systems of control in AN. Viewing the diagram from left to right, we illustrate how systems of control are both negatively and positively reinforced in two domains that are relevant for those with AN: the experience of their bodies and their relationships with others.

therapies which are increasingly being used to treat eating disorders. We then point to emerging research that suggests an improved capacity to accept and act in the presence of difficult thoughts and feelings occurs in tandem with AN symptom improvement.

PSYCHOLOGICAL INFLEXIBILITY AS A THERAPEUTIC TARGET

Data Supporting the Use of Acceptance and Mindfulness-Based Treatments With AN

According to our conceptualization of AN, treatment should aim to help individuals with AN to tolerate uncertainty, risk negative outcomes, and behave in new ways that are unscripted but guided by momentary feedback. To this end, strategies which shift effort away from avoidance and control and toward observing and welcoming present-moment thoughts and feelings may be particularly useful. Such strategies would not only be expected to generate increased variability in behavior so that responses may be shaped more adaptively by ongoing experiences, but also may decrease the need for eating disorder symptoms that facilitate avoidance. The end result may be development or refinement of a crucial regulatory capacity, and more efficient reinforcement learning. Specifically, observing internal experience would be expected to improve the ability to discriminate and use somatic-affective cues to guide behavior. Further, because these strategies increase openness to all internal and external events, individuals with AN would be expected to improve in their capacity to learn from ongoing feedback. Ultimately, they would be more able to use verbal rules as guides that are amendable to the unique demands of the situation and broader life goals. Facilitating effective action in the presence of heightened emotional arousal, depressogenic thoughts, and the like, is the stated goal of acceptance and mindfulness strategies which form the backbone of Acceptance and Commitment Therapy (ACT), Mindfulness-Based Cognitive Therapy (MBCT), and Dialectical Behavioral Therapy (DBT), among others.

Preliminary data on the use of acceptance and mindfulness-based treatments for eating disorders have demonstrated improvements in eating disorder symptoms, quality of life, and related psychopathology including anxiety and depression across eating disorder diagnostic categories (Baer, Fischer, & Huss, 2005a, 2005b; Berman, Boutelle, & Crow, 2009; Heffner, Sperry, Eifert, & Detweiler, 2002; Kristeller & Hallett, 1999; Safer, Lock, & Couturier, 2007; Safer, Telch, & Agras, 2001a, 2001b; Salbach-Andrae, Bohnekamp, Pfeiffer, Lehmkuhl, & Miller, 2008; Telch, Agras, & Linehan, 2000, 2001). Overall, these treatments are well tolerated and have relatively low levels of attrition (Berman et al., 2009; Safer et al., 2007; Telch et al., 2000, 2001). Both mindfulness-based cognitive therapy (Segal,

Williams, & Teasdale, 2002) and mindfulness-based eating awareness training (Kristeller & Hallett, 1999) have been found to improve binge-eating (Baer et al., 2005a; Baer et al., 2005b; Kristeller & Hallett, 1999). Similar effects have been found with adults and adolescents undergoing modified DBT treatments for AN, bulimia nervosa, and binge-eating disorder (Safer et al., 2007; Safer et al., 2001a, 2001b; Salbach-Andrae et al., 2008; Telch et al., 2000, 2001). Further, early work supports ACT with AN (Heffner et al., 2002), and research findings suggest it may be and have been a useful treatment for adults with AN with a previous history of treatment and protracted course of illness (Berman et al., 2009), a population for which effective treatments are lacking. However, at this point, data are still preliminary and consist only of case studies with simple pre-post test designs limited to short-term follow-ups. Further, there is a need for additional research to determine which components of these interventions are active and responsible for positive outcome.

Psychological Flexibility as a Process of Change

Although limited, emerging data provide early support for psychological inflexibility as a viable process of change in the treatment of AN. For example, in a study of 21 adults who currently met full diagnostic criteria for AN, 18 adults who met criteria in the past but were currently weight restored, and 23 adults without any history of an eating disorder, we found systematic between-group differences in psychological flexibility. Consistent with the model, individuals with full-syndrome AN reported less psychological flexibility, followed by individuals with a history of the illness who were weight restored, and finally, healthy controls (Merwin, Moskovich, & Zucker, 2010).

Further, in an ongoing treatment study with adolescents with AN[1], our preliminary analyses have indicated that psychological flexibility occurs in tandem with AN symptom remission across treatment. In this randomized controlled trial, adolescents with AN and their caregivers receive 20 sessions of either family or group-based psychotherapy (Zucker, Ferriter, Best, & Brantley, 2005) over the course of 6 months. We assessed eating disorder symptoms and psychological acceptance at baseline, 3 months (mid-treatment), 6 months (end of treatment), and at 9 and 12 months post-intervention follow-up. Of 35 families that were randomized to the study, 18 completed the treatment phase of the study at the time of analysis. We found that psychological inflexibility declined among the adolescents from pre to post-treatment, and throughout the follow-up assessment time points. Change from baseline to 12 months approached significance even in this small sample size. A similar pattern was found for interoceptive deficits, which as defined by the subscale of the Eating Disorder Inventory, includes abilities to label affective experience and the willingness to experience emotional states. Overall, adolescents demonstrated a significant and systematic

decline in interoceptive deficits from baseline to follow-up. Interoceptive capabilities are particularly relevant to psychological flexibility because deficits in this area suggest difficulty with ongoing awareness and acceptance of internal states (e.g., hunger/satiety, emotions). Significant improvement in eating disorder symptoms and BMI was observed concurrent to these other changes. Further, time-lagged linear regression analyses indicated that the degree of psychological flexibility (i.e., an adolescent's willingness to experience difficult thoughts and feelings and behave effectively) at one time-point predicted eating disorder symptom severity at the subsequent time point (Merwin, Zucker, Marx, France, & Moskovich, 2009).

We also examined change in the frequency and experience of perfectionistic cognitions as a function of treatment among the adolescents with AN. We expected that while frequency of perfectionistic thoughts might not change as a result of treatment, the extent to which individuals were distressed by these thoughts may. This pattern of results would support targeting how individuals with AN react to their private experience, rather than focusing solely on the content of the cognition. Results supported this conceptualization. Although the frequency of perfectionistic cognitions did not change, adolescents' reported decreased distress in response to these thoughts. Importantly, decreased distress was associated with reductions in dietary restraint and lower global scores on a structured interview of eating disorder symptoms when baseline levels of symptoms were controlled (Zucker et al., in submission). This is consistent with studies of adults with AN that have reported greater acceptance of negative thoughts and feelings about weight and shape corresponded with ED symptom improvement in the absence of any significant change in the content or frequency of the thoughts and feelings themselves (Berman et al., 2009; Heffner et al., 2002).

Together, these studies highlight the potential clinical relevance of psychological flexibility for the prognosis and differentiation of AN from healthy individuals. Lower levels of psychological flexibility distinguish individuals with full syndrome AN from those who are weight restored and healthy controls, while the ability to engage flexibly with distressing thoughts and feelings is associated with AN symptom remission across treatment. Perfectionism and related cognitions which have long been described as part of the phenomenology of AN (Bulik et al., 2003), do not change in frequency but in impact as a result of successful intervention, suggesting how individuals with AN relate to these thoughts may be of prime import. Much additional research is needed to understand how contemporary CBT interventions improve ED symptoms. However, the above data suggest that increased psychological flexibility is a plausible mechanism that warrants further investigation. If tenable, acceptance and mindfulness approaches would be theoretically appropriate. Below we describe some aspects of mindfulness that may be particularly useful in addressing AN as we have conceptualized the illness. Strategies might be delivered either in the context

of an acceptance-based treatment package, such as ACT, or provided as adjunct to more traditional cognitive-behavioral therapies.

Using Mindfulness With AN

The core skill of mindfulness is observing experience as it unfolds in the present moment with full awareness and without unnecessary attachment. In other words, all of experience is greeted openly, which the same degree of curiosity and attentiveness. Experiences are held lightly and enter and exit conscious awareness freely. Mindfulness entails a shift in the frame of reference from one who is guided by the content of thoughts and the intensity and valence of feelings to one who observes these internal experiences. From a mindful stance, an individual recognizes internal events for what they are: dynamic, related to the current and historical situation, and separate and distinct from the individual. This observer stance is characterized by focused, purposeful, and flexible attention to the process of thinking and feeling, rather than the product, content, or valence of cognition and emotion. For example, in a typical mindfulness exercise, an individual may be asked to follow their breath, to notice all sensations that accompany breathing, and to become an unbiased filter of all that transpires internally and externally. When attention is captured by a passing thought e.g., "*I am not doing this right,*" an individual notices that *as a thought* (nothing more, nothing less) and gently guides attention back to the breath. The breath serves as an anchor to the present moment and establishes a connection with the self. At least two things happen during a mindfulness exercise: a) capacities to sustain and shift attention are cultivated, and b) the literal quality of thought is disrupted as the process of thinking is witnessed. Observance and disengagement from the literal properties of thought not only increase behavioral options, but also prevent cognitive elaboration (Bishop et al., 2004). Thoughts can become the object of introspection and the subsequent rationalization, rumination, or other elaboration of thought content that commands attentional capacities that would otherwise be relegated to other aspects of experience and the unfolding present moment. Mindful observation frees these cognitive capacities and allows greater contact with ongoing experience, a requisite for effective action.

Facilitating a Regulatory Capacity

For individuals with AN, an observer stance may increase capacity to step back from verbal rules and more effectively incorporate somatic-affective experience in decision-making. In this way, mindfulness may cultivate a regulatory capacity in which *experience* can be flexibly integrated with verbal guidelines to direct behavior and produce desirable outcomes. For example,

rather than blindly following rules of diet and exercise, individuals with AN can observe these rules *as thoughts* and use their experience to determine whether to comply. In the case of hunger or fatigue, and the rule "*You cannot eat between meals,*" mindfulness skills may be used by the individual with AN to notice the full range of internal and external events, merely observe those aspects that are not helpful, and identify an appropriate behavioral response. Further, because mindfulness promotes approaching all internal experiences with curiosity, openness, and acceptance, using mindfulness may decrease unhelpful secondary reactions, such as fear, guilt, and shame in response to internal experience (e.g., guilt about feelings of satiety). As a result, individuals with AN may be more able to tolerate feelings, and even welcome them as useful information. Over time, through a process of mindful discrimination training, individuals with AN would come into greater contact with the full range of a motivated state and presumably develop capacities to respond effectively. Thus, rather than ignoring or suppressing feelings that are uncertain or uncomfortable, individuals with AN can step back from judgment, take time to determine what, if anything, the feeling is communicating (e.g., the need to eat, the need to seek social support), and respond in a way that allows them to get their physical or emotional needs met. Of importance, flexible attention to internal states has been found to promote more effective behavioral responses among individuals with disordered eating. For example, in a mindfulness-based intervention, increases in satiety awareness were correlated with a reduction in binge-eating episodes (Kristeller & Hallett, 1999). Further, there is at least preliminary data that mindfulness mediates the relationship between anorectic cognition and functioning (Masuda, Price, Anderson, & Wendell, 2010).

Expanding the Behavioral Repertoire and Improving Social Functioning

Mindfulness allows for an ongoing awareness of all potential candidates to relegate attention and may directly foster the ability to notice and disengage from cues. Thus, rather than attention being captured by a single aspect of experience (e.g., gut discomfort), it may be gently redirected to a multitude of other stimuli, such as awareness of a worry thought, or aspects of the external environment, e.g., other people in the room. For individuals with AN, this may mean that rather than being fixated on how the body feels, they can be aware of how body sensations are related to other internal or external cues, and use this information to guide action. For example, in an evocative social situation, an individual with AN may be fixated on the experience of the gut and unaware that this is associated with anxious arousal related to not being part of a social group. Unaware of the need to be with others, the

individual with AN may stay isolated and fixated on the experience of the body. Through flexible attention to the full range of cues, the individual with AN may notice the thought and feeling of being left out, and approach a safe person. With continued practice, flexible attention to fears of rejection and letting go of worry thoughts might enable individuals with AN to approach situations that are of greater risk. In this way, a mindful, observant posture increases the breadth of antecedents available to guide behavior and thus the possibility of novel and diverse responses.

Mindfulness might also expand the breadth of the behavioral repertoire by diminishing the literal or aversive properties of thoughts and feelings which would typically narrow behavior. Because private events are less painful when observed mindfully and thoughts are no longer verbal dictates, an individual has a number of options of how to respond to internal experiences that might otherwise generate avoidance and control. For example, rather than the previous rigid sequence of a knot in stomach, the thought "unacceptable," and then dietary restriction; mindfulness allows alternative responses, such as noticing and accepting the knot in the gut, the ability to observe and describe the accompanying anxious arousal, and the reorienting of attention and behavior to a meaningful life goal (i.e., *"I am experiencing a knot in my gut, and I accept that it is here, and orient to other aspects of my day."*).

A mindful approach might be employed not only with somatic sensations or specific thoughts, but also a collection of private events. For example, a therapist could evoke the experience of *uncertainty* in session and then guide a patient through observing and accepting all aspects of this event. The therapist might begin by facilitating the client simply noticing the experience without acting to make it "go away" or changing it in any way. The client subsequently may be asked to interact with this experience in a number of ways other than avoidance, escape or control (e.g., be curious about it, describe it as an object or a color, etc.). As a result, a repertoire of alternative responses could be fostered such that when *uncertainty* is experienced in the natural environment, behavior can be flexibly organized around the client's life goals. For instance, when confronted with the choice of going to a social event that evokes fears of not knowing what to say or do, an individual with AN might experience strong urges to engage in a clearly prescribed exercise routine instead. Mindfulness practice would help this individual notice this urge, including corresponding thoughts *(i.e., I must exercise)* and feelings (*anxiety*), recognize that it is associated with the social situation, *and* make an active choice to attend. This would require not following the literal dictates of their thoughts and accepting that they will experience fear or discomfort in order to cultivate friendships.

Mindfulness might also facilitate more responsive and potentially enhanced social functioning during the event. For example, in contrast to

focusing and attaching to signs of rejection and engaging in elaborative ruminative thought about personal flaws deemed to warrant rejection, an individual with AN might notice thoughts of rejection for what they are (i.e., products of thinking or verbal constructions of the world), and "let go" of these experiences in order to focus attention and resources on the conversation. Over time, this pattern of behavior would be expected to put individuals in contact with positive feedback from others (e.g., warmth, invitations to social events), increasing life value and meaning and decreasing the need for AN.

Mindfulness and Value-Guided Action

Individuals with AN are reluctant to give up their symptoms, experiencing them as acceptable and in line with their self-conceptualization (Vandereycken, 2006). We propose the reason for this is because symptoms provide a sense of safety amidst confusion and threat, and thus are negatively reinforced. Because the system of starvation is "working," conditions are not conducive to exploring and identifying other life values. As a result, individuals with AN may have limited awareness of things that are meaningful or cared about in a genuine way, other than weight and body. Increasing awareness of moment-to-moment fluctuations in somatic and affective experience and promoting an openness to experience and access to experiential ways of knowing may allow individuals with AN to find other things that are worthwhile and more compelling than their disorder.

Some contemporary approaches specifically work to foster the development of patterns of meaningful action based on individually chosen values as an alternative to avoidance and rigid behavioral control based on thought content. For individuals with AN, values might provide an organizing framework for behavior that allows for the relinquishment of AN. Indeed, without the constraints imposed by AN, the range of behavioral options may be experienced as vast and overwhelming. Values may provide a compass to guide behavior facilitating navigation through this uncertainty. Further, the delineation of values and the corresponding behaviors consistent with these values may motivate approach behaviors. Thus, value-guided exposure to novel or threatening circumstances may be more potent than exposure for the sake of symptom reduction, a finding that may be particularly relevant in a clinical population which is typically behaviorally inhibited and harm avoidant (Cassin & von Ranson, 2005). Further, establishing that particular thoughts and feelings (such as fear of failure) will undoubtedly manifest when individuals work toward things that are important to them (e.g., forming connections with other people), may transform how these internal events are experienced; it is no longer just discomfort, but discomfort with a purpose. An increase in novel and variable behavior may also help to define

values not previously realized. Thus, there is greater potential for shaping action that is more adaptive than the current patterns of self-starvation.

CONCLUSION

Future Research and Treatment Directions

Individuals with AN are indeed driven to predict and control. Although in certain areas they may have been reinforced for such rigid determination, their failure to sample from unexplored domains and integrate ongoing somatic-affective feedback means ultimately they are not learning optimally: not benefiting from either internal cues or all the environment has to offer and unwilling to risk a solution that may be better (but could be worse). If we are to help those individuals with AN engage fully in their lives, then we may consider integrating mindfulness and acceptance strategies into current treatment models.

The model and predictions outlined above are largely speculative. While mindfulness-based strategies and associated intervention seem theoretically consistent with the deficits and related phenomenology of AN, the evidence base is weak. Such basic considerations as how best to identify and define values in those with AN remain unexplored. Further, within the complex packages that comprise behavioral interventions, the function and efficacy of specific techniques or value of particular philosophical approaches is unknown. The current paper attempts to better characterize the experience of AN to provide a conceptualization of symptom function so novel treatment development can be guided by this framework. Indeed, it is an exciting time for the development of novel interventions for AN. True to the mindful spirit, researchers need to select an approach and unbiasedly observe what unfolds.

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