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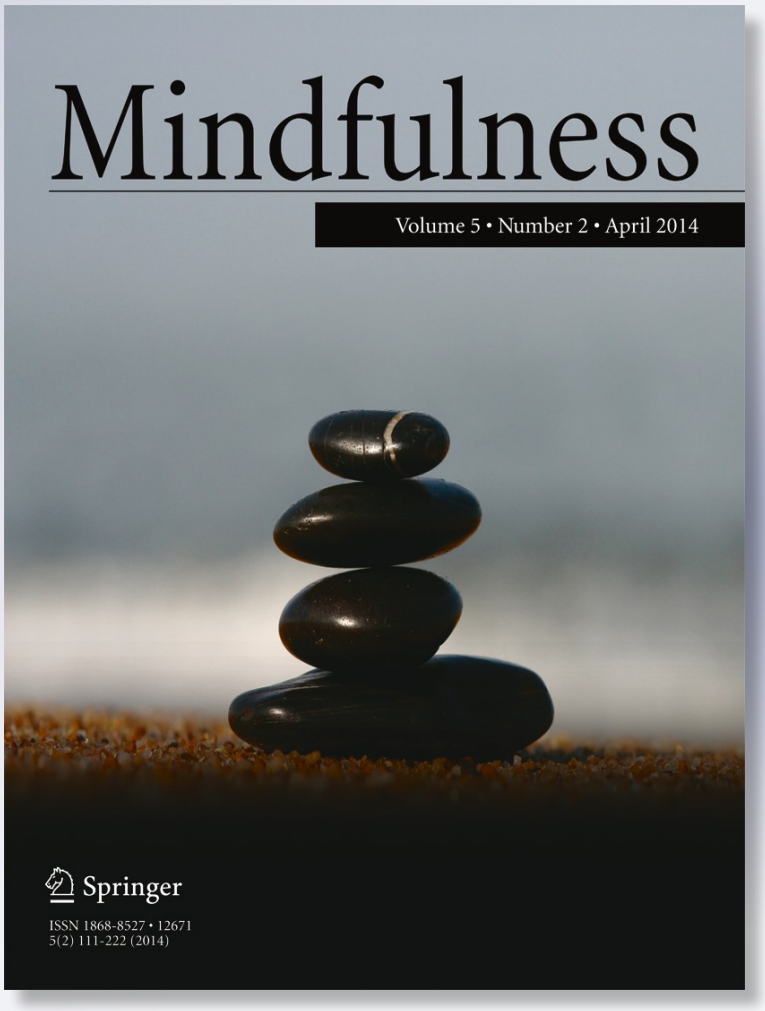

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ORIGINAL PAPER

Examining the Relationship Amongst Varieties of Interpersonal Valuing and Mindfulness Processes in Eating Pathology

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Abstract Despite the rising prevalence rates of eating disorders in today's society, few effective treatments exist. Recently, acceptance and mindfulness-based processes have begun to receive increasing attention. Acceptance and Commitment Therapy (ACT) is a cognitive behavioral treatment that promotes mindfulness-based processes in the context of personal values clarification and engagement. The addition of values to treatment protocols has yielded promising effects in several populations, but investigations of the role of values in eating behaviors are largely nonexistent. This study explored the relationship between valuing in interpersonal domains and aspects of mindfulness in the context of eating disorder symptomatology. Results indicate that both lack of success at living important interpersonal values and pliant valuing predict eating disorder symptoms and that pliant valuing predicts interpersonal problems. However, the relationship between pliance and both disordered eating and interpersonal problems disappears after aspects of mindfulness are added to the model. Implications for the use of ACT in the treatment of eating disorders are discussed.

Keywords Values · Mindfulness · Disordered eating · Acceptance and commitment therapy

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Introduction

Eating pathology is a mounting problem in modern society. Evidence suggests that increasing numbers of adolescents begin struggling with abnormal eating patterns between the ages of 10 and 19 years (Currin et al. 2005), and lifetime prevalence rates of eating disorders have risen in recent decades (Favaro et al. 2003; Hoek 2006). High rates of co-morbidity with other psychological problems (e.g., depression and anxiety disorders) suggest a steep inverse relationship between eating pathology and psychological well-being (Hudson et al. 2007). Unlike many psychological problems, however, medical complications for eating pathology can be extreme and fatal, particularly for those suffering with anorexia nervosa (Steinhausen 2002). Notwithstanding medical complications and high rates of co-morbidity, eating disorders can result in impaired functioning across cognitive, emotional, and interpersonal domains (Wilson et al. 2007).

There is an increasing body of evidence regarding the psychopathological mechanisms present in eating disorders and the appropriate clinical interventions to target these mechanisms; however, this literature is still in its infancy. Matching the clinical intervention to identified mechanisms may increase the effectiveness of treatment. One hypothesis regarding the mechanism of maladaptive eating patterns posits that they function as avoidance strategies that reflect an unwillingness to experience negative thoughts, feelings, and physiological sensations (Serpell et al. 1999; Slade 1982; Wildes et al. 2010), also known as experiential avoidance (EA; Hayes et al. 1996; Orsillo et al. 2004). A growing body of research indicates that high levels of EA are, indeed, correlated with greater eating disorder pathology (Masuda et al. 2011, 2010; Masuda and Wendell 2010).

Acceptance and Commitment Therapy (ACT; Hayes et al. 1999) is an acceptance-based behavioral treatment that belongs to the family of cognitive behavioral therapy and

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has demonstrated preliminary promise in undermining the maladaptive avoidant function of eating disorder thoughts and behaviors (Juarascio et al. 2010; Merwin et al. 2011). While there are six processes of clinical change used in the ACT model (acceptance, defusion, self-as-context, present moment awareness, values, and commitment), for simplicity and the purposes of this paper, only two of the primary components will be discussed: acceptance and values.

Acceptance is not only a key process in the ACT model but is also one of two components in mindfulness (purposeful, nonjudgmental, present moment awareness; Bishop et al. 2004). Thus, mindfulness incorporates both acceptance and awareness. Acceptance can be conceptualized as the opposite of experiential avoidance, namely, the willingness to experience distressing thoughts, feelings, and body sensations (Hayes et al. 1999). With regard to eating disorders, acceptance is actively being aware of and embracing one's internal experiences (i.e., thoughts, feelings, body sensations) without using disordered eating behaviors (i.e., restriction, bingeing, and purging) to reduce their frequency or alter their content. From an ACT perspective, increasing one's acceptance and awareness of (negative) internal experiences can promote behavior change and lead to an improved quality of life. Studies have suggested that mindfulness mediates the relationship between eating disorder-related cognitions and psychological distress (Masuda and Wendell 2010), and there is also evidence indicating that mindfulness and eating-related cognitions are inversely related (Lavender et al. 2011, 2009). Accordingly, mindfulness-based strategies have been shown to be effective in alleviating eating disorder symptomatology (Baer et al. 2005; Juarascio et al. 2010; Kristeller and Wolever 2010; Merwin et al. 2011; Palmer et al. 2003; Wildes et al. 2010). Within the literature on ACT and eating disorders, the majority of research on mindfulness and its relation to symptomatology and treatment has focused on the component of acceptance (Juarascio et al. 2010; Kristeller et al. 2006; Merwin et al. 2011), likely as a result of its conceptualization as the "opposite" avoidance, which is specifically targeted in the ACT model.

In addition to the acceptance aspect of mindfulness, a novel component of ACT that could contribute to improved treatment outcomes is a specific focus on individual values. Values are chosen life consequences linked to patterns of behavior that provide a sense of life meaning or purpose and coordinate behavior over long periods of time. Component analyses suggest that personal values guide and enhance the difficult nature of therapy (Kelly and Strupp 1992; Wilson and Murrell 2004), complement the therapeutic relationship (Wilson and Sandoz 2008), and are a promising process in psychotherapy (Wilson et al. 2010). Exploring and identifying personal values reduce defensiveness (Crocker et al. 2008) and prejudice (Lillis and Hayes 2007), improves diabetes and chronic pain management (Gregg et al. 2007; McCracken and Velleman 2010; McCracken and Vowles 2008), and buffers neuroendocrine and psychological stress responses (Creswell et al. 2005). Additionally, success at living values has been shown to mediate both symptom improvement and quality of life outcomes (Lundgren et al. 2008). Hence, helping individuals live more consistently with their stated values, or increasing their success at living important personal values, is an important part of ACT interventions broadly (e.g., Hayes et al. 1999) and may also be highly relevant for treating eating disorders. While there is little to no research on values and eating disorders, it is possible that values affirmations and increasing behaviors consistent with these chosen values can serve as generalized operants that aid the individual in making non-eating disordered decisions (e.g., Mulkerrin et al. 2011).

While simply increasing behavior that is in line with personal values is an important part of any ACT intervention, there is another aspect of values-consistent behavior that should be clarified. From an ACT perspective, the behavioral functions of values-consistent behaviors are important for coordinating behavior patterns; behavior under appetitive (approach) control is more likely to be sustained and be experienced as meaningful over extended periods of time. Behavior under aversive (avoidant) control will either contribute to suffering over the long-term or will be extinguished. Thus, poor outcomes and reduced likelihood of recovery may result from an increase in value-directed behavior *when* the value itself is under aversive control.

Ideally, values are chosen freely (appetitive control); however, it is possible for individuals to engage in apparent value-guided behaviors due to reinforcement of those behaviors within intimate relationships (such as family or friends) or by society, and these sources of governance may function as aversive. The process by which an individual engages in behavior on the basis of socially mediated consequences rather than directly experienced consequences is termed pliance (Barnes-Holmes et al. 2001). Pliance, therefore, refers to rule-following behavior that is reinforced by adherence to social rules and norms rather than the direct consequences of the behavior itself. Colloquially, the person is behaving because they are "supposed" to follow the rules and not because the behavior "works" for them. On the other hand, rule-governed behavior that is rewarding or reinforcing because it results in consequences specified by the rule is known as "tracking." In this case, a rule accurately predicts the direct consequences of behaving. For example, a person may be told that they should listen to a new musical group because the music is fun and catchy and listen to the new musical group and indeed find it fun and catchy. If the individual continues to listen to the group because the music is pleasing, their behavior would be said to be maintained by the consequence of behaving (listening to the group) and not

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any other consequence provided by the rule givers (such as approval or attention). Thus, two individuals can engage in a topographically identical behavior, but the function of each behavior may be different—the former in the example would function as tracking whereas the latter behavior would qualify as pliance. In other words, in one context, an appropriate social interaction may be maintained by a desire to avoid censure (pliance) whereas in another context an appropriate social interaction may be maintained by the natural outcomes of the interaction itself, such as life-enhancing engagement in interpersonal relationships (tracking). In the context of treatment for eating disorders, the patient is asked to eat regular meals. At the beginning of treatment, the patient could eat because she has been informed that regular meals are necessary and she wishes to avoid possible hospitalization or criticism from others (pliance) *or* she could eat because she notices that eating provides her with energy to do things she cares about (tracking). From this example, one can see how pliant behavior (eating to avoid hospitalization or criticism) may not lead to lasting change whereas tracking (eating because it is enables one to engage in value guided behavior) is more likely to lead to persistent behavior change.

As social beings, humans are deeply affected by the quality and nature of their interpersonal relationships; accordingly, both psychological well-being and physical health have been linked to strong, positive interpersonal relationships (Ryff and Singer 2000). An important means of maintaining healthy relationships is through interpersonal skills, specifically the ability to emit freely chosen (non-pliant) behaviors that are positively reinforced, and the ability to avoid behaving in ways that are punished (Libet and Lewinsohn 1973). Deficits in interpersonal skills have been linked to poorer psychological and physical health, including eating disorders (Zaitsoff et al. 2009). Furthermore, interpersonal deficits are increasingly being recognized as playing a large role in the etiology and maintenance of eating disorders (e.g., Zucker et al. 2007) and deficits in areas such as social isolation, social cognition, and higher levels of social anxiety in individuals with eating disorders often predict poorer outcomes (Goodwin and Fitzgibbon 2002). Thus, for those individuals who value interpersonal relationships, shaping their ability to behave in ways that elicit reinforcement from others could facilitate or maintain recovery.

While values are meant to encapsulate certain areas of life that result in increased vitality, meaning, and quality, seeking and maintaining interpersonal relationships can be difficult and lead to rejection, hurt, loss, and many other uncomfortable experiences common to the human experience. As such, even if values are stated as important, individuals may seek to avoid such uncomfortable experiences. Pliant valuing in interpersonal domains could, therefore, function as a means of experiential avoidance (Dahl et al. 2009) and decrease the likelihood of vitality and meaning in life.

Values have recently been assessed within ACT studies as both a clinical tool (Wilson et al. 2010) and a mediator of life satisfaction outcomes (Lundgren et al. 2008). However, empirical work examining the role of values (or problems with valuing) in psychopathology is still in its nascent stages, and no studies to date have examined the functional nature of values from an ACT perspective in eating behaviors. It is clear that interpersonal relationships are important for individuals with disordered eating and that those who tend to engage in experiential avoidance may struggle in the interpersonal arena as they may wish to avoid any negative interactions. Regular avoidance of interpersonal interactions that could be perceived as negative may also reduce the likelihood of individuals experiencing the reinforcing value of following the rules (tracking) and may interfere with their ability to engage in value-guided behavior. Thus, it is possible that individuals with eating disorders may be more susceptible to identifying their values as a function of pliance or avoidance in interpersonal domains as opposed to appetitive reasons.

Such a hypothesis suggests that the tendency to engage in pliant valuing could serve as a predictive or maintaining factor for eating disorders, particularly for those who are also low in acceptance. Those who are low in acceptance are likely not able to tolerate any unpleasant experiences in interpersonal areas and are more likely to engage in pliant behavior that will be reinforced by others (e.g., going out to a restaurant with friends simply because she would feel like a bad friend). Examined another way, if individuals are high in acceptance and mindfulness processes, they may be better able to track the direct consequences of behaviors linked to interpersonal values (e.g., going out to a restaurant with friends and noticing the positive experience of being with friends). The following study is intended to be a first step in exploring the relationship between pliant valuing and eating disorder symptomatology. It is expected that greater pliance will be associated with greater eating disorder symptomatology. As pliant valuing in interpersonal domains could be a form of experiential avoidance, it is essential to determine if an individual's level of mindfulness (i.e., less avoidant) also accounts for variance in eating disorder symptomatology. It is expected that pliance will account for unique variance in eating disorder symptomatology after accounting for levels of mindfulness.

Method

Participants

Participants were students recruited from a large, suburban university on the West Coast. The sample elected to complete the assessments online to receive credit in psychology courses.

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Participants were 62 (56.4.6 %) women and 48 (43.6 %) men between the ages of 18 and 44 years, with an average age of 20.62 (SD=3.1876)years; 95.5 % of the sample was single. Ethnicity within the sample varied with 59.1 % Caucasian, 10.9 % Hispanic, 7.3 % Asian, 3.6 % Pacific Islander, 1.8 % African American, and 0.9 % Native American; 10.0 % identified as "Other", and 6.4 % of participants chose not to indicate their ethnicity. The average body mass index (BMI) was 24.01 (SD=5.04)kgm^2 with a range of 16.84–44.85 kgm^2. A BMI of 18.4 kgm^2 and below is considered underweight; BMI between 18.5–25.0 kgm^2 is normal weight; 25.1–30.0 kgm^2 is overweight, and a BMI above 30 kgm^2 is considered obese. Participants were primarily of normal weight (n=69, 62.7 %), with 14.5 % overweight (n=16), 10.0 % obese, and 2.7 % underweight (n=3). Eleven participants opted not to provide weight and/or height data (10.0 %).

Materials

Demographic Information Participants were asked to provide information on their gender, race, age, education status, and self-reported height and weight.

Acceptance and Action Questionnaire The Acceptance and Action Questionnaire (AAQ) is a questionnaire that measures the construct of experiential avoidance or the unwillingness to experience undesirable or difficult thoughts and feelings (Hayes et al. 2004). It is a nine-item self-report measure that requires participants to rate their thoughts on a seven-point Likert scale, ranging from "never true" to "always true," with higher scores indicating higher levels of experiential avoidance. It has been used extensively in psychotherapy process research and has been shown to be both a mediator and moderator of outcome; the scale exhibits good internal consistency and adequate criterion, convergent, and predictive validity (Hayes et al. 2004). Cronbach's alpha for the current study was 0.53. Given the low internal consistency of the AAQ in this sample, it was not used in analyses.

Eating Disorder Inventory-3 The Eating Disorder Inventory-3 (EDI-3) (Garner 2004) is one of the most common measures of eating disorder behavior, thoughts, and feelings; it has been shown to have strong internal consistency, test–retest reliability, and convergent validity (Cumella 2006). The EDI-3 has 91 items, including three symptom specific subscales (Drive for Thinness, Bulimia, and Body Dissatisfaction) and nine subscales assessing personality patterns commonly found in those with eating disorders. In addition to the symptom-specific subscales, the subscales of interest for this study were Personal Alienation (feeling alone and empty as well as a lack of emotional self-understanding), Interpersonal Insecurity (difficulties effectively engaging in social situations, tendencies to avoid other people, and difficulty in expressing thoughts and feelings), and Interpersonal Alienation (feeling as if there is a lack of trust and understanding in relationships as well as feeling disappointed in relationships). Cronbach's alphas for the scales of interest (Drive for Thinness, Bulimia, Body Dissatisfaction, Personal Alienation, Interpersonal Insecurity, and Interpersonal Alienation) were 0.92, 0.88, 0.91, 0.83, 0.80, and 0.80, respectively.

Kentucky Inventory of Mindfulness Scale This 39-item scale measures a multifaceted construct of mindfulness. The Kentucky Inventory of Mindfulness Scale (KIMS) (Baer et al. 2004) was developed to be a valid measure of different aspects of mindfulness in daily life and to be valid for individuals who do not engage in meditation or other mindfulness practices. In addition to the constructs of awareness and acceptance, the KIMS assesses an individual's ability to measure labelling experience and acting mindfully. Thus, the KIMS has four subscales, each reflecting a different aspect of mindfulness: Observe (noticing and being aware of internal and external phenomena), Describe (labelling what is observed in a non-judgmental way), Act with Awareness (full engagement in chosen activities), and Accept without Judgment (to allow experiences to be what they are without trying to change or escape from them). Cronbach's alphas in this study were 0.81, 0.89, 0.77, and 0.86 for each subscale, respectively.

Personal Values Questionnaire The Personal Values Questionnaire (PVQ) measure (Blackledge and Ciarrochi 2006) assesses nine valued domains—family, social and romantic relationships, career, education/personal development, recreation/leisure, spirituality/religion, community, and health/well-being. The ACT perspective on valuing in particular life domains fits well with the goal-striving literature (e.g., Sheldon and Kasser 1995), which indicates that individuals who pursue goals for avoidance reasons tend to have poorer psychological and physical health outcomes than those who pursue goals for appetitive reasons. The importance of each value and effectiveness in moving toward it is assessed across each valued domain, as well as the reason participants have endorsed each particular value (e.g., pliance, experiential avoidance, or appetitive reasons such as vitality and enjoyment). Specifically, for each of the nine valued domains included in the PVQ, respondents are asked to report on the reasons for valuing in each domain (pliance, avoidance, appetitive reasons), the importance of each domain, successful living in that domain in the last 30 days, and desire to increase behaviors consistent with that value.

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For this study, we focused on two portions of the PVQ: pliance (pliant reasons for valuing) and participants' report of success at living consistent with that value. We included success at living interpersonal values in our analyses because success at living chosen values (including interpersonal relationships) has been shown to mediate life satisfaction outcomes in clinical samples (Lundgren et al. 2008). Composite variables were created by summing participant's scores across the three interpersonal relationship domains (family, social, and romantic relationships) for both pliant reasoning and success at living consistent with that value. These interpersonal composite variables were created because research indicates that individuals with disordered eating behaviors tend to have significant difficulties in interpersonal relationships (Björck et al. 2003; Jackson et al. 2005).

The three interpersonal domains were rated as highly important by the participants in the current study (4="very important"; family relations M=4.34, SD=0.76; social relations M=4.35, SD=0.74; romantic relations M=4.32, SD=0.93). Therefore, how successful participants were at living these important values was viewed as a useful predictor variable for eating disordered behavior and interpersonal relationship variables. Cronbach's alpha for pliant valuing across all domains in this study was 0.89. Consistency for pliant valuing in the three interpersonal domains alone (i.e., intimate, social, family) was 0.78. Finally, consistency for success at living a valued life on the three domains was 0.61. While the alpha for success is somewhat low across interpersonal domains, we included success as a variable in our analyses as it is an important variable from an ACT perspective.

Data Analytic Strategy

In order to assess the appropriateness of the data for analysis, we calculated frequencies and examined histograms, calculated skewness and kurtosis, assessed outliers, and determined overall fit with assumptions of the general linear model for the variables used in the analyses (Tabachnick and Fidell 2007). Less than 10 % of data were missing, and missing data were replaced using mean substitution for all variables used in the analysis (Shrive et al. 2006) with the exception of the values variables (as each question about values assesses a different construct, mean substitution was not appropriate).

In order to explore the impact of both success at living interpersonal values and pliant value reasoning on disordered eating, a series of hierarchical regressions was conducted. For these analyses, gender was entered into the first step as eating disorder symptomatology may differ across gender and because the EDI is not typically administered to men. Success and pliance in interpersonal relationships were entered in the second step, and all of the subscales of the KIMS were entered simultaneously in the third step. Although the "Accept without Judgment" and "Awareness" subscales of the KIMS were of greatest interest, we opted to include all subscales into the model as different aspects of mindfulness may be differentially related to both pliance and eating disorder symptomatology. As pliance can function as experiential avoidance, we wanted to determine how much of the variance in eating disorder symptomatology could be accounted for by mindfulness.

The impact of pliance on distress in interpersonal relationships was explored using the same method. Due to the fact that dependent variables measured lack of success in interpersonal relationships, success at living interpersonal variables was not included as an independent variable. Furthermore, as there was no reason to assume differences between males and females on the interpersonal dependent variables, gender was not included as an independent variable. Thus, for the second set of analyses, pliance in interpersonal relationships was entered as the first step, and the subscales of the KIMS were entered as the second step.

Results

Means and standard deviations for women, men, and the entire sample on all variables are reported in Table 1. Bivariate correlations between all independent and dependent variables are provided in Table 2.

Table 1 Means and standard deviations for men (N=48) and women (N=62) and the entire sample

Variable	Men M (SD)	Women M (SD)	Total sample M (SD)
EDI-Bul	5.94 (6.25)	6.64 (7.24)	6.34 (6.81)
EDI-DT	6.96 (6.92)	12.68 (8.31)	10.19 (8.21)
EDI-BD	9.84 (8.47)	19.31 (11.01)	15.18 (11.00)
EDI-IA	7.31 (4.89)	7.87 (5.64)	7.63 (5.31)
EDI-II	8.34 (5.86)	7.73 (5.73)	7.99 (5.79)
EDI-PA	6.46 (5.01)	6.24 (5.38)	6.33 (5.20)
KIMS-total	124.38 (15.11)	124.47 (12.79)	124.43 (13.78)
KIMS-O	39.22 (7.17)	39.29 (6.54)	39.27 (6.79)
KIMS-A	29.06 (6.33)	28.64 (4.75)	28.82 (5.47)
KIMS-D	27.48 (6.86)	27.53 (5.61)	27.51 (6.16)
KIMS-Acc	28.73 (6.68)	29.01 (6.57)	28.83 (6.25)

Equal variances not assumed

EDI-Bul EDI Bulimia subscale, *EDI-DT* EDI Drive for Thinness subscale, *EDI-BD* EDI Body Dissatisfaction subscale, *EDI-IA* EDI Interoceptive Awareness subscale, *EDI-II* EDI Interpersonal Insecurity subscale, *EDI-PA* EDI Personal Alienation subscale, *KIMS-total* KIMS total score, *KIMS-O* KIMS Observe subscale, *KIMS-A* KIMS Act with Awareness subscale, *KIMS-D* KIMS Describe subscale, *KIMS-Acc* KIMS Accept without Judgment subscale

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Table 2 Correlations between all variables

Variable	BMI	Success	Pliance	EDI-DT	EDI-Bul	EDI-BD	EDI-PA	EDI-IA	EDI-II	KIMS-O	KIMS-D	KIMS-A	KIMS-Acc	KIMS-Total
BMI	1	−0.12	0.04	0.19	0.06	0.45**	0.17	−0.03	−0.03	−0.08	0.05	0.24	−0.13	0.003
Success	0.25	1	−0.21	−0.22	−0.16	−0.18	−0.44**	−0.45**	−0.36**	−0.10	0.26*	0.22	0.32*	0.42**
Pliance	−0.03	−0.15	1	0.15	0.12	0.14	0.35**	0.25*	0.37**	−0.13	−0.35**	−0.18	−0.39**	−0.35**
EDI-DT	0.22	−0.24	0.27	1	0.63**	0.77**	0.56**	0.31*	0.25	0.21	−0.09	−0.24	−0.55**	−0.30*
EDI-Bul	0.23	−0.14	0.40**	0.58**	1	0.49**	0.40**	0.23	0.29*	0.14	−0.18	−0.11	−0.39**	−0.24
EDI-BD	0.20	−0.31**	0.36*	0.77**	0.74**	1	0.53**	0.33**	0.20	0.08	−0.04	−0.12	−0.43**	−0.24
EDI-PA	−0.23	−0.43**	0.39**	0.23	0.52**	0.44**	1	0.76**	0.62*	0.02	−0.35**	−0.41**	−0.61**	−0.61**
EDI-IA	−0.18	−0.29*	0.22	0.18	0.30*	0.33*	0.67**	1	0.57**	0.10	−0.16	−0.35**	−0.49	−0.40**
EDI-II	−0.09	0.29*	−0.26	0.09	0.29*	0.34*	0.55**	0.58**	1	−0.08	−0.67**	−0.19	−0.36**	−0.59**
KIMS-O	−0.10	0.06	−0.05	0.09	−0.11	−0.21	−0.27	−0.03	−0.55**	1	0.32*	−0.10	−0.39**	0.41
KIMS-D	−0.18	0.08	−0.32*	−0.18	−0.38**	−0.43**	−0.46**	−0.22	−0.77**	0.59**	1	0.22	0.12	0.75
KIMS-A	−0.05	0.16	−0.25	−0.37**	−0.47**	−0.47**	−0.38**	−0.22	−0.22	0.05	0.27	1	0.31	0.58**
KIMS-Acc	0.31*	0.06	−0.08	0.03	−0.12	−0.01	−0.34*	−0.26	0.09	−0.19	−0.25	0.07	1	0.48**
KIMS-total	−0.03	0.16	−0.30*	−0.18	−0.47**	−0.49**	−0.63**	−0.38**	0.67**	0.69**	0.75**	0.59**	0.21	1

The table is divided by gender with correlations for women on the top and men on the bottom

EDI-Bul EDI Bulimia subscale, *EDI-DT* EDI Drive for Thinness subscale, *EDI-BD* EDI Body Dissatisfaction subscale, *EDI-IA* EDI Interoceptive Awareness subscale, *EDI-II* EDI Interpersonal Insecurity subscale, *EDI-PA* EDI Personal Alienation subscale, *KIMS-total* KIMS total score, *KIMS-O* KIMS Observe subscale, *KIMS-A* KIMS Act with Awareness subscale, *KIMS-D* KIMS Describe subscale, *KIMS-Acc* KIMS Accept without Judgment subscale

*$p<0.05$ and **$p<0.01$

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Eating Disorder Symptomatology In order to explore the impact of success and pliance in interpersonal relationships on disordered eating, a series of hierarchical regressions was conducted. See Table 3 for a summary of results. In the first regression, Drive for Thinness was the outcome. Gender was a significant predictor (R^2=0.12, F(1, 107)=15.11, p< 0.01), with women having greater drive for thinness than men (t=−3.89, $p\leq$0.01). Adding success and pliance in the second step significantly increased the predictive ability of the model [R^2_Δ=0.07, F_Δ (2, 105)=4.21, p=0.02; R^2=0.19, F(3, 105)=8.14, p<0.01], with gender (t=−4.23, $p\leq$0.01) and success in interpersonal relationships (t=−2.01, p< 0.05) the only significant predictors. Adding the subscales of the KIMS significantly changed the model (R^2_Δ=0.12, F_Δ (4, 101)=4.38, p<0.01); along with gender (t=−4.33, $p\leq$0.01), Accepting without Judgment (t=2.44, $p\leq$0.02) and Act with Awareness (t=−2.03, p<0.05) subscales were both significant predictors (R^2=0.31, F(7, 101)=6.46, p< 0.01). Thus, less acceptance and awareness were associated with increased drive for thinness.

Gender did not significantly predict scores on the Bulimia subscale of the EDI-3 (R^2=0.002, F(1, 107)= 0.10, p=0.70); however, the addition of success in interpersonal relationships and pliance to the equation significantly increased its predictive power [R^2_Δ=0.07, F_Δ (2, 105)= 3.79, p=0.03]. Although the model itself was not significant [R^2=0.07, F(3, 105)=2.60, p=0.056], both success and pliance in interpersonal relationships were examined. Success was not a significant predictor, but pliance was (t=2.26, p<0.03). When the subscales of the KIMS were added in the third step [R^2_Δ=0.12, F_Δ (4, 101)=3.62, p< 0.01], pliance was no longer a significant predictor (p= 0.56). The third model was significant (R^2=0.19, F(7, 101)=3.29, p<0.01), with both Describe (t=−2.19, p= 0.03) and Accept without Judgment (t=−2.20, p=0.03) significant predictors of bulimic symptomatology.

Finally, when investigating the impact of the independent variables on Body Dissatisfaction, gender was a significant predictor (R^2=0.18, F(1, 107)=23.59, p<0.01), with women having greater dissatisfaction than men (t=−4.86, p< 0.01). Adding success and pliant valuing to the model significantly increased its predictive ability [R^2=0.2, F(3, 105)=11.68, p<0.01; R^2_Δ=0.07, F_Δ (2, 105)=4.87, p= 0.01]; gender (t=−5.29, p<0.01), success in interpersonal relationships (t=−1.98, p=0.05), and pliance (t=2.02, p< 0.05) were all significant predictors. When the subscales of the KIMS were entered into the equation, the predictive ability of the model increased (R^2_Δ=0.07, F_Δ (4, 101)= 2.55, p=0.04); yet success in interpersonal relationships was no longer a significant predictor (p=0.27) nor was pliance (p=0.42). In the final model, only gender (t= −5.34, p<0.01) and Accepting without Judgment (t= −2.26, p<0.03) were significant predictors of greater Body Dissatisfaction (R^2=0.32, F(7, 101)=6.76, p<0.01).

Interpersonal Relationships In order to explore the impact of pliance on distress in interpersonal relationships, a second series of hierarchical regressions was conducted. See Table 4 for a summary of results. In the first regression, Interpersonal Insecurity was the outcome. Pliance significantly predicted insecurity (R^2=0.10, F(1, 108)=12.39, p< 0.01, β=0.32, $p\leq$0.01); however, once the subscales of the KIMS were added in the second step, these relationships disappeared [F_Δ(4, 104)=27.28, $p\leq$0.01]. The only significant predictors of Interpersonal Insecurity [(R^2=0.56, F(5, 104)=26.71, p<0.01] were the Describe subscale of the

Table 3 Summary of hierarchical regression analyses for the eating disorder symptom variables as dependent variables

Variable	Drive for thinness			Bulimia			Body dissatisfaction		
	B	SE *B*	Beta	*B*	SE *B*	Beta	*B*	SE *B*	Beta
Step 1									
Gender	−5.82	1.50	−0.35	−0.57	1.31	−0.04	−9.39	1.93	−0.43
Step 2									
Gender	−6.19	1.46	−0.37	−0.93	1.29	−0.07	−9.93	1.88	−0.45
Success	−0.53	0.26	−0.18	−0.26	0.23	−0.11	−0.67	0.34	−0.17
Pliance	0.56	0.33	0.15	0.66	0.29	0.22	0.86	0.43	0.17
Step 3									
Gender	−5.97	1.38	−0.36	−0.75	1.23	−0.06	−9.76	1.83	−0.44
Success	−0.32	0.26	−0.11	−0.07	0.23	−0.03	−0.38	0.34	−0.10
Pliance	0.07	0.35	0.02	0.18	0.31	0.06	0.37	0.46	0.08
KIMS-O	0.16	0.12	0.13	0.85	0.11	0.09	−0.08	0.16	−0.05
KIMS-DA	−0.17	0.14	−0.13	−0.27	0.12	−0.25	−0.16	0.18	−0.09
KIMS-AD	−0.27	0.13	−0.18	−0.17	0.12	−0.14	−0.29	0.18	−0.14
KIMS-Acc	−0.30	0.12	−0.23	−0.24	0.11	−0.22	−0.37	0.16	−0.21

KIMS-O KIMS Observe subscale, *KIMS-A* KIMS Act with Awareness subscale, *KIMS-D* KIMS Describe subscale, *KIMS-Acc* KIMS Accept without Judgment subscale

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Table 4 Summary of hierarchical regression analyses for the interpersonal variables as dependent variables

Variable	Interpersonal insecurities			Interpersonal alienation			Personal alienation		
	B	SE *B*	Beta	***B***	SE *B*	Beta	***B***	SE *B*	Beta
Step 1									
Pliance	0.83	0.24	0.32	0.55	0.22	0.23	0.86	0.21	0.37
Step 2									
Pliance	0.11	0.19	0.04	0.06	0.23	0.03	0.27	0.18	0.12
KIMS-O	−0.04	0.07	−0.05	0.03	0.08	0.03	−0.11	0.06	−0.14
KIMS-DA	−0.65	0.08	−0.70	−0.20	0.09	−0.24	−0.23	0.07	−0.27
KIMS-AD	0.02	0.07	0.02	−0.15	0.09	−0.15	−0.20	0.07	−0.21
KIMS-Acc	−0.20	0.07	−0.21	−0.31	0.08	−0.36	−0.41	0.06	−0.49

KIMS-O KIMS Observe subscale, *KIMS-A* KIMS Act with Awareness subscale, *KIMS-D* KIMS Describe subscale, *KIMS-Acc* KIMS Accept without Judgment subscale

KIMS (t=−8.58, p<0.01) and the Accept without Judgment subscale of the KIMS (t=−3.00, p≤0.01), indicating that less acceptance (without judgment) and decreased ability to describe emotions contributed to higher Interpersonal Insecurity.

Similarly, pliance (t=2.44, p<0.02) initially predicted interpersonal alienation [R^2=0.05, F(1, 108)=5.96, p=0.02, β=0.23, p=0.02]; however, it no longer accounted for any variance once the subscales of the KIMS was entered into the equation [F_{Δ}(4, 104)=7.04, p<0.01]. As with the Interpersonal Insecurity subscale, decreased ability to describe emotions (t=−2.22, p≤0.03) and decreased ability to accept experiences without judgment (t=−3.92, p<0.01) predicted higher degrees of interpersonal alienation [(R^2=0.25, F(5, 104)=7.09, p<0.01].

With Personal Alienation, a slightly different picture emerged. Once again pliance (t=4.10, p<0.01) was significant in the first step (R^2=0.13, F(1, 108)=16.77, p<0.01, β=0.37, p<0.01), and its impact disappeared in the second step [F_{Δ}(4, 104)=18.51, p<0.01]. The model remained significant [(R^2=0.36, F(5, 104)=20.33, p<0.01], with Describe (t=−3.06, p<0.01), Act with Awareness (t=−2.81, p<0.01), and Accept without Judgment (t=−6.44, p<0.01) being all significant predictors of Personal Alienation. Once again, lower scores on these subscales were associated with greater Personal Alienation.

Given that the Accept without Judgment subscale appeared to account for the largest amount of variance in all three dependent variables, a series of post hoc moderation analyses were conducted in order to determine whether levels of acceptance could moderate the impact of pliance on interpersonal difficulties. In order to do this, the independent variable (Pliance) and hypothesized moderator (Accept without Judgment) were both centered. The SIMPLE program for interactions in regression (O'Connor 1998) was then used to calculate the interaction and probe any interaction one standard deviation above and below the mean. All three moderation analyses were significant. For Interpersonal Insecurity, the interaction was significant [F(1, 106)=4.01, p=0.05) specifically at one standard deviation above the mean (t(106)=3.67, p<0.01). The same was true for Interpersonal Alienation [F(1, 106)=5.29, p=0.02), with one standard deviation above the mean (t(106)=2.70), p<0.01], and Personal Alienation F(1, 106)=6.94, p=0.01), one standard deviation above the mean (t(106)=4.10), p<0.01]. The interactions are depicted in Figs. 1, 2, and 3.

Discussion

This study examined the relationship between disordered eating, interpersonal values, and mindfulness. The first set of analyses investigated success at living interpersonal values, pliant rationale for valuing interpersonal relationships, and lack of present moment awareness as potential factors contributing to three measures of eating disorder symptomatology: Drive for Thinness, Bulimia, and Body Dissatisfaction. Success in interpersonal relationships and Pliance both predicted Drive for Thinness, a measure of an individual's desire to achieve or maintain the "thin ideal," and body dissatisfaction, the degree to which an individual reports not being satisfied with their weight and shape. The significant effect of success and pliance on these two eating disordered subscales was lost in the second step of the analysis when the KIMS subscale, "Accept without Judgment," was added to the model. "Accept without Judgment" predicted the dependent variables, suggesting that the less acceptance of one's internal experience that an individual has, the higher their drive for thinness and body dissatisfaction. A slightly different story emerged with the Bulimia scale, a measure of an individual's desire or need to binge and/or purge. Pliance predicted Bulimia scores; however, success at living according to one's values did not. Furthermore, the "Describe" (i.e., how well an individual can articulate, without judgment, what they are thinking or feeling) and "Accept without Judgment" merely approached significance for the Bulimia scale.

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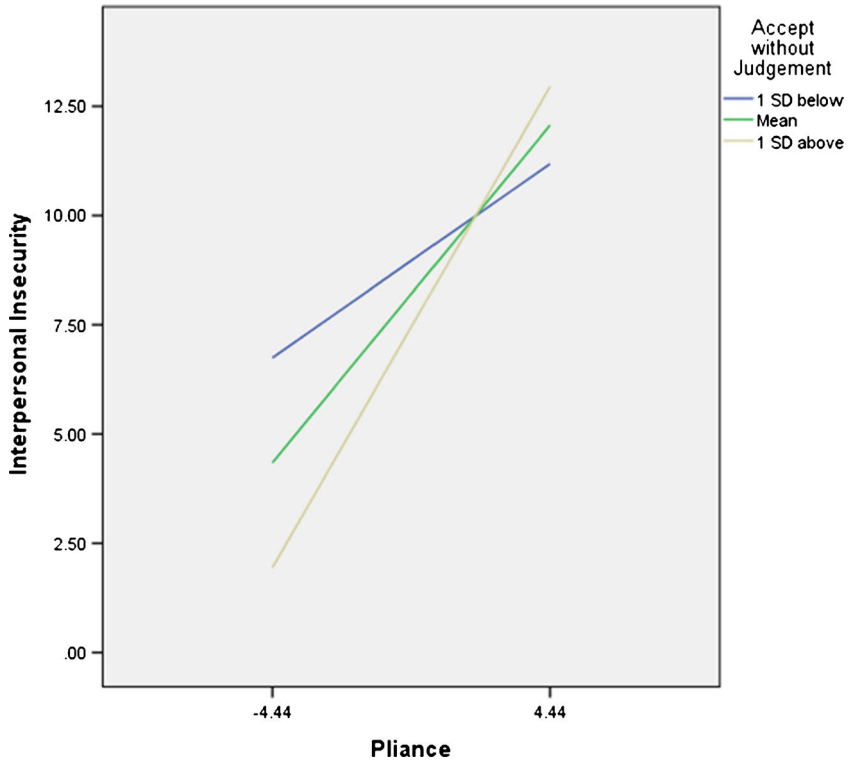

Fig. 1 Graphical depiction of post hoc moderation analysis with Interpersonal Insecurity as the DV. The moderator (Accept without Judgement) is shown at 1 SD above and below the mean, and the IV (Pliance) is plotted at 2 SD above and below the mean

While more research is needed to extrapolate findings related to the effects of success at valued living and pliant valuing on eating disorder symptomatology, this study indicates that a lack of acceptance of internal experiences (without judging the "rightness" or "wrongness" of them) is associated with eating disorder symptomatology, particularly drive for thinness and body dissatisfaction. That lack of acceptance did not predict bulimia symptoms is not unusual and may be due to a lack of consistent conceptualization of the function of a binge that is reflected in the questions in the Bulimia subscale of the EDI (Merwin et al. 2010). The role of non-acceptance in predicting more

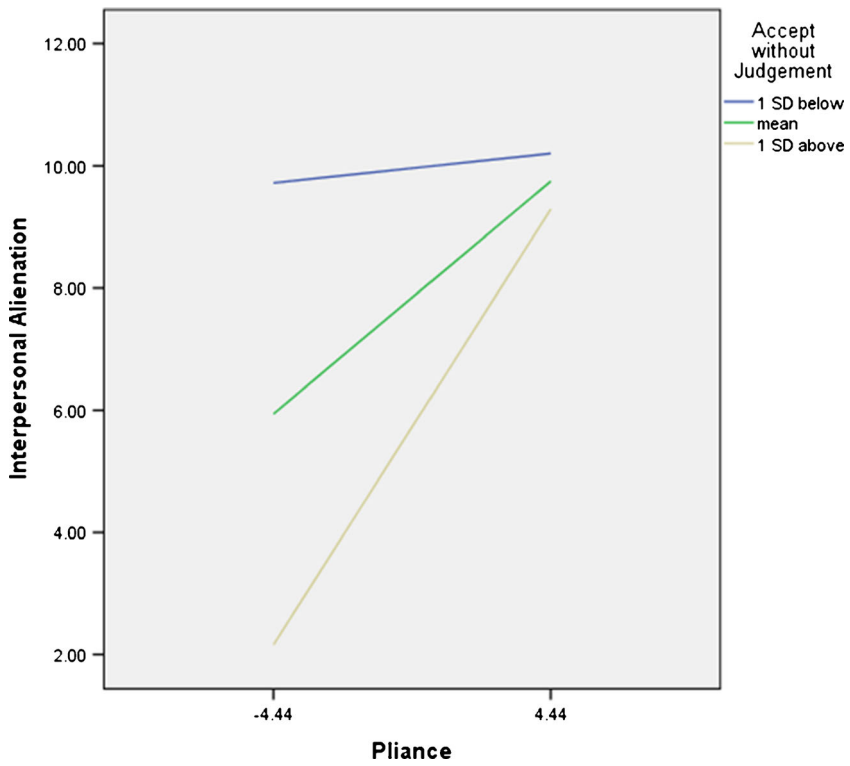

Fig. 2 Graphical depiction of post hoc moderation analysis with Interpersonal Alienation as the DV. The moderator (Accept without Judgement) is shown at 1 SD above and below the mean, and the IV (Pliance) is plotted at 2 SD above and below the mean

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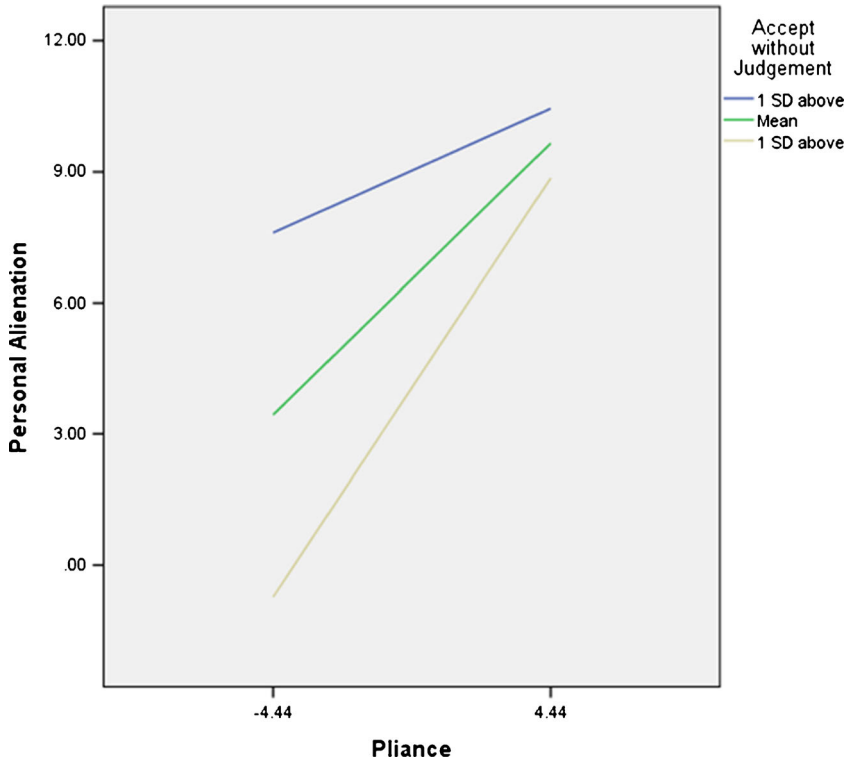

Fig. 3 Graphical depiction of post hoc moderation analysis with Personal Alienation as the DV. The moderator (Accept without Judgement) is shown at 1 SD above and below the mean, and the IV (Pliance) is plotted at 2 SD above and below the mean

restrictive eating disorder symptoms provides evidence for a link between dysfunctional eating patterns and experiential avoidance, particularly in light of the non-clinical nature of this sample. In short, the less an individual is willing to experience distressing thoughts, feelings, and body sensations, the more likely they are to develop an inflexible eating repertoire. Given that any predictive ability of pliance disappeared once non-acceptance was entered into the model indicates that pliance may, indeed, reflect some degree of avoidance as hypothesized.

The second set of analyses examined pliant rationale for Valuing Interpersonal Relationships and Lack of Mindful Awareness as potential factors contributing to three interpersonal domains related to eating disorders: Personal Alienation (experience of aloneness and emptiness, lack of self-understanding), Interpersonal Insecurity (difficulties engaging with others and expressing oneself, avoidance of social interactions), and Interpersonal Alienation (lack of trust/understanding in relationships). Pliance predicted all three dependent variables; however, similar to the measures of eating disorder symptomatology, the predictive ability of pliance disappeared in the second step of the analysis when the KIMS subscales, "Accept without Judgment" and "Describe" were added. Personal Alienation was also predicted by the "Act with Awareness" subscale of the KIMS. It seems as if the more one observes and can label experiences in interactions with others and is more accepting of these experiences, the less likely individuals' behavior will characterized by pliance.

The relationship between Pliant Valuing and Accepting Internal Experience in interpersonal domains is further highlighted by the post hoc moderation analyses. Consistent with an ACT perspective, the data indicate that, when acceptance is high and pliance is low, individuals report the least difficulties with interpersonal relationships; when both acceptance and pliance are high, difficulties in the interpersonal domains tend to increase. This is particularly true for Interpersonal Insecurity. As Interpersonal Insecurity measures discomfort with others as opposed to difficulties with one's self in interpersonal situations, pliance in valuing may be more relevant for those high in Interpersonal Insecurity as they are more likely to behave in line with what they believe others will think is appropriate or right. Given that Interpersonal and Personal Alienation speak more to one's own experience of self in a social interaction, acceptance of internal experiences may be more important in predicting difficulties than interpersonal values. Thus, the results provide a window into a new area to consider in the treatment of eating disorders, namely assessing valued domains and helping individuals move away from pliant valuing.

The results of this study point to an interesting association between mindfulness, values, and disordered eating. When individuals are less accepting of their internal experiences, they tend to report pliant values, which by definition are highly focused on perceptions of how to please others. A hypothesized model leading from pliant valuing to difficulties in interpersonal interactions (including Interpersonal Alienation, Interpersonal Insecurity, and Personal Alienation) is one in which individuals

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never learn to identify the features of interpersonal relationships that are more appetitive and effective for the individual. If an individual is overly attuned to doing only what he or she thinks others want, and that individual is also not willing to experience some internal discomfort, it appears that the person may consequently behave in ways that paradoxically lead to increased interpersonal difficulties. These increased interpersonal difficulties may, in turn, serve as a diathesis for maladaptive behavior (such as dysregulated eating). This hypothesized model needs to be more directly explored in future research.

There are many clinically relevant factors that may affect the success with which an individual with an eating disorder engages in valued activity. The values targeted in this study were in the interpersonal domain; individuals who are emotionally distressed, fearful of rejection, or whose behavior is under other form(s) of aversive control may not behave in ways consistent with chosen values. Perhaps the more an individual's interpersonal values are under the control of pliance, the less successful they are at living those values. It is also possible that the degree to which one engages in behavior that is inconsistent with values predicts other forms of functioning (e.g., quality of life or eating disordered behavior). As the data suggest that pliant valuing may lead to poor interpersonal outcomes, assessing and targeting reductions in pliant valuing via mindfulness training could be a useful clinical target for individuals with eating disordered behavior patterns and warrants further exploration, particularly in a clinical sample.

It is important to remember that this study is preliminary and, as such, has some important limitations. First, this study was cross-sectional, and all data were collected via self-report from a non-clinical population, rather than employing more objective means of measurement for any of the variables. As such, causality cannot be determined. Furthermore, the values measure utilized in this study is still under development, and while it is theoretically consistent with an ACT model of values, the best method to assess these aspects of values is still unclear. Examination of the relationship amongst values, mindfulness, and symptoms of dysregulated eating should be explored using other measures of values in order to ensure that the findings reported here are consistent across variable measures of values. Overall, the measurement of values is in need of further refinement and study. The sample in this study included both men and women. While most individuals who suffer with eating pathology tend to be women, men do struggle with eating problems to a lesser extent. Future studies utilizing a large sample size may enable researchers to better parse meaningful gender effects. Finally, to better understand the lasting role of valuing and acceptance of internal experiences in important interpersonal functioning within eating disorders populations, longitudinal and experimental methods will need to be employed.

Despite these limitations, the data indicate that there may be important facets to assessing and treating eating pathology that, to date, have been overlooked. Increasing different aspects of mindfulness (in particular acceptance) while simultaneously decreasing pliance could yield promising outcomes. Increasing behavior to be consistent with important chosen values can provide motivation and incentive for engaging in uncomfortable acceptance and mindfulness processes and can facilitate the activation of feared or avoided (yet valued) behaviors. Given the potential negative effects of lack of successful valued living and that valuing under the control of pliance has on interpersonal relationships in individuals with eating disorders, assessing the function of values statements is increasingly significant in this population and should be explored.

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